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COAL AGE

With Which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND
COAL MARKETING

EXTRACTION METHODS, EQUIPMENT AND MINING NEWS
MARKET REPORTS, PRICES AND STATISTICS
OF THE COAL INDUSTRY

ISSUED WEEKLY

VOLUME XXIV

July 1 to December 31, 1923

McGRAW-HILL COMPANY, INC.

10th AVE. AT 36th ST. B

NEW YORK

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COAL

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, JULY 5, 1923

Number 1

Not a Strange Decision

REFUSAL by the Interstate Commerce Commission of permission to the Virginian Railway Co. to extend its line across the Guyan River in West Virginia to serve a projected new mine of the Pocahontas Coal Co. throws into the spotlight the question of overdevelopment of the bituminous-coal industry. The transportation Act of 1920 conferred on the commission the power and responsibility of granting or refusing the right to build new railroads or extend old ones, having due regard to present and future public necessity and convenience. In this decision the commission is plainly acting within its powers and is doing that which the law anticipated and provided.

The commission found that the Virginian has not been able to give the full measure of service to the coal mines already on its lines and that the addition of another, as would be permitted by the building of this extension, would not increase the supply of coal produced and carried to market, that it would in fact serve only to dilute the service now possible to mines already existent. Unless the carrier should subsequently add materially to its road equipment, it would decrease rather than increase its revenues by reason of having this new mine to serve. The coal company alone stood to benefit.

Even if the carrier should increase its facilities and thereby make it possible for the new mine to market more coal, the necessity does not exist, in the opinion of the commission, for it says: "There are at present more mines in the country than is consistent with the most efficient use of carriers' equipment, and their aggregate capacity exceeds greatly the country's demand." Thus it appears that the refusal is predicated on two points, one the present fact of more mines on the Virginian than that road may adequately serve and the other that whether or not that be true, there are already too many soft-coal mines in the country for the carriers as a whole to serve properly.

On the second point the commission is not on sound ground; the premise is too general. The general condition of overdevelopment of the bituminous-coal industry cannot reasonably be held to prejudice a local situation. It is easily conceivable that public necessity and convenience might dictate the advisability of further mine development in a particular location. What would have been the decision of the Interstate Commerce Commission in this instance had the coal company shown that it could market the additional coal and the railroad that it could carry it to market? Would the fact that, the country taken as a whole—the Southwest, Illinois, other parts of West Virginia included—there is more mine capacity than is required or than can be served by present railroads have been a reason for denying this extension?

This is the first effective check on development of soft-coal mines. The railroads point out that for many years they have been obliged to meet every request of this

character to avoid discrimination. The Railroad Administration would not permit the Fuel Administration to withhold sidings from new mines. Coal companies, as in this instance, find it better business to bring undeveloped reserves into production than to carry them as overhead. There has developed in recent years an insistent opinion that some way must be found to stay the endless opening of new soft-coal mines. Now that, some three years after its grant of power, the Interstate Commerce Commission has applied the designated remedy in a particular instance, it is well not to jump at conclusions as to the wisdom of the move. It is not, as characterized by the *New York Times*, "A Strange Decision."

This is, of course, regulation of the coal business and not so indirect at that. Its importance as respects coal may easily be over-emphasized—the real point on which a verdict is awaited is the apparent precedent set for all industry.

Lewis Against the Field

THE anthracite mine workers acceded to the request of the U. S. Coal Commission that the Tri-district convention in Scranton last week not bind its scale committee to hard and fast demands. This much favors a peaceful settlement. The scale committee will meet the operators at Atlantic City this week and in a few days is expected have before it the anthracite report of the Coal Commission. The cards will then be dealt and the game go on.

On the face of it the matter at issue is quite simple. The miners want more money for their work. They have framed their desires into some eleven "demands" starting off with 20-per cent increase in wage rates and winding up with many other demands, all calculated to increase their earnings. No one supposes for a moment that the operators will or can afford to grant such demands offhand. The customers of the coal companies do not like the price of coal as it is.

The mine workers will attempt to show that the operators should give them an increase out of profits, for the miners recognize the peculiar interest of the buying public in the price of their product. Following the precedent set by the soft-coal people last spring and under similar inspiration from the Coal Commission, the miners and operators might within a week easily reach an agreement to continue the present contract. This appears to be the logical outcome, whether it is reached in July or in September.

Matters are not so easily arranged in the hard-coal field, however, for the present International officers of the United Mine Workers "belong" less to this field than to the bituminous regions. The anthracite workers have the bit in their teeth and the matter from now forward will be more of a contest between the local anthracite leaders and the Lewis forces than one with the operators.

Dips Under Creeks and Streams

CONTRARY to Mr. Clevenberg's remarks in this issue, a general experience is that the coal under valleys is higher, not lower, than normal. Toward the outcrop, it is true, the coal tends to drop in a series of small faults, the throw of which does not exceed perhaps one to three inches, and is likely also to dip toward the face exposed by erosion, but where the seam passes under the valley no such slipping and miniature faulting can take place, and the coal tends to rise because the pressure of the hill causes the uncovered and unloaded measures in the valley to lift.

The clays tend to flow to the point of reduced pressure and there is some evidence that the coal also has flowed to that point, for it is often somewhat thicker in such places.

What Mr. Clevenberg remarks, however, is a different condition. He assumes that when the coal measures of the Carboniferous era were laid down, the peat was deposited over a slightly rolling surface and that these rolls are still visible as coal dips. It would be interesting to know if manifestations of the kind he describes have any uniform orientation. If they have not his surmise seems unanswerable.

If they have a sort of common direction, then they probably are due to mountain-making movements in little, occurring as they doubtless did occur in the Carboniferous era. The streams may have followed or may not have followed these movements of flexure, for if the latter were slow the streams would continue in their courses and would erode the intersecting flexures as they developed, as has happened monumentally in the Weber Canon in Utah. Mr. Clevenberg very plausibly suggests that as the dips follow the present streams, the original streams followed these dips.

In the Lower and Middle Kittanning beds of Pennsylvania there are well-marked dips running east and west which have neither relation to the topography nor to the mountain-making movements that occurred in the Permian and perhaps in the late Carboniferous era. But because the dips in these measures are so regularly oriented and are obviously different from Mr. Clevenberg's dips does not in any way disprove his theory of the origin of those dips which he describes.

Yet it is interesting to note that the "wants"—the ancient erosions and replacements—in these beds also ran in their main areas east and west, though it is true other erosions and replacements enter them often at right angles. These scars seem to have healed promptly in Pennsylvania. Nothing can be seen in upper beds of the dips that might have been expected to rise from them or from other orogenic movements of like kind. Still at least one fairly large east and west erosion has been determined in the lower Freeport which tends to show that the orogenic movements continued like in kind throughout the laying down of the Allegheny Series. What is stranger still is that the erosion in the lower Freeport is often lacking in the beds lower down. As against this theory is the fact that at least in some sections of Pennsylvania the dips running parallel to the so-called Permian uplift have thicker coal than the summits between them. This seems to suggest that a slight orogenic movement, gentle but not unimportant, and similar to the larger movement in the Permian, occurred during the late Carboniferous period when the uppermost beds were being deposited.

The east and west erosion and dips and the thickening in northeast and southwest dips are contradictory and neither is so generally established as to justify dogmatism and to solve the question as to the line of folding during the deposition of the Allegheny series. Much of what happened during the laying down of that series is still a mystery and will remain so till the subject is carefully studied in the light of recent mine workings and levelings. Mr. Clevenberg, however, has added two interesting observations to aid us in our studies of the Carboniferous era and has offered a reason for them which is hard to gainsay.

The Indianapolis Indictments

BY THE manner in which he announced the unwillingness of the government to prosecute the Indianapolis indictment of the 226 coal operators and mine workers' officials charged with conspiracy under the Sherman law, Attorney General Daugherty added nothing of credit to his record. By a legal move he wiped the charges from the record of Judge Anderson's court and by a declamatory process he sets them up as his own. "In fact," he says, "I believe the acts committed were unlawful."

It has been the current opinion for some time that these defendants would never be brought to trial by the government and that the indictment probably would expire by the limitation of time. We are inclined to be of the opinion that it is Judge Anderson and not Mr. Daugherty who has had the wisdom and courage to *nolle prosequi* it. It remains to inquire whether any good purpose was served by the proceeding and what significance attaches to Mr. Daugherty's threats that "We will get you again if you don't watch out."

The Attorney General said that the public is "fed up" with the idea that there is a "great and stubborn controversy" in the coal industry when in fact there is no controversy at all, that strikes are fake pretensions to alarm the public, under cover of which coal wages and prices are boosted. The facts are, we believe, just the opposite. Wage controversies in the coal industry are real but altogether too many people think they are staged, a belief fostered by these particular indictments and one which Mr. Daugherty is perpetuating. The overhanging threat of this case has greatly interfered with the proper course of wage negotiations in the past two years. The doubt thrown on the whole process of collective bargaining by the proceedings in Judge Anderson's court and the hesitation natural to those operators who were under this cloud in meeting in interstate conferences was a factor of no mean consequence in the strike of 1922.

Nor is the air cleared with the dismissal of the charge in respect to these 226 defendants. "It is essential to the prosperity of both employer and employee," the Attorney General is quoted as having said, "that proper agreements be entered into, and the government is not concerned whether the agreements are made collectively or individually if the things agreed upon are lawful." The general tenor of his remarks to the court are to the effect that these people did a lot of unlawful things but because they would be able to convince a jury of their good intent and the participation of a previous administration in their activities, they could not be convicted. But, if they do unlawful things again, he will get after them.

What is unlawful in the premises?

Carbon Dioxide Succeeds in Fighting Bitner Mine Fire When the Flooding of the Workings Fails*

When Fire Dies, Mine Atmosphere Contracts and Sucks in Air
Unless Given Carbon Dioxide which Cools Mine, and Saves
Fire from Necessity of Generating Its Own Inert Gas

BY CHARLES L. JONES†

MUCH interest should be manifested by coal operators and the state mine departments in the successful way in which the fire in the Bitner mine, of the H. C. Frick Coke Co., was extinguished with the aid of liquefied carbon dioxide. This mine, which is located in the coke region of Pennsylvania, caught fire on the night of Nov. 16, 1922. Prior to the adoption of the unusual method about to be described an attempt was made to fight the fire by flooding, but because flooding failed to stem the spread of the fire, which by Dec. 16 had extended over an area of approximately 13 acres, the management decided to use liquefied carbon dioxide for subduing the conflagration.

From Dec. 16 to Dec. 25 large quantities of this inert gas were administered to the affected workings, after which period the quantities introduced were considerably reduced. It should be mentioned here, however, that the application of water was continued; thus the temperature was lowered without for a moment allowing the atmosphere surrounding the fire to become of a character that would support combustion. Aside from its efficiency in the fighting of mine fires, carbon dioxide appeals by virtue of its low cost and its ease of administration.

Carbon dioxide has been suggested on several occasions in the past as an agent for fighting mine fires, and in a few cases trial has been made of its value. The attempts have met with all degrees of success from complete effectiveness to entire failure, depending upon conditions. However, the relative costs of different sources of inert gas, the quantities necessary to insure success and the technique of inert-gas application have

never been definitely determined in such a way as to encourage conservative mining engineers in making any general application of the method, although the theoretical supremacy of inert gas as a fire-extinction medium has been generally taken for granted.

As typical of the attitude of mining engineers and operators may be cited the attitude of state mine inspectors. After two months of gas application at Bitner had given good indications of success, I addressed a letter to each of the state mine inspectors listed in *Mineral Industry*, stating that certain practical information on the inert-gas method of extinguishing mine fires had been developed, and inquiring as to the number of fires occurring in the various states during the last three years.

Nineteen answers were received, mentioning specifically thirty-nine fires, of which twenty-two were in coal mines. Two states apparently had no fires. Nine replies showed that an effort was being made to keep a record of fires in the states, while ten showed no such effort. One letter expressed doubt as to the efficacy of the inert-gas method, two expressed interest in any information that might be forthcoming, and fourteen showed no interest whatever in carbon dioxide as an agent in fighting mine fires.

Successful applications of the inert-gas method as long ago as 1851, at Clackmannan, Scotland, have been related by Walker.¹ The use of liquefied carbon dioxide as a fire-extinction agent seems to have been first suggested by Barber,² and Spencer³ has described the successful application of liquefied carbon dioxide to a small mine fire.

*Paper read before West Virginia Coal Mining Institute, at Clarksburg, W. Va., June 19.

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¹*Mines and Minerals*, June 1908, 505.

²*American Chemist*, 5 (1875), 395.

³*Trans. Inst. Min. Eng.*, 17 (1900), 181.

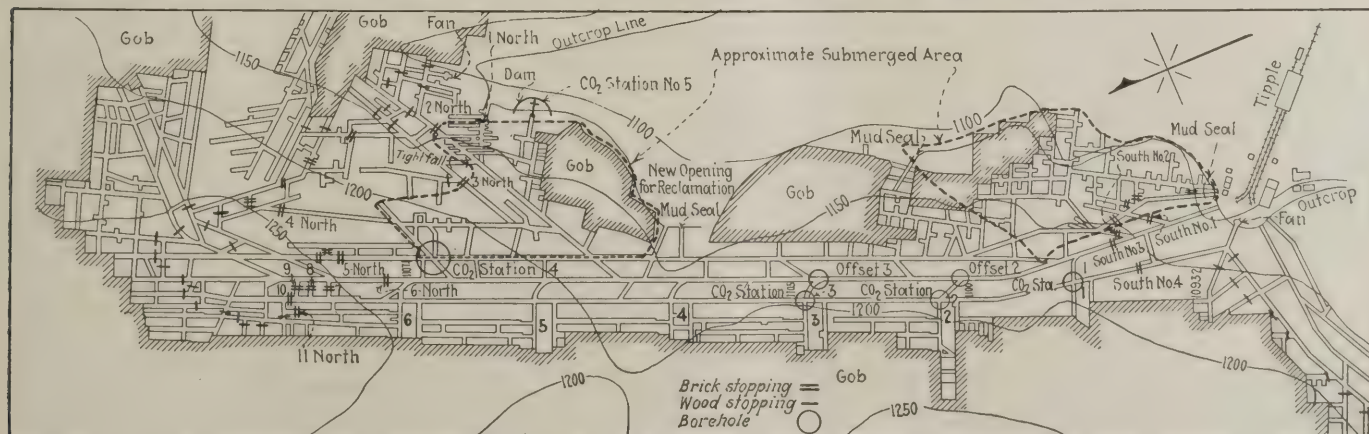


FIG. 1—PLAN OF BITNER MINE SHOWING SEALS AND POINTS AT WHICH CARBON DIOXIDE WAS ADMITTED

The outcrop line on this map apparently was drawn before the coal was extracted and crosses the coal area in places. The coal, however, crops along much of the upper or roughly the eastern line of the

illustration. The coal in the lower left-hand corner has about 150 ft. of cover but the cover is less over the rest of the area and in many places is only about 50 ft. thick, as can be noted by the contour lines.

The weak spots were in the caved rooms near the crop, but water had been run into two-thirds of these reducing the hazard that air might enter and restore the activity of the smoldering fire.

Evans' has told of a fire at Senghenydd colliery in the autumn of 1913, which was treated for several weeks with insufficient quantities of carbon dioxide manufactured on the spot from sodium bicarbonate and sulphuric acid. Even in this case, although water and perseverance finally put out the fire, it is believed that the carbon dioxide rendered valuable assistance in lowering the temperature, minimizing changes in pressure and preventing fresh air being drawn in to the fire area. This last action of drawing in air when cooling and driving it out as the temperature rises is known as the "breathing effect."

On the other hand, it is recorded in scientific literature that carbon dioxide has been employed unsuccessfully in several cases; for example, in the metal mines of the United Verde Copper Co.⁵ However, fires in metal mines occur under conditions vastly different from those in coal mines, particularly with respect to the ratio of combustible material to oxygen supply, consequently the two classes of mine fires cannot be treated in at all the same manner by the inert-gas method. The compressed-air method finally adopted by the copper company mentioned would have played havoc in a coal-mine fire.

Unfortunately, negative results are not often published, and there must be some cases in which the inert-gas method has failed in coal mines, just as there are buildings burned to the ground in spite of modern fire apparatus. In each case a number of variables deter-

mine the success or failure of the treatment, but the fireman at a burning building must use his judgment unaided by any accurate means of determining conditions he cannot see, while the mine fire can be literally "chemically controlled."

The various agencies which may give rise to mine fires have been discussed at length in the literature⁶ and need not be referred to here. It seems that the progress of an imperfectly sealed mine fire has never been followed carefully, either under inert-gas treatment or otherwise, by an adequately large number of systematic gas analyses at various points, as well as by close daily observation of temperatures, pressures, etc., at various parts of the affected area. I was, therefore, glad to have an opportunity to make a complete study of the Bitner fire and to follow up the application of liquefied carbon dioxide to it.

Between fifty and sixty million pounds of liquefied carbon dioxide are produced annually in the United States. Small quantities are obtained from magnesite, from fermentation and from natural mineral springs, but the bulk of it—in fact over 90 per cent—is manufactured by the combustion of coke. High-grade coke is burned under specially constructed boilers, with carefully regulated draft, producing flue gases with 17 to 19 per cent of carbon dioxide. The flue gases are scrubbed to remove dirt and sulphur compounds, and the carbon dioxide is then absorbed in a solution of sodium or potassium carbonate, from which it is boiled out prac-

⁴Colliery Guardian, March 7 (1916), 505.

⁵Bull. Am. Inst. Min. Eng., 55 (1916), 186.

⁶G. A. Burrell, I. W. Robertson and G. S. Oberfell, "Black Damp in Mines," Bureau of Mines, Bull. 105.

Table I—Analyses of Gases, Temperatures and

South No. 2	December											
	20 11 A.M.	21 11 A.M.	21 3 P.M.	22 9 A.M.	23 9 A.M.	24 7 A.M.	24 4 P.M.	25 10 A.M.	26 10 A.M.	27 10 A.M.	27 4 P.M.	28 10 A.M.
Carbon Dioxide.....	10.2	15.0	15.4	15.4	15.2	13.7	19.3	19.9	20.0	17.2	17.6	16.5
Oxygen.....	5.1	1.6	1.6	2.5	3.5	6.5	0.7	0.7	0.8	2.9	2.4	1.5
Carbon Monoxide.....	0.6	0.7	1.0	1.0	0.8	0.6	1.1	0.8	1.0	0.8	0.9	0.6
Methane.....	1.5	1.8	1.8	1.8	1.7	1.4	1.9	1.9	1.9	1.7	1.7	1.9
Nitrogen.....	82.6	80.9	80.2	79.3	78.8	77.8	77.0	76.7	76.3	77.4	77.2	79.5
Air.....	24.5	7.7	7.7	12.0	16.8	31.2	3.4	3.4	3.8	13.9	11.5	7.2
Firedamp.....	2.1	2.5	2.8	2.8	2.5	2.0	3.0	2.7	2.9	2.5	2.6	2.5
Blackdamp.....	73.4	89.8	89.5	85.2	80.7	66.8	93.6	93.9	93.3	83.6	85.9	90.3
CO ₂ in Blackdamp.....	13.9	16.7	17.2	18.1	18.8	20.5	20.6	21.2	21.4	20.5	20.5	18.2
N ₂ in Blackdamp.....	86.1	83.3	82.8	81.9	81.2	79.5	79.4	78.8	78.6	79.5	79.5	81.8
Temperature.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pressure.....	.....	.....	-0.020	-0.024	.....	-0.010	.....	.....	-0.015	+0.008	.....	.....

South No. 4	December											
	19 10 A.M.	17 J.R.C.	20 11 A.M.	21 11 A.M.	21 3 P.M.	22 9 A.M.	22 2 P.M.	23 9 A.M.	24 7 A.M.	24 11 A.M.	24 4 P.M.	25 10 A.M.
Carbon Dioxide.....	4.7	5.2	6.9	9.8	11.5	8.8	13.3	12.2	9.8	10.6	15.7	6.4
Oxygen.....	12.6	10.4	11.6	8.1	6.9	11.0	6.9	8.0	10.0	10.2	5.3	14.6
Carbon Monoxide.....	.....	1.6	0.7	1.0	1.9	0.8	1.6	1.1	1.1	1.4	1.8	0.6
Methane.....	0.8	1.0	0.9	1.2	1.3	0.9	1.3	1.2	1.0	1.0	1.5	0.6
Nitrogen.....	81.9	81.8	79.9	79.9	78.4	78.5	76.9	77.5	78.1	76.8	75.7	77.8
Air.....	60.5	50.0	55.6	38.9	33.1	52.8	33.1	38.4	48.0	49.0	25.4	70.1
Firedamp.....	0.8	2.6	1.6	2.2	3.2	1.7	2.9	2.3	2.1	2.4	3.3	1.2
Blackdamp.....	38.7	47.4	42.8	58.9	63.7	45.5	64.0	59.3	49.9	48.6	71.3	28.7
CO ₂ in Blackdamp.....	12.1	11.0	16.1	16.6	18.0	19.3	20.8	20.6	19.6	21.8	22.0	22.3
N ₂ in Blackdamp.....	87.9	89.0	83.9	83.4	82.0	80.7	79.2	79.4	80.4	78.2	78.0	77.7
Temperature.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pressure.....	.....	.....	-0.028	-0.016	-0.030	-0.019	.....	.....	-0.015	-0.007	.....	-0.004

South No. 2	January											
	14 9 A.M.	15 1 P.M.	16 11 A.M.	17 11 A.M.	18 9 A.M.	19 9 A.M.	20 9 A.M.	22 5 P.M.	23 10 A.M.	24 11 A.M.	25 11 A.M.	27 5 A.M.
Carbon Dioxide.....	9.2	12.0	11.0	8.8	11.4	11.4	11.5	12.3	11.9	10.4	9.4	11.9
Oxygen.....	6.4	3.3	5.5	7.6	3.4	3.6	3.7	2.6	3.1	5.2	6.1	2.2
Carbon Monoxide.....	0.2	0.5	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.7	0.5
Methane.....	1.4	1.7	1.5	1.3	1.7	1.7	1.6	1.7	1.7	1.5	1.4	1.8
Nitrogen.....	82.8	82.5	82.0	82.2	83.5	83.2	83.1	83.3	83.1	82.7	82.4	83.6
Air.....	30.7	15.8	26.4	36.5	16.3	17.3	17.7	12.5	14.9	25.0	29.3	10.6
Firedamp.....	1.6	2.2	1.5	1.4	1.5	1.8	1.7	1.8	1.9	1.7	2.1	2.3
Blackdamp.....	67.7	82.0	72.1	62.1	82.0	80.9	80.6	85.7	83.2	73.3	68.6	87.1
CO ₂ in Blackdamp.....	13.6	14.6	15.2	14.1	13.9	14.1	14.3	14.4	14.3	14.2	13.7	13.6
N ₂ in Blackdamp.....	86.4	85.4	84.7	85.9	86.1	85.9	85.7	85.6	85.7	85.8	86.3	86.4
Temperature.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pressure.....	.....	.....	.....	.....	+0.01	.....	+0.01	-0.01	+0.015	.....	.....	.....

tically pure. Modern plants are balanced so that there is just enough steam produced from the combustion of the coke to operate the machinery and compress the carbon dioxide into cylinders.

Carbon dioxide is sold in cylinders of two standard sizes, of which the larger contains 50 lb. of gas, equivalent to 408 cu.ft., at 32 deg. F. and 760 mm. pressure, or about 450 cu.ft. under an average atmospheric temperature and pressure. This size of cylinder has an outer diameter of 8½ in. and is 51 in. high. It contains slightly over 150 lb. as an average when filled with gas. These cylinders are all built and tested under Interstate Commerce Commission regulations, and such has been the progress in manufacture and testing that accidents in handling these cylinders are almost unknown. All work in connection with the application of carbon dioxide to mine fires may be performed by common labor.

The turnover on cylinders in the carbon-dioxide industry is very slow, and, as the investment in containers is high, interest charges, depreciation and maintenance equal in aggregate the manufacturing cost. Hence the cost of the gas apparently is high, although it will be shown to compare favorably with other methods for the results obtained. As 90 per cent or more of the output of liquefied carbon dioxide is used in the soft-drink trade, the business is necessarily seasonal in nature, but stocks in most large cities are sufficient to assure an immediately available supply of gas at any mine located near a center of population.

The refrigerating effect of the gas expanding from

the pressure in the cylinders deserves special mention. When the gas is discharged directly from the cylinders to the atmosphere or into a mine, this refrigerating effect is sufficient to reduce a part of the gas to the form of a snow, which has a temperature colder than 100 deg. F. The cooling effect of this snow in the mine is not as valuable as its action in excluding air from the fire, but it is important nevertheless. This cooling effect is not an unmixed blessing, however, for it occasionally stops up the cylinder valves with snow, thus retarding the discharge of gas. At the Bitner fire, therefore, the valves were kept thawed by means of torches when for a comparatively short time it was desired to obtain very high rates of gas input. Means have since been developed of avoiding this mechanical difficulty, without recourse to torches or to any other source of heat.

Carbon dioxide has been used successfully for fighting fires in other places than coal mines. One branch of the Bell system uses small cylinders of carbon dioxide for extinguishing fires in telephone switchboards, and for many years it has been used for smothering fires on shipboard. It is a method now well recognized by shipping experts and has the indorsement of the fire underwriters in Scandinavian countries. It has been more recently introduced on some American shipping with good results, and possesses many obvious advantages, especially in that it does not damage valuable cargo and in that it penetrates portions of the vessel which could not be reached with a hose.

One large American petroleum company owns tank

Pressures Observed at Two of the Seals in Bitner Mine

													January												
28 4 P.M.	29 9 A.M.	29 2 P.M.	29 3 P.M.	30 9 A.M.	30 4 P.M.	31 10 A.M.	1 9 A.M.	2 9 A.M.	3 9 A.M.	4 9 A.M.	5 9 A.M.	6 2 P.M.	7 11 A.M.	8 9 A.M.	9 5 P.M.	10 1 P.M.	11 9 A.M.	12 11 A.M.	13 1 P.M.						
17.2	14.6	13.0	15.2	15.1	10.2	15.0	12.9	14.4	14.2	13.8	12.0	13.3	11.2	9.7	10.6	10.6	11.3	11.5	9.4						
1.0	2.6	4.6	1.8	1.7	7.4	1.2	3.4	0.8	0.5	1.2	3.2	1.1	4.3	5.9	4.3	4.6	4.7	2.7	6.1						
0.5	1.4	0.5	0.5	0.8	0.6	1.1	0.3	1.6	0.7	1.4	0.6	0.6	0.3	0.2	0.3	0.1	0.2	0.6	1.4						
1.9	1.7	1.6	1.8	1.8	1.3	1.9	1.7	1.9	2.0	1.9	1.9	1.9	1.6	1.4	1.6	1.6	1.5	1.7	1.4						
79.4	79.7	80.3	80.7	80.6	80.5	80.8	81.7	81.3	82.6	81.7	82.5	83.1	82.6	82.8	83.2	83.1	82.3	83.5	82.8						
4.8	12.5	22.1	8.7	8.2	35.5	5.8	16.3	3.9	2.4	5.8	15.4	5.3	20.7	28.3	20.7	22.1	22.6	13.0	29.3						
2.4	3.1	2.1	2.3	2.6	1.9	3.0	2.0	3.5	2.7	3.3	2.3	2.5	1.9	1.6	1.9	1.7	1.7	2.3	1.7						
92.8	84.4	75.8	89.0	89.2	62.6	91.2	81.7	92.6	94.9	90.9	82.3	92.2	77.4	70.1	77.4	76.2	75.7	84.7	69.0						
18.5	17.3	17.2	17.1	16.9	16.3	16.4	15.8	15.6	15.0	15.2	14.6	14.4	14.5	13.8	13.7	13.9	14.9	13.6	13.6						
81.5	82.7	82.8	82.9	83.1	83.7	83.6	84.2	84.4	85.0	84.8	85.4	85.6	85.5	86.2	86.3	86.1	85.1	86.4	86.4						
...	+0.017	+0.030	...	...	+0.015	-0.015	...	+0.015	-0.005	+0.010	...	...	-0.010	...	...	...	...	...	...

													January												
29 9 A.M.	29 12 M.	29 2 P.M.	29 3 P.M.	30 9 A.M.	30 3 P.M.	31 10 A.M.	1 A.M.	2 A.M.	3 A.M.	4 A.M.	5	6	7	8 9 A.M.	9 5 P.M.	10 1 P.M.	10 4 P.M.	11 9 A.M.	12 11 A.M.	13 1 P.M.					
2.2	11.4	16.9	19.3	20.1	13.4	1.0	11.6	14.8	14.4	13.7	12.7	13.9	11.6	10.6	10.9	4.6	11.3	9.9	8.6	8.5					
17.1	9.4	3.9	1.4	0.3	7.1	18.4	5.2	0.2	0.3	1.1	3.0	0.6	4.3	5.3	5.3	14.1	4.0	5.9	7.4	8.3					
0.0	0.1	1.8	1.9	2.1	1.5	0.0	1.4	2.2	2.2	2.4	2.1	2.7	1.7	2.1	1.3	0.6	1.1	1.2	0.8	0.4					
0.4	1.1	1.6	1.9	2.0	1.3	0.2	1.5	2.0	2.0	1.9	1.7	1.9	1.6	1.6	1.5	0.6	1.6	1.5	1.3	1.2					
80.3	78.0	75.8	75.5	75.5	76.7	80.4	80.3	80.8	81.1	80.9	80.5	80.9	80.8	80.5	81.0	80.1	82.0	81.9	81.9	81.6					
82.1	45.1	18.7	6.7	1.4	34.1	88.4	25.0	1.0	1.4	5.3	14.4	2.9	20.6	25.4	25.4	60.7	19.2	26.4	35.5	39.8					
0.4	1.2	3.4	3.8	4.1	2.8	0.2	2.9	4.2	4.2	4.3	3.6	4.6	3.3	3.6	2.8	1.2	2.7	2.7	2.1	1.6					
17.5	53.7	77.9	89.5	94.5	63.1	11.4	72.1	94.8	94.4	90.4	81.8	92.5	76.1	71.0	71.8	31.1	78.1	70.9	62.4	58.6					
12.6	21.2	21.7	21.6	21.3	21.2	8.8	16.1	15.6	15.3	15.2	15.9	15.0	15.2	14.9	15.1	14.8	14.5	14.0	13.8	14.5					
87.3	78.8	78.3	78.4	78.7	78.6	91.2	83.9	84.4	84.7	84.8	84.5	85.0	84.8	85.1	84.9	85.2	85.5	86.0	86.2	85.5					
73	...	...	...	95	...	59	59	68	73	...	...	...	73	102	90	90	Water	up	to pipe	...
-0.02	+0.08	+0.102	...	+0.070	+0.020	-0.050	...	+0.025	+0.015	-0.005	...	+0.010	+0.010	...	...	...	...	...	...	...

February													March												
6 11 A.M.	8 9 A.M.	10 9 A.M.	12 9 A.M.	14 9 A.M.	16 9 A.M.	18 9 A.M.	20 9 A.M.	22 9 A.M.	24 9 A.M.	26 9 A.M.	1 9 A.M.	3 9 A.M.	5 9 A.M.	7 9 A.M.	9 9 A.M.	11 9 A.M.	13 9 A.M.	15 9 A.M.	17 9 A.M.	19 9 A.M.	21 9 A.M.				
8.9	6.1	8.9	8.0	9.4	7.0	6.0	8.8	8.4	6.2	9.3	8.0	9.3	7.6	5.6	6.2	8.5	8.7	5.8	6.4	7.7	7.6				
6.8	9.5	6.9	8.2	5.5	10.1	11.0	7.0	6.8	10.7	4.9	7.1	4.8	8.2	12.1	10.6	5.9	6.0	9.9	8.3	8.1	8.6				
0.0	0.2	0.4	0.2	0.0	0.2	0.4	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.2	0.2				
1.3	1.4	1.3	1.2	1.5	0.9	0.9	1.3	1.3	1.3	1.5	1.3	1.5	1.2	0.8	1.0	1.4	1.4	1.0	1.2	1.2	1.2				
83.8	82.8	82.5	82.4	83.6	81.7	81.7	82.8	83.4	81.9	84.3	83.6	84.4	83.0	81.5	82.0	84.2	83.8	83.2	84.1	83.0	82.4				
32.7	31.2	33.2	39.4	26.4	48.9	52.8	33.6	32.6	51.3	23.5	34.1	23.0	58.0	58.0	50.9	28.3	28.8	47.5	39.8	38.8	41.3				
1.3	1.6	1.7	1.4	1.5	1.2	1.3	1.4	1.4	1.2	1.5	1.3	1.5	1.2	0.8	1.2	1.4	1.5	1.1	1.2	1.2	1.4				
66.0	67.2	65.1	59.2	72.1	49.9	45.9	65.0	66.0	47.5	75.0	64.6	75.5	59.4	41.2	47.9	70.3	69.7	51.4	59.0	60.0	57.3				
13.3	13.5	13.7	13.5	13.0	14.0	13.1	13.6	12.7	13.0	12.4	12.4	12.3	12.8	13.6	13.0	12.1	12.5	11.3	10.8	12.7	13.2				
86.5	86.3	86.3	86.5	87.0	86.0	86.9	86.4	87.3	87.0	87.6	87.6	87.7	87.2	86.4	87.0	87.9	87.5	86.7	89.2	87.2	86.8				
...	+	+	...	+	+				



FIG. 2—TIPPLE, BITNER MINE

The Bitner tippel is quite close to the opening of the mine, as can be seen in the map. The easy hill slopes can be noted in the rear of this illustration.

ships provided with automatic appliances, thermostatically released, for discharging carbon dioxide into the vapor space of the oil tanks. Used in this way it makes a positively non-freezing and non-corrosive extinguisher. Two central-station companies have equipped turbo-generators with appliances for extinguishing fires with carbon dioxide.⁷

The principal function of carbon dioxide in fighting mine fires is not so much to extinguish fire *per se* as to prevent inward leakage of air, whether it occurs as compensating for fluctuations of barometric pressure or as the result of the cooling of the mine atmosphere.

To illustrate the latter point, consider an underground working which is comparatively tight, the fire in which could be extinguished easily by accepted methods of sealing off. If the fire is a hot one and occupies a large percentage of the sealed-off area, the average temperature in the fire area may easily reach 240 deg. F. In such a case the contraction in cooling to normal temperature would be about 25 per cent of the gas volume in the fire area. Assuming no leakage, this would mean a pressure difference across the brick stoppings of about 3.7 lb. per square inch, which, due to leakage, is never observed in practice. Obviously the answer is that leakage is important even in this case. It would be interesting to know how much more quickly such a sealed-off fire might be opened under inert-gas treatment than when sealed off without such treatment, especially where the fire area cuts off all access to important workings.

Another simple way of presenting this theory of mine-fire behavior is to consider the relation of the two heat quantities—namely the heat generated by combustion, and the heat dissipated. The heat dissipated may consist of heat removed by running water through the mine, heat conducted through adjoining strata, heat transferred by air currents from hotter to cooler parts of the mine and heat dissipated by direct ventilation of parts of the fire zone where the temperature is already relatively low and no combustion is taking place. It is difficult to treat the whole subject in any precise manner, as there are so many variables in each case, but some study will convince the reader that water is the agency with the greatest potentiality for rapid cooling in an emergency, assuming that conditions are not such as to generate large volumes of steam or water gas.

When these two heat quantities are approximately equal—the heat generated and the heat dissipated—the fire does not either grow or die down very rapidly, and we say that such a fire is smoldering. In fact smoldering is *prima facie* evidence that these two heat quantities are approximately equal. Now, relatively speaking, we have no control over the quantity of heat dissipated by conduction through the adjoining strata, although, to be sure, this varies with the temperature of the mine. We can, however, control the quantity of heat generated by controlling the inward leakage of air. It is obvious that when this leakage is decreased until the heat generated becomes less than the heat dissipated, the mine must cool and we are moving toward extinction of the fire. It would be desirable to avoid leakage altogether, but it should be noted that this is not necessary.

CARBON DIOXIDE BETTER THAN SULPHUR DIOXIDE

Other inert gases have been proposed for fighting mine fires, namely, sulphur dioxide, nitrogen, and flue gases. Sulphur dioxide in its actual effect on fire has some advantages over carbon dioxide, in that it is heavier and is more effective in abstracting heat. Pure sulphur dioxide in liquid form is too expensive and not available in sufficiently large quantities to warrant consideration in most cases, and flue gases which can be made by burning sulphur under practical conditions still contain such large percentages of oxygen that they would be much less effective, for example, than a carefully produced flue gas from direct combustion of coal or coke. Furthermore, very small percentages of sulphur dioxide render atmospheres irrespirable, while men can tolerate without ill effects any percentage of carbon dioxide which will not extinguish a safety lamp, and in some cases even more.

Nitrogen is obtained in large quantities in the manufacture of oxygen by the liquid air process. The ratio of cylinder weight or shipping weight to the weight or volume of gas contained introduces high transportation charges, however, so that nitrogen need be considered only where the fire to be extinguished is close to the plant shipping the nitrogen. Further, carbon dioxide is more effective than nitrogen, at least for gaseous combustion.⁸

Flue gas is the only serious competitor of liquefied carbon dioxide for fighting mine fires and has been used successfully for the purpose. But it is not as effective

⁸J. K. Clement, "The Influence of Inert Gases on Gaseous Combustion," U. S. Bureau of Mines, Technical Paper 43.



FIG. 3—HAULING CYLINDERS BY TRACTOR TO STATION
This also gives an idea of the easy contours of this region.

⁷Electrical World, 80 (1922), 165; idem, 80 (1922), 1089.



FIG. 4—ONE OF THE CARBON-DIOXIDE STATIONS

Station No. 3. Nothing elaborate was needed. A simple canvas shelter served to protect the operations. A small stock of cylinders is lying on the outside of the station.

as carbon dioxide, it contains some oxygen, it is not as easily transported and distributed over large areas, and it requires for its preparation and application equipment which requires some time to assemble. The liquefied gas excels it in the following particulars:

(1) Liquefied carbon dioxide is 100 per cent effective. Flue gas is effective only in proportion to the oxygen which has been removed from it. Inexperienced help cannot prepare flue gas containing 19 per cent of carbon dioxide in any kind of improvised apparatus. The production of gas having that percentage of dioxide requires considerable care and close regulation of draft. The availability of comparatively large quantities of water for cooling the flue gas is an additional necessity. Though flame is extinguished by moderate percentages of carbon dioxide, incandescent carbon will continue to absorb oxygen until low percentages of residual oxygen are reached. The residual oxygen introduced with flue gases is, therefore, undesirable.

(2) Liquefied carbon dioxide in most cases is quickly available. The motor truck has placed most of the country's coal mines within a few hours of the nearest liquefied carbon-dioxide plant, and a minimum of special equipment is required for application of the gas. Flue-gas application requires time and trouble for the installation of special equipment.

(3) Liquefied carbon dioxide is portable. In the Bitner mine fire, gas was introduced through six stations or units, separated by considerable distances along a line over 2,000 ft. long. Once an entire station was moved to a new location where it appeared to be more effective. It would have been expensive and difficult to distribute flue gas in this manner from a centrally located boiler.

On the other hand, flue gas unquestionably is cheaper per cubic foot where it is to be used in sufficient quantities and over a long enough time to pay for the equipment that must be installed. I believe that flue gases and liquefied carbon dioxide have distinct and special fields, and that flue gases should be used wherever: (1) Plenty of time is available between the decision to apply the gas and its actual application. (2) Leakage is very great and it is evident that large volumes of inert gas will have to be applied over long periods of time in order to put out the fire. (3) The nature of the fire is such that portability is not a consideration.

The Bitner fire was discovered on the night of Nov.

16, and is supposed to have been caused by a grounded trolley. However, from its later behavior, it seems possible that more than one source of fire may have played a part. At any rate, the fire spread notwithstanding the best efforts of the fighters, until the length of the area actually on fire was 2,400 ft. At this point in its advance J. R. Campbell, chief chemist for the company, suggested that inert gas be considered. On Dec. 13 decision was made to try liquefied carbon dioxide, and by the afternoon of Dec. 16 1,440 50-lb. cylinders of carbon dioxide had been hauled over 60 miles by motor truck, a line of 25 brick-stoppings in the mine surrounding the fire area had been completed, some of the surface leaks caused by falls along the outcrop of the coal seam had been sealed, facilities had been provided for discharge of gas into the mine through three boreholes, and at 3 p.m. the first gas was discharged into the mine. Much better time might have been made had it not been necessary to plan and construct discharge facilities on the ground.

The drums were discharged into the mine through boreholes in units of five, each unit being housed separately in a temporary shelter with wooden roof and canvas or jute sides. On of these units is shown among the accompanying photographs. Before commencing to apply the gas, seven boreholes were drilled from the surface into the mine workings, and four of these holes were used for the introduction of gas. The casing in the boreholes was reduced to 2 in. at the top, and led to a manifold of 2-in. pipe with $\frac{1}{2}$ -in. branches.

Gate valves were provided in all units and branches, so that any drum or unit could be disconnected without permitting a back rush of gases from adjacent units or from the mine. Each drum was connected to the $\frac{1}{2}$ -in. type through a $\frac{1}{2}$ -in. sleeve and nipple of ordinary weight by means of a ground union. In general, the five drums of each unit were discharged all at once and changed on regular schedule, allowing from two to eight hours between changes. However, the schedules were laid out on a basis of the trend of gas analyses, pressures, and temperatures in the fire zone, and on occasion a drum was discharged completely in less than half an hour, while, on another, drums were changed only twice daily.

Each of the shelters was heated by a salamander which burned coke. No difficulty was experienced in discharging the gas, although torches had to be used to empty the cylinders completely when they were dis-

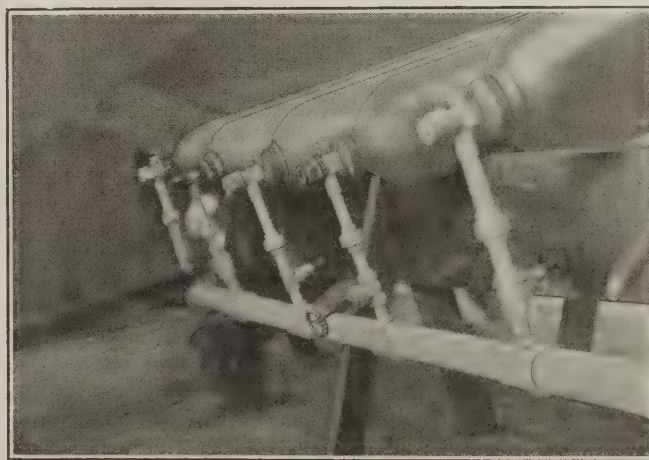


FIG. 5—RACK OF GAS CYLINDERS AND MANIFOLD

The discharge pipes of the gas cylinders are connected with a manifold through which the carbon dioxide passes to the borehole. The piping becomes frosted owing to the intensity of the cold generated by the evaporation of the carbon dioxide. The dioxide freezes at a temperature of 100 deg. below zero, F.

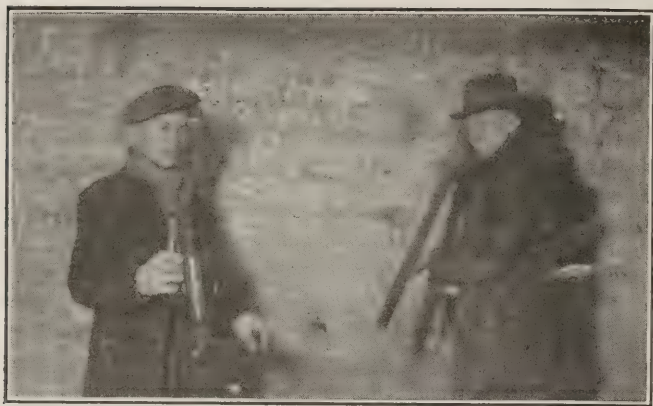


FIG. 6—BRICK STOPPING SHOWING METHOD OF TAKING GAS SAMPLES AND TEMPERATURE READINGS

An oak pole was used to pass the apparatus into the hole and pull it out again. All stoppings were patrolled at regular intervals and indications of each visit were marked on the wall of the stopping.

charged at the higher rates. Occasionally, after the mine had become comparatively cool, plugs of ice were formed in the boreholes from ground waters seeping through the earth below the bottom of the well casing and coming into contact with the cold carbon dioxide, but this ice melted when operations were temporarily suspended.

Gas samples were taken through $\frac{1}{2}$ -in. pipes cemented into the stoppings and through boreholes not used for gas input. Temperatures were taken by means of tapered hardwood poles about 4 ft. in length, made to enter and plug a 2-in. pipe through the stopping up to the last 6 in. of their length. They thus protruded inside the stopping some 30 in., and carried on the inner end a thermometer placed in a groove and fastened. These thermometers were left in position continuously, except when withdrawn for reading, and the error introduced by withdrawing them for this purpose is believed to have been small. Temperatures also were taken at the bottom of the boreholes by means of maximum-minimum thermometers. The locations at which these analyses and temperatures were taken may be identified on the map (Fig. 1).

It will be observed that the boreholes actually used for gas input have been numbered from south to north, and that the south stoppings and the north stoppings have been numbered separately. Although the total number of brick stoppings is twenty-five, the number of effective stoppings separating fire areas from respirable gases is fifteen, four on the south end and eleven on the north.

Pressures were measured only a part of the time and then by means of an Ellison draft gage. At other times they were noted simply as positive (outward) or negative (inward). Where fans were ventilating the area outside the stopping, the fan pressure must be added or subtracted from the observed differential pressure, in order to get the relation of the inside pressure to the atmospheric.

Gas samples were analyzed in a Burrell type Orsat apparatus lent by the Pittsburgh station of the U. S. Bureau of Mines, and acknowledgment should be made to D. K. Smith, who did much of the work. Analysis was made for oxygen, carbon dioxide and carbon monoxide. Occasional check analyses showed the methane to be about 2 per cent. Soon after the work of extinguishment commenced, decreasing to about 1 per cent before the mine was opened.

Hence, in interpreting the analyses, which often were of nine gases more or less diluted with air, the methane content was assumed to be 2 per cent of the combined firedamp and blackdamp, inasmuch as inleaking air, of course, carried no methane. The factor used in converting oxygen percentage to air was 4.3. Samples were taken daily, and oftener when necessary, until Jan. 25, and every other day thereafter.

Firedamp, which is held to include combustible gases, is taken as the sum of experimentally determined carbon monoxide and the assumed methane content. Blackdamp (constituents which will not burn or support combustion) is then 100 per cent less the sum of the air and firedamp. The advantage of a calculation made on this basis, which will be obvious to most mining men, lies mainly in the direct indication of the percentage of air, which is an index of leakage. Furthermore, by its means we are able to determine the quantity of carbon dioxide in the blackdamp, thus eliminating the confusing effect of leakage when interpreting the gas analysis in the light of the quantities of gas introduced.

The rate of gas input and its effect are shown in Fig. 7. It will be seen, gas input started Saturday afternoon, Dec. 16, and on Dec. 24 reached the maximum rate of 355 50-lb. cylinders of carbon dioxide in 24 hours, or 159,750 cu.ft. The greater part of the carbon dioxide—some 230,000 lb. was introduced in all—was administered during this period. On Dec. 25 and 27 the rate of delivering gas received its first decided cut.

Referring to Fig. 7 it will be noted that the percentage of carbon dioxide in the blackdamp commenced to decrease at this time, and continued a "long-swing" decrease throughout the rest of the work, except as brief increases were caused by the lowering of the barometer or by further changes in the rate of gas input. The suggestion that the leakage from the fire zone must have been between 80,000 and 150,000 cu.ft. per day under average conditions at once presents itself, but this does not follow directly, as the number and distribution of the points where gas samples are taken has a direct bearing on the average figures obtained.

The "average" is not a true figure expressing the average volume composition of the mine gases but only the arithmetical average of samples taken at accessible points. Table I gives records for reference, the com-

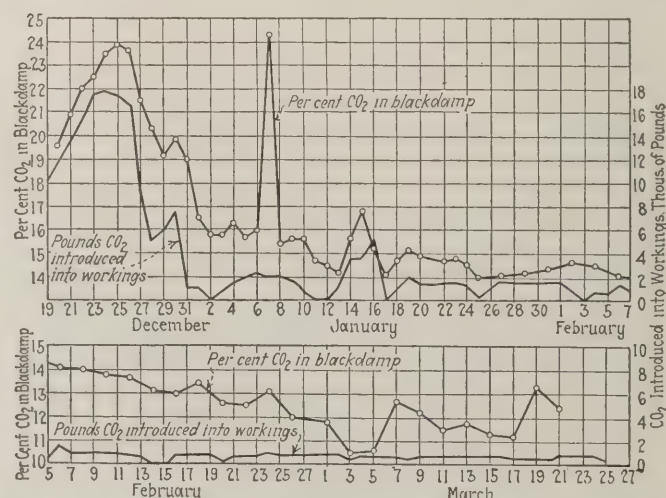


FIG. 7—DIOXIDE IN BLACKDAMP AND AS FED TO HOLES

The lower graph should be read as continuous with the upper graph. Note that the base line of what should be the right half is 10 and that of what should be the left half is 12. The figures of the blackdamp are average figures for all points of test over the entire field and the quantities of carbon dioxide also are totals for all the stations.

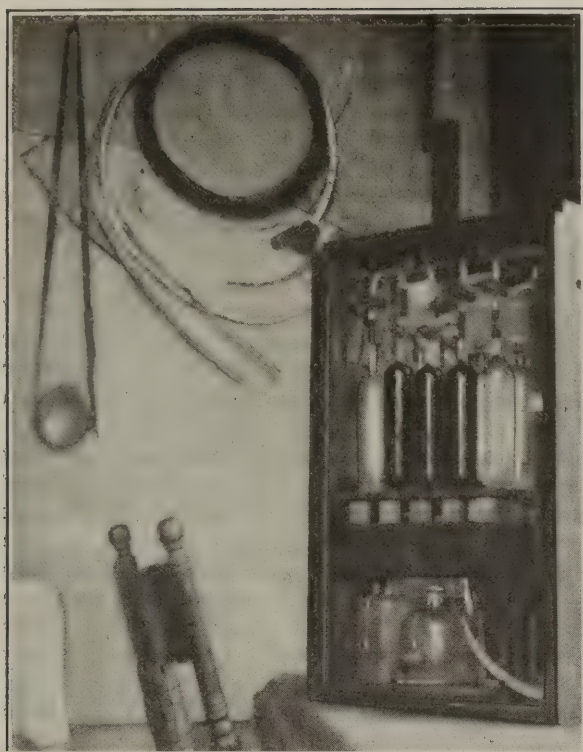


FIG. 8—"CHEMICAL LABORATORY," BITNER MINE

All that was needed was a portable Orsat apparatus of the Burrell type, a thermometer, a barometer and a pyrometer. This small outfit constitutes a complete laboratory for mine-fire control.

plete record of gas analysis for No. 2 and No. 4, both south, together with the values of temperature and pressure readings. An inspection of the volumes required to effect the changes in gas composition shown will confirm the statement that the mine is exceptionally leaky.

Throughout the operation gas analysis proved to be a most useful means of predicting changes and in controlling the gas input. Gas-analysis variations can be correlated consistently with barometric changes and the comparatively large quantity of gas taken up by the mine during the earlier stages without producing violent outward movement of gases can be explained only on the basis of rapid cooling. Unfortunately the temperature records are not as complete as might be desired, but this is not felt to detract much, as temperature data obtained at stoppings must be interpreted with the utmost caution. Every temperature reading so obtained is affected by the direction of the gas movement.

Perhaps the best example of this is at South Stopping No. 4, where the gas analysis was conspicuously unsatisfactory and for a larger percentage of the time than at any other point. This point was particularly sensitive to barometric changes, and the tendency toward inward movement of gases at this point seemed to be greater than at the other stoppings sampled. Temperature readings at this point were always satisfactory, fluctuating somewhat with outside temperature so long as air temperatures were taken inside the stopping and showed a steady cooling when the area immediately adjacent to the stopping was later flooded.

Several times during March it was reported that the gas analysis was such as to encourage fire in this local area, and on March 19 some increase in carbon-monoxide percentage at this point was noted. When the mine was finally opened a small hotbed of smoldering coke was discovered a short distance inside, which fortunately was so limited in extent as to be easily extinguished and

loaded out. All temperatures recorded in this end of the mine were below 75 deg. F. before the mine was opened. Therefore, it is quite safe to say that gas analysis has proved itself capable of indicating conditions not recorded on a thermometer—at least when the thermometer is placed near a stopping and when the gas movement is inward.

A second excellent example of incorrect indications of temperature is in the increases noted at many points during December, when carbon dioxide was being introduced at the greatest rate and when the gas analysis indicated that no fire could exist in the sealed-off area.

This apparently puzzling phenomenon was caused merely by the establishment of a current of gas outward from hotter portions to the cool stoppings, due to the large quantities of gas introduced. Under certain conditions, then, rising temperatures around the edges of a sealed-off fire may be hopeful signs that the leakage it outward, while falling temperatures may indicate only inward leakage. One does not look for high temperatures at the fan intake of a forced-draft boiler setting.

Breathing, thermal contraction and other influences may change the gas analysis considerably at any given point yet if there is no fire behind a given stopping the percentage of air will vary without changing the proportions of nitrogen and carbon dioxide in the synthetic blackdamp which has been built up by adding carbon dioxide to the normal blackdamp. This result is modified somewhat through absorption of oxygen by the coal, but it is at least roughly true.

No. 4 South Stopping will again serve as the example, for the fire referred to above could not affect the analysis of the gases immediately behind the stopping to any great extent, inasmuch as it was over 100 ft. from the stopping and the prevailing draft was inward. Between Dec. 27 and 30 the carbon dioxide in the total sample at this stopping went down from 19.2 to 2.2 per cent and then back to 20.1, due to barometric fluctuation, but the carbon-dioxide percentage in the blackdamp remained practically constant, between 20 and 22.

The variation of the carbon-dioxide percentage in the blackdamp and its relation to the amounts of gas introduced are shown in Fig. 7. The direct variation of gas composition by analysis with barometric fluctuation is to be expected. However, barometer readings are not included in Table I, as the mine is more sensitive than the barometer in its response to changes in atmospheric pressure. Thus, the pressure observations at the stoppings are more significant than the barometer readings for showing the direction of flow of the mine gases. Table II illustrates the variation of gas analysis with barometer readings:

TABLE II—VARIATION OF ANALYSIS WITH BAROMETER

Date	Barometer reading, 9:00 A. M.	Average Carbon Dioxide Percentage in Samples Over Entire Field
Jan. 15.....	28.24 (falling)	13.4
Jan. 16.....	28.20 (rising)	11.0
Jan. 17.....	28.90 (rising)	9.9
Jan. 18.....	28.32 (falling)	12.8

Three different agencies played parts in the extinction of the Bitner mine fire: gas, water, and sealing. Before the gas was applied but after the fire was sealed an inspection of the ground, coupled with observations of the behavior of the fire, afforded ample basis for the statement that the conflagration probably would never have been extinguished by sealing alone. At least it may be said that it could not have been put out by this method unless, at tremendous expense, the falls had been

laboriously mud-sealed for a distance of nearly one-quarter mile along the outcrop of the coal seam. A considerable area was never reached by water. That is clearly indicated by the high-water line marked on the map (Fig. 1). It is, of course, safe to say that the fire would not have been extinguished in this area by any combination of sealing and water treatment.

Water was of the greatest assistance, however, in rapidly cooling certain parts of the mine which could be reached by it; in fact without water cooling it would have been impossible to open the mine within reasonable time. In addition to the sections where it was possible to submerge the roof, and hence make certain of the absence of fire, other sections which could not be flooded were treated for a part of each day with running water.

As the specific heat of water is much higher than that of gases, comparatively rapid cooling was attained. It should be emphasized that the main function of this running water, which did not reach the roof over the greatest part of the area affected by it was not to extinguish fire but to produce rapid cooling, and in this action it was very successful.

Water was not applied, moreover, until Jan. 5, after gas analysis indicated that all flame had been extinguished, and when the temperatures recorded made it evident that the possibility of forming large quantities of steam or water-gas, or of causing violent fluctuations by the introduction of water, was remote. Under these conditions cooling was much accelerated.

By building surface dams at both ends of the mine it proved possible to back the water inside the mine to the high-water line shown on the map. Without some such scheme it would have been impossible to flood any considerable part of the mine.

Reference has already been made to the refrigerating effect of carbon dioxide expanding from cylinders. The main cooling effect of the inert gas, however, is due to the exclusion of air. It may be assumed that each pound of carbon dioxide introduced prevents an equivalent weight of air from gaining access to the fire. Consequently it will prevent the generation of something like 600 B.t.u. and hence will relieve the adjoining strata from having to conduct this quantity of heat.

HAVE NOT HAD NEED TO OPEN ENTIRE FIRE AREA

On March 26 a new opening was broken through the coal about the middle of the fire area, as indicated in Fig. 1. Starting from this point, by the present time (June 1, 1923) the fire area has been explored and reclaimed from end to end along the main haulage, manway and air return, and along the main gob areas on the west side of the mine. Some hot coals have been found, but the hot material was confined to small areas where the gas had not been fully effective and was in such condition that it could be wetted down and loaded without serious difficulty.

It is worthy of mention that as the combustion was early checked by the introduction of inert gas and as the area subject to fire was cooled more slowly than by the direct use of water, less injury was done to the roof.

Coal is now being produced from the reclaimed area. Smaller areas on the east side of the mine—that is, along the outcrop—have been sealed up pending the time when it will be convenient to explore and reclaim them. So far as is definitely known, there is no flame in these areas, but hot spots may exist. Exact conditions in these relatively small parts of the mine will not

be known unless and until they have been explored. For obvious reasons, some worked-out parts of this area may never need to be opened.

The quantity of liquefied carbon dioxide used, and hence its cost, will depend upon the leakage and the length of time during which gas must be applied. These conditions will vary, of course, for different mines.

In the case of the Bitner fire the actual cost of the carbon-dioxide gas alone is less than 10 per cent of the total sum spent to date, the remainder being largely the expense of the direct method of fighting. Under average mine-fire conditions, if there are any average conditions, bad mine fires probably can be extinguished with inert gas for less than 50 per cent of the cost of the direct method.

It is clear that the application of inert gas should be restricted to fires which can be sealed sufficiently to avoid the consumption of prohibitively large quantities of gas. Its use is indicated wherever it is impossible to seal off the fire tightly enough to extinguish it by this means alone, and it is possible that money can be saved by reason of quicker reclamation even where good sealing is practicable. It can extinguish fires under certain conditions more cheaply than any other method. As soon as inert gas is applied it arrests the combustion of coal and the depreciation of the mine by reason of roof falls, etc. and it makes possible early opening of sealed-off areas. That it will be invariably successful, if employed intelligently under the proper conditions, cannot be denied.

State Coal Laws Handicap Retail Dealers

In a letter to its members, the New England Coal Dealers' Association, Boston, Mass., has the following to say in connection with the new coal laws in some states, referring particularly to the "Governor's Coal Law" in Massachusetts:

"The new Laws in some states are causing a little trouble for the regular dealer, but we have one case in Massachusetts where an inspector took a sample, served a legal notice on the dealer that effectively stopped coal being sold from the bins in question. 'Physical examination of this coal indicates it is unfit for ordinary use and subject to condemnation and seizure,' is the language. In this case the coal analyzed 94 per cent pure. The dealer's business suffered and he might have been closed down for over a week if he had had only the two bins in question. He has a right to sue the inspector for damages. The idea of any coal which analyzes 94 per cent pure having the appearance of being unfit for ordinary use is a preposterous situation, and the consumers of Massachusetts will find the 'Governor's Coal Law' a serious handicap the next time we have conditions similar to last winter."

DISTRICT ENGINEERS OF THE BUREAU OF MINES and the engineers on its mine-rescue cars have been instructed to make written reports, whenever possible, to mine operators, containing recommendations for more effective prevention of accidents and for improvement of health conditions in the mines examined. An extract from the order issued in this connection is as follows: "The chief purpose of these safety service reports is to present directly to the operator the results of such safety investigations of the Bureau as may be specifically applicable to his particular mine, to the end that the work of the Bureau for the promotion of safety in the mining industry may be made more effective. These reports, of course, would also include suggestions and recommendations relative to safety methods, devices and practices observed in visits to other mines by Bureau engineers, which they believe could be adopted to advantage in the particular mines covered by the reports. Adoption of the recommendations in such a safety service report rests entirely with the mine operator, and the recommendations must be reasonable and practicable ones."

Theory and Operation of Electric Braking As Applied to Mine Locomotives

Greatest Field of Use on Locomotives Making Many Stops—Reduces Maintenance Costs—Proof Against Common Abuses—Transition from Motors to Generators Explained—Motors Always Started in Series

BY EDGAR J. GEALY

Electrical Engineer; Associate Editor, *Coal Age*

WITHIN the last few years the electric trolley locomotive, as designed for mine service, has undergone several important improvements. One of the most interesting changes has been the application of the electric-braking controller. By means of this new controller positive and graduated braking is obtainable without the application of the mechanical brake except for finally holding the locomotive and trailing load at rest.

The greatest field for the use of this new type of controller seems to be on the gathering type of locomotive, yet there are many opportunities for its use on main-haulage locomotives, especially in conditions where long grades are met, and it is necessary partially to apply the hand brake. The main-haulage locomotive as a rule makes few stops; it starts from some point where it picks up a trip of loaded or empty cars and few stops are made en route to the shaft bottom or to a distributing point where it delivers the cars. In its work the motorman is less frequently required to operate the brake than on the gathering locomotive which makes many starts and stops.

The gathering locomotive ordinarily makes many starts and stops during the day, its trips are short and frequently the locomotive and cars must be stopped at switches, room entrances and whenever couplings must be made. The very nature of the work of the gathering locomotive therefore requires frequent application of the brakes and much more braking effort must be expended in the operation of the locomotive. Consequently while the gathering locomotive is lighter in weight than the main-haulage machine the sum total of braking effort in a day is considerably greater. Aside from requiring more effort on the part of the motorman these frequent starts and stops are very hard on the equipment, wearing the brake shoes, brake rigging, flat spots on the tires and subjecting the locomotive to strains. Furthermore, the motorman may often be found to operate the locomotive with the mechanical brake partly on, with the idea of being ready at all times for a quick stop. This procedure greatly overloads the motors and frequently results in breakdowns.

LESS BRAKING EFFORT REQUIRED

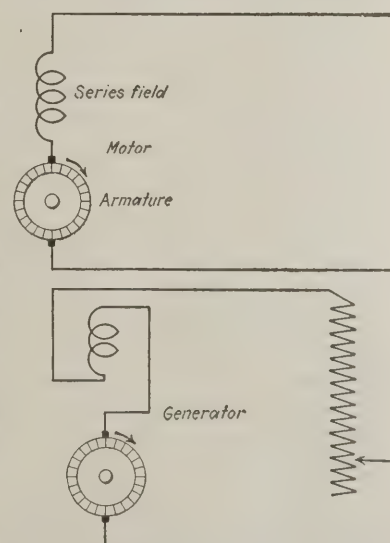
To relieve the motorman of most of this braking effort the electric braking controller was applied. With this new controller the locomotive is retarded by the stored-up energy in the form of momentum in the moving locomotive and trailing load. This is accomplished by providing a controller with a suitable cylinder for changing the motors of the locomotive into self-excited generators. The electrical energy developed by the generator action is absorbed in the main resistors. The amount of braking thus obtained is a function of the speed at which the locomotive drives

the motors as generators and the resistance in the circuit.

With a fixed value of resistance in the circuit, the faster the locomotive is moving at the time the motors are converted into generators the greater will be the generated voltage, the greater will be the current flowing through the resistance and the greater will be the retarding effect. Under the same conditions decreasing the resistance will increase the braking effect, while increasing the resistance will decrease the braking effect. Therefore under all conditions under which the locomotive may be driving the motors as generators the less the resistance in the circuit the greater will be the retarding effect upon the locomotive. In fact it is merely a question of loading up the generators until their driving force has spent its energy and can no longer carry the load. As on any other generating system the lower the resistance across the terminals of the machine the greater the load and consequently the greater is the tendency to stop the driver and therefore the generation of power.

When the motors are acting as generators and there is considerable resistance in the circuit the locomotive will spend considerable time in giving up its energy, which is in the form of momentum; but when the resistance is mostly cut out the locomotive must give up its energy more quickly and therefore comes to a rather quick stop.

When the locomotive is nearly stopped there is a point where the speed of the motors, acting as generators, is not sufficiently high to generate enough voltage to produce the necessary current to produce any further braking effort; at this point, and at all speeds slower than this it is necessary to apply the hand brake to bring the locomotive to a stop. By this method and the various graduations of resistance which may be inserted in the circuit it is apparent that the locomotive may be brought to a gradual stop without



FIGS. 1 AND 2—SERIES MOTOR AND SERIES GENERATOR CONNECTIONS

The first figure shows the dynamo operating as a motor and having a certain direction of rotation. The second figure shows the same dynamo operating as a generator. The armature is running in the same direction as when it was a motor. Closing the circuit on the generator with its series field reversed represents how electric braking is accomplished.

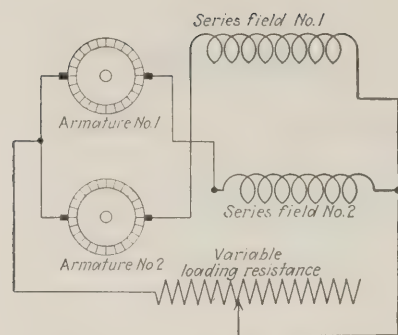


FIG. 3—CONNECTIONS OF ARMATURES AND SERIES FIELDS FOR BALANCING TWO SERIES GENERATORS

The armature of generator No. 1 is connected in series with the series field of generator No. 2, and the armature of generator No. 2 is connected in series with the series field of generator No. 1. This maintains an equal voltage on both machines, thus balancing the load while employing electric braking.

motors, when acting as generators, is sufficient to insure almost as quick a stop as when the trolley is connected. This is an important factor in estimating the all-around serviceability of electric braking in gathering work, because failure of voltage on the trolley or the flying of the trolley pole off the trolley wire would otherwise result in serious consequences.

On a level track the motorman can bring his train to a dead stop without using the ordinary hand brake at all if he can wait long enough for the friction of the track and bearings to absorb the small amount of energy remaining in the trip after the electric braking has all but stopped the train. In fact, this is the usual condition, the action being relatively quick. He also can readily bring it to a stop on a grade by setting his mechanical brake; otherwise the locomotive will come nearly to a stop and will continue to run at a slow speed. A runaway is impossible so long as the train weight and grade are within the braking capacity of the motors (acting as generators) and the control equipment.

Another point of advantage in electric braking lies in the fact that the retarding effect of the motors is zero as soon as the wheels have stopped rotating, and there is practically no skidding of the wheels; hence there will be few if any flat spots developed from this cause.

In order to understand the operation of the electric braking controller it may be interesting to review some of the important characteristics of the series motor and series generator which bear upon the subject. To clarify the matter we will use the word dynamo as the general term for a motor or a generator and when the dynamo acts as a driver it will be called a motor and when it acts as a generating machine it will be called a generator.

A series motor generates a counter-voltage which tends to stop the incoming current that drives the motor. If a series motor is running and it is suddenly disconnected from its supply it will continue to run and generate a counter-voltage. Should the motor be short-circuited or even closed on a resistance of low value the counter-voltage would cause a flow of current through the circuit, but the direction of this current would be such as to oppose the residual magnetism in the field poles which created the counter-voltage. This counter-voltage therefore would create a current which

the application of the mechanical brake and the attendant strains. The degree of braking is under the motorman's control at all times, for if he finds that he is stopping too quickly, he merely has to throw off the controller or step back a notch or two, thus inserting more resistance into the circuit. It has been found by numerous tests that even with the trolley disconnected the residual magnetism of the

would kill the residual magnetism in the fields and in so doing would reduce the counter-voltage to zero.

If the field of the motor is reversed with respect to the armature before the motor is short-circuited, however, the current flows in a direction through the series fields to increase the magnetism in the fields. In this way the motor becomes a generator. By loading up the circuit leading from the generator a retarding effect is produced which will tend to bring the generator to rest.

Fig. 1 shows a given connection of armature and field with a certain direction of armature rotation and the dynamo acting as a motor. Fig. 2 shows what changes must be made to change the motor into a generator. Note that with the direction of rotation the same, the series field connections have been reversed and the generator is loaded on a variable resistance to obtain electric braking.

Electric braking is quite simple when only one motor is used. When two or more series motors are used in parallel as generators some provision must be made to balance the current between them, because the voltages which they generate are rarely exactly the same in value due to small variations in construction and the composition of the magnetic frames.

If two series motors are operated in parallel as series generators, the dynamo generating the greater voltage will force current through the one generating the lesser voltage, and this current will be in a direction opposite to the direction of the inherent generated current in that generator. The result is that the polarity of the weaker generator is reversed and the two machines generate a current into a short-circuit between themselves. Under these conditions the line wires leading from the parallel connection of the two generators has no influence upon the operation of the machines, regardless of the value of any external resistance between the line wires.

To overcome this condition is rather simple when only two generators are involved. The fields of the two generators are interconnected so that the armature of one generator is in series with the field of the other. The connections are as shown in Fig. 3. This arrangement prevents an interchange of current between the two generators as an increase in the armature current of one generator increases the current in the field of the other, causing it to generate a higher voltage, thereby taking a heavier current until the load on each generator becomes balanced.

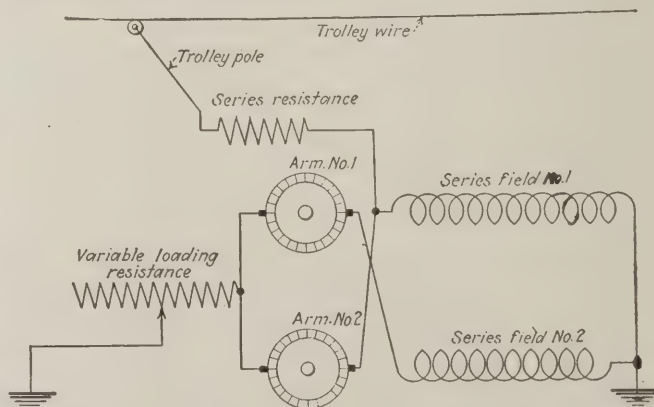


FIG. 4—COMPLETE ELECTRIC BRAKING CIRCUIT WITH TICKLER CIRCUIT

The circuit from the trolley through one of the series fields to ground assists the series field residual magnetism and quickens the action of the motors when converted into generators for electric braking.

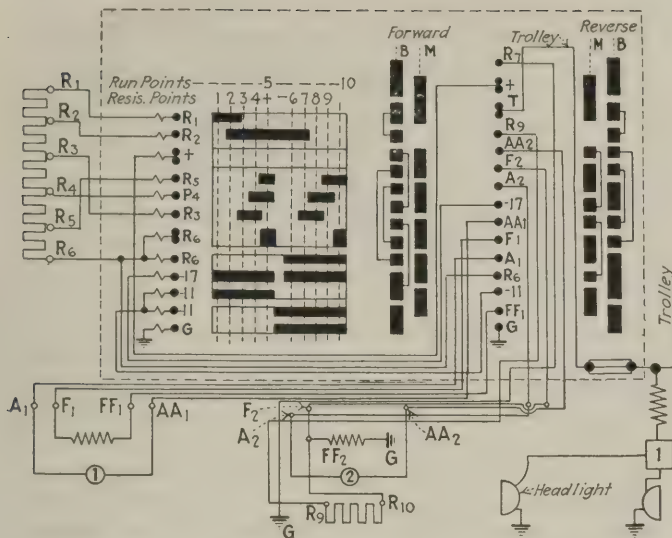


FIG. 5—COMPLETE ELECTRIC-BRAKING CONTROLLER WIRING DIAGRAM

The arrangement of the controller is quite similar to the other designs used on locomotives in mine work. The diagram shows that the wiring may hardly be classed as being more complicated than that of the ordinary controller.

To assist the residual magnetism to build up the strength of the series field and thus make the generators take their load more quickly a small current is allowed to flow through the series field of one of the generators by means of a circuit from the trolley wire through a high resistance and thence through the series field to ground. The generators will build up without this connection but the braking effect is a little slower in acting when this connection does not assist. This connection is illustrated in Fig. 4. In the diagram it is apparent that changes in the variable loading resistance varies the braking effect of the generators.

The wiring diagram of the electric braking controller as manufactured by the General Electric Co. is shown in Fig. 5. This controller embodies several additional features of special interest and importance.

With the ordinary controller careless or indifferent motormen do not always use the hand brakes when they want to stop. In many mines it is a rather too frequent practice for the motorman to needlessly "plug" the motors—that is, reverse the motors to save effort when a stop is to be made. When stopped in this way, the motors sustain a heavy rush of current and the gearing and other parts of the equipment receive severe shocks, all of which tend to shorten the life of the various parts or cause immediate damage and high maintenance costs.

Another novel feature of this controller is that the locomotive must first be started with the motors and resistance in series before the transition can be made to the parallel operation of the motors. Most controllers will start with the motors either in series or in parallel. Here again the indifferent motorman will not use the series position for slow running or for starting a load. Instead he will leave the reverse cylinder in the parallel position and start or get slow speed by running with the motors in parallel and the resistance in the circuit. This increases maintenance costs on controllers and resistances and also consumes twice as much current as that necessary for the same speed and load in the series position.

This method of operation of the locomotive with the motors in parallel when they might better be in series raises a serious question in additional power consump-

tion. In many cases this represents a serious economic loss when a number of gathering locomotives are used. The total amount of energy wasted in this way in a year is always a matter of consideration to the engineer who is desirous of maintaining a high over-all efficiency for the electric system of the mine. Another objection to this method of improper operation is that the additional current required means additional transforming and generator capacity and also feeder capacity, while it is also the cause of circuit breakers opening up on overloads and thus penalizing all other equipment in that section by discontinuing operations until the service is restored.

This electric braking controller is a positive insurance against this particular form of waste and abuse, as it is of the series-parallel type similar to that used on the ordinary street car and the first point is always "series-motors." Consequently the motorman cannot get to the parallel operating position of the controller until he has gone through all the series points.

Fig. 6 shows a top view of the controller. The handle in the middle of the controller, called the operating or control handle, regulates the resistance in the circuit when the dynamos are acting either as motors or generators. When the dynamos are acting as motors the control handle may be operated through ten positions; the fifth position is the series running position of the motors with no resistance in the circuit and the tenth position is the parallel running position with no resistance in the circuit. These points are specially marked on the controller and should be used as much as possible, thus saving wear and tear on the resistance and also power consumption.

In the motoring position the control handle may be operated through all ten positions for either forward or reverse running. In the braking position the control handle cannot be operated beyond the fifth position. The braking increases as the handle is turned on from the first position to the fifth position. At the fifth position the locomotive will come to a quick stop. To stop dead or to hold the locomotive stopped on a grade it is necessary to operate the hand brake. All braking, except the last operation of stopping the locomotive dead, should be obtained by the use of the electric braking feature of the controller. The transition from motoring to braking or vice versa in either direction is made by the operation of the lower right-hand lever, which is locked in position until the control handle is first returned to the "off" position. This insures the proper manipulation of the equipment under all conditions. The control resistance is so balanced that when the controller is in the no-resistance

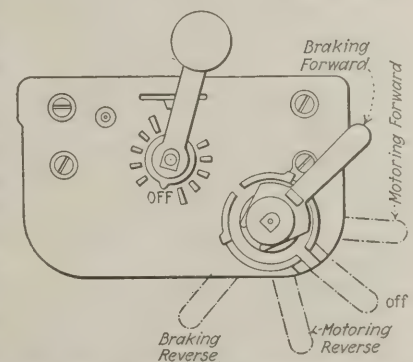
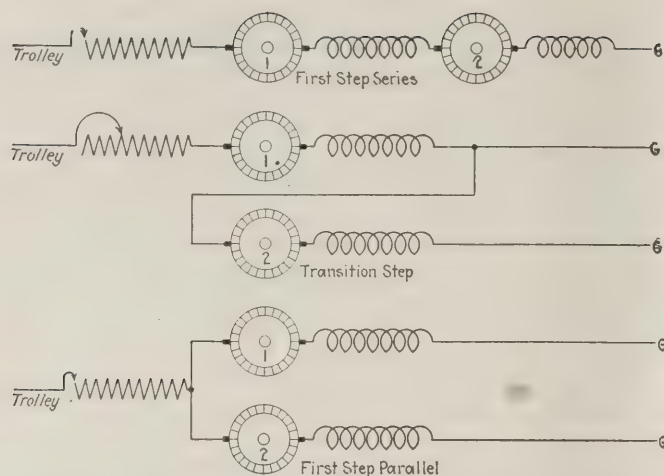


FIG. 6—TOP VIEW OF ELECTRIC BRAKING CONTROLLER

With both the operating handle and reversing handle in the off position in order to start the locomotive forward, first move the reverse handle, located on the right, to the position marked — "motoring forward" — and then move the operating handle on. To brake, move the operating handle to the off position, move the reverse handle to the position — "braking forward" — and then move the operating handle on through the first five positions as required. For motoring or braking in the reverse direction the operations are similar, as indicated by the other positions of the reverse handle.



FIGS. 7, 8 AND 9—HOW THE CONTROLLER OPERATES IN STARTING A LOAD

When the controller is operated to start a load, the motors are started in series, then later changed over to the parallel connection. All of these changes, together with changes in the amounts of resistance in the circuit, are accomplished by simply rotating the operating handle from the off position to the tenth position. This is the only operation necessary after once setting the reverse handle in the forward or reverse motor position.

series position, and the load or grade becomes severe enough to cause the wheels to spin, by moving the operating handle to the parallel position the wheels will recover their grip on the rails, provided the load is not beyond the capacity of the locomotive.

In Figs. 7, 8 and 9 the various connections of the motors and resistance are shown as the motors are being brought up to speed when hauling a load.

It is true that with the electric-braking controller the motors on the locomotive are in operation both while taking energy from the line as motors and while braking the locomotive when operating as generators. For this reason the total heating of the motors and resistance will no doubt be greater for a given day's work than with the ordinary controller. To partly offset this tendency toward too great heating, the fact that the electric controller is insurance against starting heavy loads in the parallel connection of the motors and against other abuses requiring high current consumption is important. Then again the high motor horsepower per ton of locomotive weight now used on locomotives is most favorable. With many locomotives the high motor horsepower per ton of weight has been adopted not so much from a point of view of necessary heating capacity for the work to be done as from a desire to have a locomotive whose motors cannot be overloaded, this being accomplished by making the motors so large that the locomotive will slip its wheels before the overload capacity of the motor has been exceeded.

No doubt, there are some conditions, however, under which the extra heating of the motors when used as generators in electric braking must be considered, but a proper balancing of these factors should present no serious problem.

SIZE OF PULVERIZED COAL.—There is no definite size to which coal must be ground for use in powdered-coal burning plants, although it is recommended, generally, that 95 per cent of the pulverized coal should pass through a sieve with 100 meshes to the inch and 80 to 85 per cent through a sieve with 200 meshes to the inch, states John Blizard, fuel engineer of the Department of the Interior, in Bulletin 217, just issued by the U. S. Bureau of Mines. It has been found possible to operate some furnaces with coarser coal, and found necessary for firing open-hearth furnaces to grind the coal more finely.

Are Valleys Usually Accompanied by Dips, And, if so, What Is the Explanation?

BY G. F. CLEVENBERG

Civil and Mining Engineer, Williamson, W. Va.

THE mountains of our southern West Virginia coal field are supposed to have been formed by erosion, that is, the streams have carved out the present topography from a plateau that was originally almost flat but which had a small dip to the northwest. This plateau, which composed the deltas of the Pennsylvanian, was raised by the great mountain-making movement of the Permian. The streams and rivers which flowed through this plain of low topography had their channels necessarily in the small structural dips of the strata and started immediately after the uplift to cut down into the soft and barely consolidated top strata of the old delta, and, continuing down in their meandering course, reached the beds of today, still retaining in their intrenched meanders the course they had followed when the country was level.

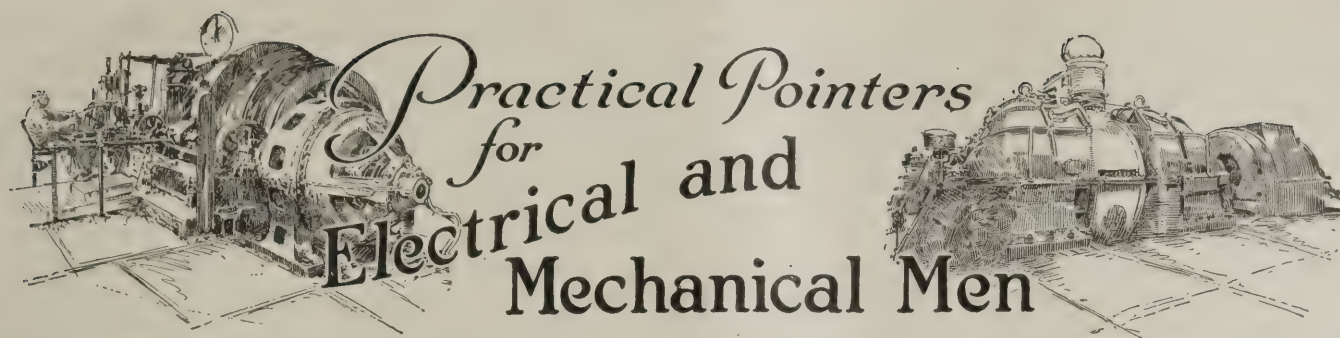
In many of our mines in the Williamson coal field I have noticed that when the working places approach any large branch or hollow the coal dips more sharply into the hollow, and sometimes this is so marked that the general dip is reversed. Often an entry approaching a hollow will begin to dip at a point about 500 ft. distant from the stream in the valley, making much trouble because of the water encountered. This dip continues till the stream is overhead, whereupon the entry begins to rise and gets back on the normal dip again in a short distance. In one mine with which I am familiar this happened when the workings passed under a small branch stream, and in another mine when the operations approached a fairly large creek. In each case the coal dipped toward the creek at about a 14-per cent grade, and flattened out after reaching the stream or creek. The normal dip in this last-mentioned mine is only about 50 ft. to the mile.

I have wondered whether this condition is universal in the dissected plateau coal fields of southern West Virginia. If so the circumstances described conclusively prove that the original streams of the plateau took their courses in the small structural dips in the strata, and if such conditions can be expected when approaching and passing under streams the trouble can be anticipated and preparations made for meeting it successfully. Such a dip would not be revealed in all cases, in fact it would be apparent only where, in the vicinity of the larger hollows, many prospect holes were opened and a careful survey was made in which the levels and elevations of the base of the coal would be carefully determined.

It would be interesting to hear from other mining men whether this condition is generally encountered where mines of the southern West Virginia or the eastern Kentucky coal field pass under the streams and the larger hollows of those regions.

THE SIOUX INDIANS claim that the United States owes them the neat sum of \$750,000,000. Let us hope that they won't occupy the Pittsburgh coal-mining district.—*Tacoma Ledger*.

MR. FOSTER is in favor of "direct action." Do not deceive yourself by thinking that this means work.—*Minneapolis Journal*.



Helical Gear Reduction Unit for Mine Fan Meshes Without Impact and Saves Space

DESIRE for flexibility in the speed of ventilating fans and the wide difference in speed between fans and electric motors early led to the adoption of a belt drive because it was believed that by this means the number of revolutions per minute most readily could be varied to meet an ever-changing operating condition merely by the use of a large or a small pulley on the motor shaft. The change of pulleys in accordance with this plan is not made frequently for the reason that a marked change in the ventilation system is in evidence only at widely separated periods. So one might justly say that the average fan installation has a constant speed, and therefore, a gear drive is expedient for the purpose.

There are disadvantages which are generally accepted as facts in the driving of a fan by a belt. Power lost through slippage is perhaps the most notable of all. Even with constant attention under favorable conditions, where the shafts are accurately aligned and the belt is precisely adjusted for tautness, there is certain to be a loss of energy between motor and fan.

Reliability in the performance of vital equipment at the mine is not merely a desirability but a necessity. To obtain it without resorting to a direct drive by an unduly large slow-speed motor, gears and pinions are employed, as, for instance, on pump units. A gear drive for a mine fan is equally as effective, and in consequence offers the mine manager a surety of fan operation. It is no more flexible than the belt drive nor is it less flexible. It is far more desirable than a belt drive in that the complete unit is compact and takes up no more space than a motor-generator set, resembling the

latter closely, as may be seen by an inspection of the accompanying illustration. Consequently the fan house can be made smaller than for a belt drive. An increased fan speed can be obtained by substituting a larger pinion for a smaller one; or the fan may be driven by a variable-speed induction motor which is provided with a brush-shifting device.

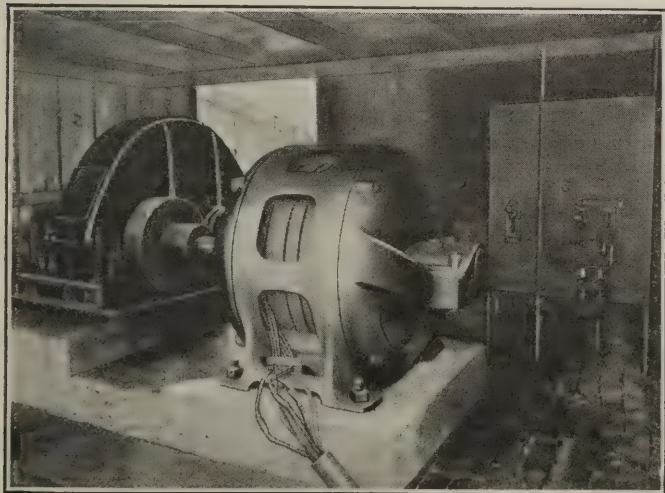
An interesting example of a gear-driven fan installation is that of the Carnegie Coal Co. at its Cedar Grove mine, Studa, Pa. Here a 12-ft. exhaust fan which makes 120,000 cu.ft. of air per minute against a water gage of $1\frac{1}{2}$ in. is driven by a 125-hp. two-speed induction motor through a standard helical gear reduction unit which was furnished by the R. D. Nuttall Co., of Pittsburgh, Pa. The fan is so situated that it will be near the center of the workings for the next ten years or more. During the day a speed at the motor of 720 r.p.m. is reduced to 90 r.p.m. at the fan. At night or when the mine is not working the motor and fan speeds are 360 and 45 r.p.m. respectively. The gear set is incased in a housing which shelters the moving parts from dust and dirt.

The helical gears are smooth running and quiet because of their design. The slight angle of the teeth provides a mechanical condition in which there is always contact between them. As a result there can be no lost motion or chatter in the meshing of teeth, and the load is transferred without impact from the pinion teeth to the gear teeth even when the pinion is worn. Moreover, the tooth design is such that the rolling contact is increased 50 per cent for the reason that the base of the tooth is wider and thicker than is the base of the ordinary teeth of a spur gear or pinion.

Safety in Electric Welding and Cutting*

THE art of welding and cutting by means of the electric arc is subject to certain rules and safeguards recommended by fire insurance and safety organizations for the preservation of property and for protection of health, eyes, and bodies of the operators. Experience has shown that the fire hazard is not serious, due to the fact that the immediate presence of the operator and the concentrated attention which his work requires help to prevent the start or spread of any fire originating from flying sparks or molten metal.

For protection of the operator and of men working in the vicinity it is necessary to take certain precautions. If these precautions are taken arc welding becomes a perfectly safe occupation. There are at present some sixty thousand welders using the arc. We have several welders at our plant who have worked steadily with the arc for six or seven years without any apparent bad effect. In ordinary arc welding, where currents ranging



INTERIOR OF FAN HOUSE AT THE CEDAR GROVE MINE
The drive end of the fan unit as pictured closely resembles a motor-generator set. A temporary wooden structure was erected to house the unit but at a later date this will be replaced by a brick building.

*Paper presented at the Safety Conference of the National Safety Council, Engineering Section, and the Detroit Safety Council, Detroit, June 12, 1923.

from 50 to 200 amp. only are used, simple precautions are necessary for the protection of the operator's eyes and the exposed portions of his body. The usual method of protecting eyes is the use of a face shield or head mask with glass window inserts, the glass of which is of such a composition as to absorb the injurious ultra-violet and infra-red rays. When several welders are working in the same room, in addition to the use of face shields or head masks colored glasses with side protection are worn to protect the eyes of each operator from the arcs of the others.

All exposed parts of the body are subject to a burning effect from the rays of the arc. This burning is similar to a sunburn and if the body is not protected by a covering of some kind it will cause the operator more or less discomfort or pain. The body usually is covered by ordinary close-woven clothing and the hands by leather gloves, not only to protect against the rays of the arc but against flying particles of hot metal. The gloves further protect him in handling hot parts. In heavy carbon arc welding and cutting, where currents from 200 to 1,000 amps. are used, it is necessary to protect the operator still further, as with these heavy currents the arc rays will penetrate the ordinary clothing and the flying particles of molten metal will burn through them. Usually a large, well fitting leather or asbestos apron is used, protecting as much of the body of the operator as is possible.

For the protection of men working near an arc welder opaque screens should be placed between the arc and the workers or, better still, a booth should be built around the operator, thereby shutting off all the arc rays from the surrounding part of the factory.

Care has to be taken regarding the painting of the interior of an arc welding booth. If a paint that reflects the rays of an arc is used the operator may be subjected to eye flashes from the side and back of his face shield, or to the burning of the back of his neck or ears. A paint that will absorb the dangerous rays should be used on the interior of a booth and on all equipment located within it. A simple, satisfactory paint for this use is composed of zinc oxide and oil, which may be given any desired tint with lamp black.

Where heavy welding or cutting is being done and where galvanized iron or steel or materials that are oily is being welded it is desirable in safeguarding the health of the operator to provide ventilation ducts or fans to carry away the smoke and fumes.

In metallic arc welding where direct current is used with an open circuit voltage of from 40 to 60 volts and a welding voltage of 20 it is not necessary to pay much attention to the protection of the operator from an electric shock. With alternating-current welding this is a little more serious, as the operating voltage ranges from 100 up to as high as 175. If the operator is not careful while changing electrodes the higher voltage is likely to give him quite a shock. There is no positive way to protect the operator against this voltage, however, if he is in direct contact with one side of the circuit in handling his work and with the other side of the circuit in inserting his electrode material. He must be careful not to get in contact with both at the same time.

This same condition applies to resistance welders used for railway work where the trolley voltage is from 450 to 650 direct current. In this case it is necessary for the operator to be careful to keep free from grounds while changing electrodes. Welding resistors for use in

railway welding are sometimes provided with a push-button station under the control of the welder for opening a contactor in the welding circuit while changing electrodes. However, many welders object to carrying around this pushbutton station and would rather take the extra precautions necessary when changing electrodes.

In many installations where a large number of small articles are welded, particularly with the automatic welder, instead of building a booth around the operator to protect outside workers and instead of providing the operator with a mask or face shield an inclosed cabinet is built around the operation itself, inserting in this cabinet a colored glass protective window through which the operator can watch the progress of the welding.

Where many welders are working on small work it is customary to build a series of small booths, the tops of which are open and extend above the operator's head, the front of the booths being supplied with the welding control apparatus and with a bench on which material to be welded is placed. The backs of the booths are protected with a series of curtains which are closed by the operators before starting to weld. This makes a compact and satisfactory arrangement.

For the protection of welding apparatus, safeguards, as applied to apparatus of similar nature, are used such as circuit breakers, contactors, fuses, enclosed switches, enclosing boxes for control apparatus, insulated couplings, gear cases, insulated holders, etc.

D. H. DEYOE,
General Electric Co.

Schenectady, N. Y.

To Avoid Clinker Trouble

(1) Keep your slice bar out of the fire. Ashes, when mixed with incandescent coal, melt and cause clinker.

(2) If you have to use the slice bar, run it gently along the grate bars, raising it just enough to break up the clinker.

(3) Throw water into the ashpit. It turns to steam, which softens the clinker.

(4) Run a $\frac{1}{2}$ -in. steam line into the ashpit, or, if necessary, install a small steam blower. The steam rots the clinker and the air increases the draft.

(5) Overheated grates cause clinker. Keep the ash-pit doors open.

(6) Throw out all sulphur balls and pieces of slate before firing. They make clinker.

(7) If you have to force your boiler, use high fusing coal. —*Courtesy W. A. Marshall & Co., New York.*

SPONTANEOUS COMBUSTION OF PENNSYLVANIA COALS.—In the course of a study of the spontaneous combustion of coal being made at the Pittsburgh experiment station of the U. S. Bureau of Mines, J. D. Davis, chemist, and J. F. Byrne, research fellow, conducted experiments on spontaneous heating of coal starting from room temperature. Upper Freeport heated 3 deg. from room temperature in six hours. Upper Kittanning coal gave no heating whatever. This corresponds to results of practice. Kittanning coal usually is sold by dealers with a guarantee not to fire. It is semi-bituminous and similar to Pocahontas coal but not so fireable. Pittsburgh coal rose a maximum of 2.7 deg. above room temperature in 72 hours. The rate at first was rapid, then slowed as the temperature continued to rise—higher temperature again caused acceleration. In these experiments the coal was first treated in a current of coal gas to bring equilibrium with the thermostat, then a current of oxygen was passed through under adiabatic conditions. The apparatus seems to work satisfactorily and the problem now resolves itself into finding the optimum rate of air or oxygen flow as a means of comparing the heating qualities of coals.

New Equipment

Solid Steel Frog Requires No Splice Bars

A NEW cast-steel frog cast in one solid piece and hence requiring no splice bars for its installation was recently placed on the market by L. A. Green, of Pittsburgh, Pa.

The absence of rivets and bolts in the construction of the frog eliminates opportunity for acids in the mine water to loosen up the various parts. The rails are bolted to the frog by means of extension pieces, similar



DURABIL STEEL FROG

Probably more derailments occur at frogs and switches than at any other place in the mine track. These derailments frequently are due to loose track accessories. Here is a frog which is made of one piece, thus reducing the number of parts to a minimum.

to splice bars, which are cast as an integral part of the frog. This arrangement makes a very rigid joint.

The composition of the steel used in the manufacture of the frog is asserted to be such that the frog will outlast several of the more common types of frogs used for mine work.

New Universal Thermal Relay

A THERMAL relay designed to be universally applicable to any surface has recently been brought out by the Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio. A brass bulb at the lower end of the relay makes contact with the surface whose temperature is to affect the operation of the relay. A liquid element in the bulb expands with the heat transmitted to the bulb and operates a push-button switch at the upper end of the relay.

A novel feature in connection with this push-button switch is that it may be placed in the housing as readily to make the relay circuit closing as circuit opening. This makes the relay applicable to control circuits which would shut down a machine or give a signal. After the relay has operated, the push-



FIG. 1
EXPLODED
VIEW OF
RELAY

B-1 and B-2 are the push-buttons of the switch; one is used for circuit opening while the other is used for circuit closing. F are machine screws which hold the cap and switch in the casing.



FIG. 2
ASSEMBLED THER-
MAL RELAY AND
BRACKET

C is the mounting bracket and E the adjusting screw for properly locating the relay. The over-all length of the relay is 6½ in.

button switch is reset by depressing the button shown at B in Fig. 2.

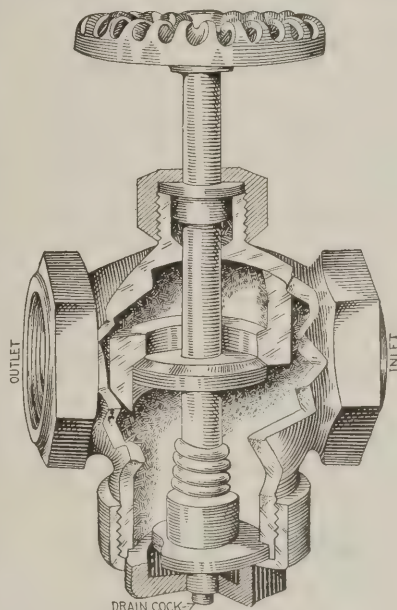
Obviously, the relay may be adapted to any system of control using either the circuit-opening or circuit-closing feature.

The relay was designed primarily for the protection of electric motors against overloading and overheating, which may be caused by any number of reasons such as single-phasing, too frequent starting, overvoltage, etc. It is applicable also to the bearings of small machines and also to transformers.

The uses of the relay seem to be unlimited as it may even be used to start spare generating equipment when the operating generator equipment heats up due to continued overload.

A Globe Valve with Many Improvements

THE line of equalized reciprocating valves made by the Murphy Valve Co., of Columbus, Ohio, is complete, the company announces. Outstanding features of the Murphy Globe valves, already on the market are, the higher the pressure the tighter the valve seats itself, one-piece disk and stem, removable cap, and the valve can be packed under pressure. When the valve is closed the pressure is confined in the lower half of the valve body so that there is no pressure on the stuffing box. It may therefore be packed on the line while under pressure. This arrangement also causes the disk to seat itself more tightly when closed, the pressure exerting a closing force upon the disk. The disk and stem of the valve make it impossible for the disk to become loosened on the stem, a common occurrence on valves used on feed lines where there is a pump pulsation or water hammer.

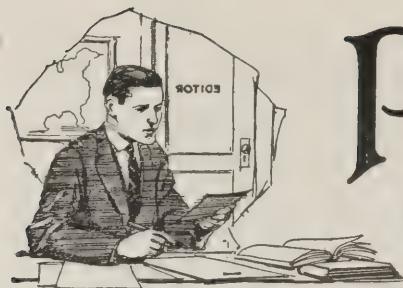


GLOBE VALVE WITH MANY
NEW FEATURES

The pressure on the inlet side of the valve is exerted against the disc, which seats itself on the valve seat more tightly when closed. The drain cock may be opened and the valve cleaned of sediment by the pressure of the lines.

Another interesting and important feature is that the valve may be opened at the drain cock and the pipe line drained from both directions. This is a sure protection against frozen and burst pipes and a ready means of cleaning the line.

M. GEORGES, CHIEF MINING ENGINEER OF FRANCE, says that while America possesses coal reserves of 2,000,000,000 tons; Germany, 410,000,000,000 tons; England, 190,000,000,000 tons; Russia, 60,000,000,000 tons; and Austria and Hungary, 54,000,000,000 tons, France has only a supply of 17,000,000,000 tons. The normal pre-war consumption of coal in France was 60,000,000 tons a year, so that France should have sufficient fuel for 300 years. In his opinion France has ample time to evolve alternate forms of energy and to devise ways and means to economize in her coal consumption.



Problems of Operating Men

Edited by
James T. Beard



Faulting of an Inclined Seam in Coal Mining

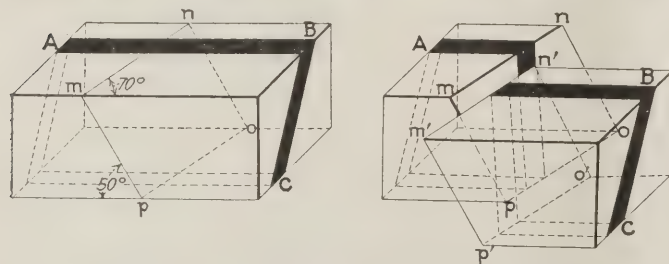
Strike of Fault Plane Seldom Parallel to Strike of Seam—Fault Plane May Have Any Position Relative to Plane of Seam

THE issue of *Coal Age* for April 12 contained a number of interesting articles, but I was particularly absorbed in reading that by James S. Chalmers, page 589, regarding the working of highly inclined seams. That in connection with the inquiry on "Locating the Coal Beyond a Fault," page 608 of the same issue, leads me to offer the following suggestion.

References made by previous writers, in regard to locating the coal beyond a fault, incline me to think they almost invariably assume that the strike of the fault plane follows the same direction as that of the seam itself. Of a dozen or more faults I have encountered in inclined seams, this has never yet been the case.

Invariably, the strike line of the fault plane makes a considerable angle with that of the seam itself. The angle may reach 90 deg. For that reason, it is impossible to illustrate the true nature of the situation on a profile similar to what has been presented.

It is clear that should the fault plane be perpendicular to the plane of the seam it would correspond to the plane of the profile or, at least, its strike line would be parallel to that plane and nothing would be effected.



ISOMETRIC PERSPECTIVE SHOWING FAULT OF DISLOCATION

Evidently, a perspective diagram similar to that I am showing in the accompanying figure is needed to illustrate the real situation.

With that end in view, I recently constructed a model of plastic clay, in the shape of a rectangular prism. In order to represent the coal seam in this model, I inlaid a piece of cardboard ABC , inclined at a considerable angle with the sides of the prism.

This being done, the next step was to cut across the entire block or prism in a plane $mno p$. In the figure, this plane is indicated as having a strike that makes an angle of 70 deg. with the strike of the seam and has a pitch or dip of 50 deg. from the horizontal plane. The cutting plane $mno p$ is intended to represent the plane of the fault.

Again, on the right of the figure is shown an isometric perspective that illustrates clearly the relative situation of the two sections of the seam, after the slip has occurred. It is evident that the calculation of the continuance of the seam beyond the fault is not as simple as when the strike of the fault plane parallels that of the seam.

As shown on the right of the figure and as often happens, the movement has taken place in two directions, one corresponding to the dip of the fault plane and the other being in a horizontal direction as a side-slip. Keeping these things in mind, a careful study of the figure will show that the movement may either increase or decrease that which would take place were the strike lines parallel. In other words, the dislocated portion may be either on the side of the footwall or the hangingwall, depending on the angle of the strike line and the relative inclination of the fault plane with that of the seam.

In every case, a practical mining man, after making an active survey of the fault, will be able to determine how to proceed to find the continuation of the seam. For example, in the case shown in the figure, he would start driving a crosscut to the right in the hangingwall.

Staunton, Ill.

HENRY BOCK.

What Is Lacking to Make Mines Safer

Certificate laws in many states—Mine superintendent the responsible head—His certification needed to insure safety in the larger mines.

NUMEROUS references have appeared recently, in the columns of *Coal Age*, regarding the reduction of mine accidents. It has been shown how a large percentage of them are such as might have been prevented had the management possessed the proper regard for avoiding possible accidents.

All of us have our own way of thinking and each is guided by his own intelligence and personal experience in the work of mining. What I have to say, however, may be of interest to operators and a benefit from a human and economic standpoint.

It is well known that the principal coal-producing states have laws requiring the employment of certified mine foremen, assistant foremen, firebosses and, in some instances, hoisting engineers. There are few who will deny that these laws have proved a benefit to mine owners and mine workers alike. Our mines, today, are worked under better conditions by reason of these laws.

On the other hand, any one who has given the matter serious thought can hardly fail to realize that the present certification laws apply more effectively to smaller mines where the mine foreman is generally the responsible head. The same is not the case at larger mines, employing a superintendent whose duties make him responsible for the safe operation of the entire mine both underground and on the surface.

My candid opinion is that our certification laws, in order to be effectual in the safe operation of all mines, should be extended so as to include the certification of all mine superintendents and others having direct charge of work underground.

It cannot be denied that the superintendent, by virtue of his position, exerts a powerful influence on the work of the mine foreman, even where the latter is supposed to have a free hand in the management of underground operations.

There are mines where the management is awake to this situation and realizes that the mine foreman should be the responsible head in respect to underground conditions where he is given a free rein. But more often the foreman is seriously handicapped either for lack of material or in respect to the character of the men he is obliged to employ.

CO-OPERATION OF SUPERINTENDENT AND FOREMAN

It goes without saying, that the most effectual system possible, in the operation of a mine, is that where the mine superintendent and mine foreman work together on a mutually equal plane of knowledge and experience in the operation of the mine.

If this was true at all mines, there would be no need of asking that our certification laws be modified. However, instances are numerous, in fact it might be said to be a general rule, that the management of many large mines are not alive to the seriousness of the situation as it regards the actual responsibility for the safe control of underground work.

The superintendent being regarded as holding the higher office is very generally considered the responsible head and the mine foreman is made subject to his orders. It is this fact that creates a dangerous state of affairs, under conditions that may arise with frequency in the operation of a mine. Therefore, it is only fair and reasonable to require the same degree of knowledge and experience of underground work on the part of both the superintendent and the foreman if they are to co-operate mutually.

DANGER IN FOREMEN SELECTING THEIR ASSISTANTS

There is still another phase of this subject concerned in the selection and appointment of assistant foremen. It is unwise to leave their selection wholly to the foreman. Human nature is human nature the world over and, however competent and honest a foreman may be, he cannot be expected to choose as his assistants certain ones whom he knows aspire to his position and who, it may be, possess certain qualifications superior to his own.

As "competition is the life of trade," it is also the one element that offers the strongest inducement to mine officials of every class to make their work efficient and produce results. Therefore a chief factor, in the efforts of managers to make their mines safe, is to promote honorable competition throughout the rank and file of their employees.

Let me say in closing that the employment of a superintendent who has not the knowledge and practical experience regarding underground operations is like attempting to run a mine car on three wheels instead of four. It is an expense to the company, a detriment to safe operation of the mine and a positive handicap to a good foreman in charge of the work underground. That has been my experience as mine manager. In this state (Illinois) the foreman of a mine is called the

"mine manager" and the fireboss is termed "mine examiner," which many think better describes his duties in the mine.

Then, finally, if our mines are to be made safer, accidents reduced to a minimum and profits increased, all officials in direct charge of work must be men of practical experience, who should hold certificates of competency granted by the state examining board. The question of the certification of mine superintendents is not new to the readers of *Coal Age*, who have argued in its favor almost universally.

DAVID YOUNG.

Edwardsville, Ill.

Electric Cap Lamp a Part of Every Fireboss' Equipment

Constant efforts made to improve lighting in the mine—Electric cap lamp the fireboss' friend—Reasons why firebosses need the lamp.

I HAVE read with interest the several letters that have appeared in recent issues of *Coal Age*, relative to a fireboss using an electric cap lamp while testing for gas. The subject calls to mind different references I have seen in books and periodicals, regarding the earlier methods of supplying an illuminant that would be free from danger in an explosive mixture.

One statement that seems almost unbelievable says that the earliest attempt made to illumine the darkness of the mine consisted in the use of fishes eyes and other putrid matter that gave a phosphorescent glow in the Egyptian darkness underground. A little later, this means of lighting gave place to the use of the old "steel mill," which was a disc of metal made to revolve very rapidly in contact with a piece of flint, causing a continuous shower of sparks.

PROPERTY OF WIRE GAUZE DISCOVERED BY DAVY

Both of these means proved most unsatisfactory and it remained for the eminent chemist, Sir Humphry Davy, in 1815, to discover the property of cool wire gauze to prevent the passage of flame through its mesh.

This discovery of Davy gave to the mining industry a lamp that produced a good light and was safe in the presence of explosive gas. The well known Davy lamp is still a favorite among a great number of firebosses who have long been accustomed to its use in making their examination of the mines.

Following the introduction of the Davy lamp, more than a hundred years ago, many improvements have been made and various types of safety lamps are now in use. The chief object has ever been to increase the illuminating power of the lamp and its security in a gaseous mixture. The result has been that a flame safety lamp capable of giving more than 1 cp. has been produced and approved by the Bureau of Mines as being safe for use in gaseous mines.

ADVENT OF THE MINERS' ELECTRIC CAP LAMP

Now comes the electric cap lamp, which is another advancement in the work of finding a better light that is safe in gas. It is universally agreed that this incandescent lamp or bulb is of no value for testing for gas, its usefulness in the mine being confined solely to the giving of a good light, which is the equivalent of several of the best types of safety lamps.

In this connection, it is amusing to read the claim of one writer that he "cannot spare the time to hide his electric lamp which blinds his eyes when making a

careful test for gas." His account of having to shed his coat, vest and overshirt and even then finding his trousers wet from perspiration is a suggestion of an endurance test as a footracer, rather than a test for explosive gas.

TIME SAVED BY ELECTRIC CAP LAMP

In my opinion, the man would save time by carrying an electric lamp in his cap, which would enable him to move about more quickly and with less exertion, and he would not then need to lower and raise again the flame of his safety lamp to make each test. It would take less time to screen his cap lamp with his hand when making a test, than is now required to lower and raise the flame of his safety lamp.

Those who claim that a fireboss "should use no other light than that of an approved safety lamp," must remember that the electric cap lamp is also an approved

lamp for use in gas. The laws, in many states, require the fireboss to examine for *all* dangers and, for that purpose, he should have as good a light as any other person entering the mine.

Briefly stated, the reasons why a fireboss should use an electric cap lamp, in connection with his safety lamp, is that the brighter light of the cap lamp will enable him to travel faster and detect danger of insecure roof and coal that he would not observe with the dim light of his safety lamp.

Also, he will be safer when climbing high falls and steep pitches that require his attention and a good light to reveal the conditions existing about him. Lastly, in the event of the safety lamp being extinguished, which often happens, the light of his cap lamp will enable the fireboss to retreat to a place of safety where he must relight his safety lamp.

Walsenburg, Col.

WILLIAM H. JAMES.

Inquiries Of General Interest

Withdrawing Mine Timber When Robbing Pillars

Careful Examination of Roof Conditions
the First Requisite—Use of Chain Post Puller
Keeps the Workman Out of Danger Zone

MANY accidents are recorded as the result of drawing timbers, in the work of robbing pillars. As is well known, it is of the utmost importance to leave no timbers standing in the waste, since they act to prevent the fall of roof whereby the pressure on the pillars is reduced and the work of robbing made less dangerous. In our mines, we have resorted to different methods of removing these timbers when drawing back the pillars, and though I can say that we have had comparatively few accidents in that work, the results have not been altogether satisfactory.

One method, which we adopted because it promised greater safety to the men, was to blast out the timbers when they could not be knocked out with any assurance of safety. A hole was drilled in the post, say ten inches or a foot below the roof, and a small stick of dynamite inserted and exploded in the hole. This method, however, had the disadvantage of destroying such posts, which were buried in the fall of roof and lost forever. I want to ask for an explanation of the most practical way of recovering mine timbers in a condition to be used again in the work of robbing. MINE FOREMAN.

Clifty, Tenn.

The growing scarcity of mine timber makes its recovery in good condition an item of economic importance in the operation of mines. Not only is the supply of timber conserved, but the cost of production in the mining of coal is greatly reduced. On this account the method of blasting out timbers should only be employed where it is impossible to remove the posts with safety, by other methods.

The most practical method to adopt for the recovery of post timber is to employ a device known as the "Chain Post Puller," the use of which is illustrated in Fig. 1. When employing this device it will be ob-

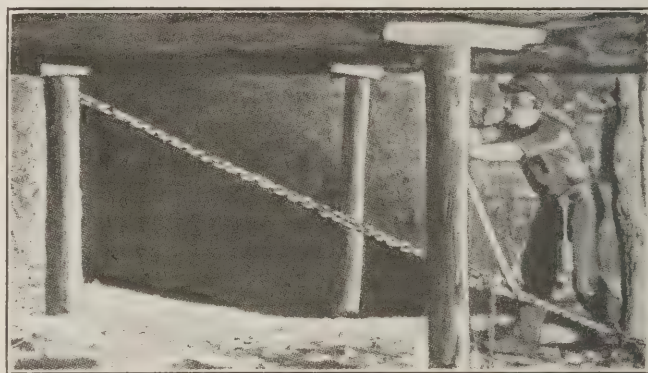


FIG. 1—DRAWING A POST WITH A CHAIN POST PULLER

served that the workman operating the machine is wholly outside of the danger zone, being protected by substantial posts standing between him and the timber he is pulling.

No explanation is needed regarding the operation of the device, the action of which is clearly shown in the figure. A short tail chain serves to anchor the machine to the foot of a post stood, for that purpose, in a good foothole cut in the bottom to give the post the needed resistance to the pull of the chain.

A longer chain is made fast around the head of the post that is to be pulled. The other end of this chain is attached to a movable piece that travels on the rack bar shown in the figure. By means of the hand lever there shown, this sliding piece is moved backward on the barrel, notch by notch, producing a great strain on the chain that pulls the head of the post free from the mine roof.

In Fig. 2 is shown the anchor post mentioned above, with a short length of chain attached to its foot. The use of this device has prevented many an accident from occurring in the dangerous work of drawing mine posts.

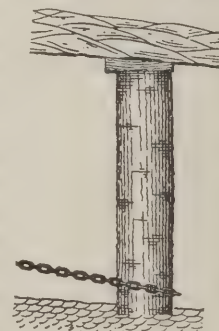


FIG. 2.
THE ANCHOR
POST

Examination Questions Answered

Hoisting Engineers' Examination, Springfield, Ill., Mar. 19, 1922

(Selected Questions)

QUESTION—An indicator attached to a winding drum is run by means of a gearwheel meshing with a worm on the end of a shaft, and the small gearwheel that is connected to the pointer has 15 teeth. If the circumference of the dial is 32 in., how far will the pointer move for each revolution of the drum?

ANSWER—Assuming that the worm is on the end of the drum shaft, each revolution of the winding drum will pass one tooth of the gearwheel attached to the pointer. Then, since the gearwheel has fifteen teeth, the pointer will make one complete revolution of the dial for each fifteen revolutions of the drum. Therefore, in a single revolution of the drum, the pointer will move $1/15$ of the circumference of the dial or $32/15 = 2-2/15$ in.

QUESTION—Name two kinds of safety valves and state which is the best type of valve to employ.

ANSWER—The spring safety valve and the ball-and-lever valve. The latter is being rapidly replaced by the former, because of the greater reliability of the action of the spring valve, in response to any change of pressure.

QUESTION—Define the terms: Forward pressure; back pressure; mean effective pressure; and state what is the difference between pressure above the atmosphere and pressure above a vacuum?

ANSWER—In steam engine practice, the term "forward pressure" relates to the pressure of the steam in the cylinder, acting to drive the engine. The term "back pressure" relates to a certain resisting pressure, which is opposed to the motion of the engine and caused by the resistance of the discharge ports to the escape of the exhaust steam from the cylinder.

The term "mean effective pressure" relates to the average pressure of the steam, in the cylinder driving the engine, and is equivalent to an assumed constant pressure of the steam throughout the length of the stroke.

The difference between pressure above the atmosphere and the pressure above a vacuum, is best explained by saying that the former is the effective working pressure producing motion in an engine exhausting against the atmosphere, disregarding the loss due to any back pressure in the cylinder. On the other hand, pressure above a vacuum is the absolute pressure, which includes both the working pressure and the pressure of the atmosphere.

QUESTION—How many horsepower will it take to pull twenty loaded cars up an incline 400 ft. long, in one minute, the weight of the coal in each car being 3,000 lb. and the weight of the empty car 900 lb., if the resistance of rope and pulleys is 13 per cent and the grade 7 per cent?

ANSWER—The total moving load, in this case, is $20(3,000 + 900) \div 2,000 = 39$ tons. Then, assum-

ing a track resistance of, say 15 lb. per ton, the grade resistance being 20 lb. per ton, for each per cent of grade, or $7 \times 20 = 140$ lb. per ton, on a grade of 7 per cent, the total resistance of track and grade is 155 lb. per ton, to which must be added 13 per cent for the resistance of ropes and pulleys, giving a total resistance of $155 \times 1.13 = 175.15$ lb. per ton of moving load. This makes the total resistance when hoisting a loaded trip of twenty cars weighing 2.36 tons, $175.15 \times 39 = 6,830.85$ lb., which is the average pull or load on the rope, under the assumed conditions. Finally, assuming an average velocity of 400 ft. per min., with a load of 6,830.85 lb. on the rope and an efficiency of 85 per cent in the hoisting engine, the required power of the engine for this hoist is

$$\frac{6,830.85 \times 400}{0.85 \times 33,000} = 97.4, \text{ say } 100 \text{ hp.}$$

QUESTION—(a) What is the tensile strength of Norway iron? (b) Give the breaking strain of a $1\frac{1}{2}$ -in. crucible, cast-steel hoisting rope having six strands, nineteen wires each; and state the safe working load?

ANSWER—(a) The ultimate strength of Norway iron varies from 48,000 to 50,000 lb. per sq.in., and the elastic limit of the metal varies from 26,000 to 27,000 lb. per sq.in.

(b) The breaking strain of a $1\frac{1}{2}$ -in. crucible, cast-steel hoisting rope, six strands, nineteen wires, is given by the formula

$$S = 39d^2 = 39(1\frac{1}{2})^2 = \text{say } 60 \text{ tons}$$

In mining practice, the factor of safety employed for hoisting, in shafts, will vary from 5 for shafts of moderate depth, say 50 or 60 yd., to 8 or 10 for very deep shafts. In this case, assuming a factor of safety of 5, the safe working load of this rope, in a shaft 200 ft. deep, should not exceed 12 tons.

QUESTION—(a) What special care is required to be given to hoisting ropes and cages? (b) How would you determine whether a hoisting rope is unsafe and what portion of the rope would you consider the weakest part, or the part most liable to give out first?

ANSWER—(a) Hoisting ropes and cages must be carefully examined at the beginning and end of every shift, to make sure that they are in safe working condition. Special care must be taken not to overload the cage or to hoist at a speed exceeding the safe limit, which must be determined in accordance with the depth of the shaft and the kind of equipment. At regular brief intervals, it is necessary to examine with particular care the entire length of the hoisting rope by allowing it to pass through a bunch of waste held in the hand, as the cage is hoisted or lowered very slowly. The purpose is to detect any loose wires or broken strands and any undue amount of wear of the outer strands that would seriously affect the strength of the rope.

(b) That portion of the rope that may be considered the weakest part and more liable to fail is the lower end of the rope, within a few feet of the coupling of the cage, because this portion is often more subject to sharp bending and sudden jerks when the cage is first started off the bottom under a heavy load. Another portion of the rope that may be considered to develop weakness is that portion over the hoisting sheave, above the shaft, when the cage is on the bottom and started too suddenly, whereby a heavy bending strain is developed in the outer wires of the rope, above the sheave-wheel at the top of the headframe.

Power of Miners' Union Based on Violence, Says Brief of Utah Operators

Non-union coal operators of Utah, through counsel for the Bituminous Operators' Special Committee, submitted to the U. S. Coal Commission on June 28 a brief attacking the United Mine Workers of America, declaring that organization to be an impotent and unconvincing machine unless permitted to indulge in violence.

The brief contends that the sole purpose of the union in the campaign in Utah during the nation-wide strike of last year by representatives of the United Mine Workers was to prevent Utah coal reaching the public while the strike lasted and that in the campaign the union was trying only to strengthen its monopolistic grip on the country, and not at all to benefit the miners of Utah. To support this the brief gives a short description of similar campaigns in non-union fields all over the country which were carried on simultaneously with the attack on Utah.

In support of the former charge, the Utah brief cites numerous instances of assaults on loyal workers and even on disinterested citizens who were mistaken for strike breakers or company officials.

These attacks brought about the dispatch of troops to the affected district by order of the government. Firearms were taken from mine guards and strikers, it says, and law and order quickly restored. "With the establishment of law and order," the brief declares, "the attempt of the United Mine Workers to stop the production of coal in Utah completely failed.

"Deprived of the weapons of violence and intimidation, and compelled to obey the law, the invading agitators of the United Mine Workers of America were powerless to further disorganize the community. By lawful methods they could accomplish nothing. The result demonstrates with clearness that at least in the fields where living and working conditions are good the United Mine Workers of America, with the present high cost of its militant organization, requires the artificial support of the 'check-off' in its system of enforced taxation to keep its existence."

In closing the brief the operators submit a list of thirty-

five names of United Mine Workers of America who have been tried and convicted of violations of the law during the strike in Carbon County, Utah. Eight others are awaiting trial for similar offenses.

Coal-Mine Fatalities in May Decrease In Number and Ratio to Output

Fatal accidents at coal mines throughout the United States numbered 170 during May, 1923, according to reports received by the Bureau of Mines of the Department of the Interior from state mine inspectors. The production of coal during the month was 54,649,000 tons, hence the fatality rate was 3.11 per million tons. In May last year the fatality rate was 4.22 based upon an output of 20,636,000 tons, including 35,000 tons of anthracite. In April, 1923, the rate was 3.49. Because of the miners' suspension of work last year, the production of fresh-mined anthracite in May, 1922, was completely stopped; in May, 1923, the anthracite output was 8,573,000 tons. For bituminous mines alone, the fatality rate in May, 1923, was 2.67 per million tons as compared with 4.17 in May a year ago.

During the first five months of the present year the fatality rate for bituminous-coal mines was 3.55 per million tons, based on 809 deaths, as against a rate of 3.70 for the corresponding months last year, based on 611 deaths. The rate for 1923 represents a reduction of 4 per cent. For anthracite mines alone the five-month fatality rate for 1923 was 5.36 per million tons, based on 228 fatalities, as against a rate of 6.72 for the first five months of 1922 based on 147 fatalities. The rate for 1923 represents a reduction of 20 per cent.

The fatality rates per million tons for the principal causes of accidents during the first five months of 1922 and 1923 were:

	1922	1923
Falls of roof and coal.....	1.906	1.765
Haulage.....	0.819	0.603
Gas and dust explosions.....	0.551	0.670
Explosives.....	0.176	0.174
Electricity.....	0.107	0.122

COAL-MINE FATALITIES DURING MAY, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground											Shaft				Surface						Total by States					
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	2												2							1					1	3	14
Alaska													1													0	0
Arkansas	1																									0	0
Colorado		2		10									12													12	4
Illinois	8		3					3					14													14	1
Indiana	1					1							2													2	0
Iowa																										0	1
Kansas							1						1													2	0
Kentucky			1	1									2													0	10
Maryland																										0	0
Michigan																										0	0
Missouri																										0	0
Montana																										0	0
New Mexico	3		1										4													4	2
North Dakota																										0	0
Ohio	10		2			1		1					14							1				1		15	3
Oklahoma								1					1													1	0
Pennsylvania (bituminous)	19	1	6					2					28						2					1	3	31	18
South Dakota																										0	0
Tennessee			1										1													1	0
Texas																										0	2
Utah	1												1													1	1
Virginia		1											1													1	3
Washington	1		1										2													2	1
West Virginia	19		3			4		1		1			28						1				1	2		30	25
Wyoming			1					1					2													2	0
Total (bituminous)	65	4	19	11		6	1	9		1			116					3	3	2				2	7	123	86
Pennsylvania (anthracite)	21	1	5	1		5		1	1				8	3									1		1	47	1
Total, May, 1923	86	5	24	12		11	1	10	1	1			159	3				3	3	2			1	2	8	170	
Total, May, 1922	38	2	21		11	3		3		1			79	1	1		1	3	1				4	5			87

Coal Retailers Urge Incorporation of Unions, Abolition Of Government Fuel Yards and Adoption of Net Ton

The National Retail Coal Merchants' Association, in annual convention at Scranton, June 25, 26 and 27, went on record as favoring incorporation of labor unions, abolition of government-owned fuel yards and advocating a uniform 2,000-lb. ton throughout the United States. The association expressed accord with, and in the purposes and confidence in the personnel of the U. S. Coal Commission and its intention to aid the commission in every possible way, and urged all retail coal merchants to furnish promptly the information requested by the commission's questionnaire.

Roderick Stephens, chairman of the Governmental Relations Committee, reported that the committee has good grounds to believe that Secretary of the Interior Work will recommend to Congress the passage of legislation to abolish the Government Fuel Yard.

Secretary O'Toole made public a letter he had sent to John Hays Hammond, chairman of the U. S. Coal Commission, in reply to a statement filed with the commission by the United Mine Workers of America in which it is alleged that "distributors are taking a profit on anthracite equal to that of the operators" and that "agreements (exist) among the retail coal dealers to dispose of anthracite at a uniform price."

"To support these allegations," says the letter, "the United Mine Workers quote selected self-serving extracts from various reports of different individuals and groups, and they append statistical tables prepared from unreliable or unknown sources, without authentication, and which, even if supported by reliable proof, are composed of facts covering so short a period, so limited a territory and so small a proportion of the retail tonnage in each section covered, as to constitute no adequate basis for any general conclusions.

"Therefore, placing full reliance upon your good judgment and sense of fair play, we shall rest our case so far as the charges contained in this document are concerned, without attempting to tabulate the mass of material we have collected from each of several cities referred to specifically, which if so presented would support our statements regarding the inaccuracy of the statistics furnished by the representatives of the miners' union."

In his report on the anthracite division of the Trade Relations Committee, Samuel B. Crowell, of Philadelphia, told of sending a letter to S. D. Warriner, chairman of the General Policies Committee of Anthracite Operators, asking for a conference at which government fuel yards, municipal fuel yards, legislation (particularly in Pennsylvania) regarding standards of preparation, publicity with particular reference to the use of buckwheat and smaller sizes and other matters should be discussed. The meeting was held and after an hour's discussion it was Mr. Warriner's opinion that owing to the unusual amount of time and energy which all branches of the industry were putting upon the questionnaires from the U. S. Coal Commission and the fact that until the final report was made by the commission, time was not opportune that the suggestions be acted upon. However, further conferences between the operating end of the anthracite industry and Mr. Crowell and members of his committee have been held and consideration given to some of the suggestions. The committee recommended to all coal dealers, particularly those doing business in the anthracite district, to individually help the sale of No. 1 buckwheat.

Marshall Keig, of Chicago, chairman of the bituminous coal committee, making a verbal report, appealed to producers to prepare their coal properly and escape criticism. It is the duty of producers and wholesale dealers to educate the public in the use of bituminous coal and he declared that the retail dealers would be glad to join them in the educational campaign.

Homer D. Jones, of Chicago, president of the Association, in his address delivered at the first session of the convention, told the members that the principles of the organization as

set forth in the Declaration of Principles are "truth, honesty, courteous service and fair dealing" and that any individual merchant or aggregation of merchants falling short of this measure is undesirable as a member of the organization. The retail dealer is as honest, dependable and law abiding as any other group of business or professional men, he declared, and it is safe to say that 95 per cent of them never have and never will commit any act or acts that are detrimental to the industry or to the coal-buying public.

Samuel B. Crowell, vice-president of the Newton Coal Co., Philadelphia, was unanimously elected president of the association to succeed Mr. Jones. Other officers and directors chosen were: Vice-presidents, Marshall Keig, Chicago, Ill.; William A. Clark, Northampton, Mass.; J. Maury Dove, Jr., Washington, D. C.; Ernest R. Sweeney, Kansas City, Mo.; Charles B. Staats, Albany, N. Y.; W. L. Vail, Toledo, Ohio; Resident Vice-president, Joseph E. O'Toole, Washington, D. C.; Treasurer, Richard J. Wulff, Brooklyn, N. Y.; Directors, Eli J. Barkume, Detroit, Mich.; Charles B. Bodwell, Manchester, N. H.; Joseph H. Lucking, Newark, N. J.; John S. McEwan, Albany, N. Y.; W. R. Fequay, St. Joseph, Mo.; J. Harry West, Baltimore, Md.; L. P. Coan, St. Louis, Mo.; Joseph Rademacher, Milwaukee, Wis.

The following evening the delegates and many operators and wholesale dealers were the guests of the Anthracite Producing & Sales Co. at a banquet at Irem Temple, Wilkes-Barre, the journey to that city being made in a special train over the Delaware & Hudson R.R. The Chicago delegation, wearing costumes of white capes and large straw hats with wide red bands, was headed by a band of music, while the delegation from Detroit was attired in blue overalls and straw hats. J. Hayden Oliver, general counsel, Glen Alden Coal Co., was the toastmaster.

Cadwallader Evans, Jr., consulting engineer, speaking on "Mining Anthracite" told the dealers that in his opinion there can be no reasonable expectation of a decrease in cost due to a reduced cost of labor except such as will come through a reduction in the wage scale, nor a reduction in cost due to easier mining conditions for these conditions, at least in the northern anthracite region, will grow more and more severe each year. The opening up of the virgin reserve tonnage of the larger companies in the southern anthracite region will no doubt replace the diminishing output from the northern fields as years go on, but with no decrease in cost.

Other speakers at the banquet were Charles Dorrance, Jr., vice-president, Hudson Coal Co., who spoke on the "Preparation of Anthracite," and Alan C. Dodson, president of Weston Dodson & Co., whose subject was "Sales and Distribution."

The last day of the convention was devoted to trips to various mines, the delegates leaving the Hotel Casey in nearly 100 automobiles and visiting the Marvine breaker of the Hudson Coal Co., the Baker breaker of the Glen Alden Coal Co., and the Lafin breaker of the Hudson Coal Co. Many of the visitors remained until later in the week and inspected the inside workings of the mines.

12,910,000 Barrels of Portland Cement Produced During May

Production of portland cement during May, 1923, according to the U. S. Geological Survey, totaled 12,910,000 barrels, compared with 11,176,000 barrels in the corresponding month of 1922 and 11,359,000 barrels in April, 1923. Shipments for the month were 14,257,000 barrels against 12,749,000 in May a year ago and 12,954,000 barrels in April, 1923. Stocks at the end of May were 10,115,000 barrels compared with 12,893,000 barrels at that period in 1922 and 11,463,000 barrels at the end of April, 1923.

Nationalization of Coal Mines Would Be Fatal Venture, Says Brydon

President Harding's stand against nationalization of coal mines, as expressed in his address at Cheyenne, Wyo., June 25, was declared today by John C. Brydon, president of the National Coal Association, to reflect the opinion of economists throughout the country, industrial experts who know that such nationalization would spell disaster for the consumer as well as the miner.

"The competition which now exists in the coal industry, particularly in the bituminous field," he said, "is an advantage to the public. If the government were to run the mines, a non-competitive condition would exist, resulting in inefficiency and consequent reaction against the consumer."

"Furthermore, it seems to me to be obvious that it would be utterly impracticable for the government to operate the mines even if constitutionally possible, either under a system of ownership or of direct control. Bituminous mines spread variously through thirty of the forty-eight states and anthracite mines run thickly in eastern Pennsylvania. There are approximately 7,000 individual coal producers or companies, with some 10,000 mines, engaged in the bituminous field alone. They employ more than 600,000 miners and their yearly output runs between 450,000,000 and 550,000,000 tons, according to the national demand. Approximately 200 operating companies are engaged in anthracite mines, which turn out from 90,000,000 to 100,000,000 tons a year and employ about 150,000 men."

President Brydon declared that federal ownership or control would destroy competition among these widely scattered mines and would throw upon the government the handling of intricate labor problems involving the fixing of wages. "And what is of great importance," he said, "the taking over of the mines by the government would involve a huge increase in the public debt at a time when the country is already under the burden of an unprecedented war debt. From every public viewpoint nationalization would be a fatal venture."

Massachusetts Attorney General Corrects Misunderstanding of Pure Coal Law

Enactment of the Massachusetts pure-coal law, drawn up to prevent the sale of fireproof coal in that state, is causing considerable apprehension to the coal trade there, it being asserted that it will materially curtail shipments of anthracite to the Bay State. For that reason Eugene Hultman, State Fuel Administrator, has asked Jay R. Benton, State Attorney General, to give an opinion on the provisions of the act and its workings. The Attorney General's reply, under date of June 14, is as follows in part:

"Sub-section 249A of the act provides, in substance, that the Department of Public Health, local boards of health, the Director of Standards and local sealers of weights and measures and their authorized agents may enter places where coal is stored or kept for sale and may inspect coal or take samples. Samples taken must be tested. If the coal is unfit for ordinary use it may be condemned, seized and destroyed, or otherwise disposed of than for ordinary use.

"This is the only section of the new law which relates to condemnation and seizure of coal. Because there has been some misunderstanding relative to the law I desire to call your attention to several important provisions.

"The only coal which may be condemned and seized is coal which is unfit for ordinary use. *This means coal which will not burn.* Coal which will burn may neither be condemned nor seized. Secondly, no coal may be condemned or seized except by the Department of Public Health, which is a state department, or with its approval. Local sealers of weights and measures may not under any circumstances condemn coal. Local boards of health may condemn coal *only* with the approval of the Department of Public Health. You will thus observe that the state department is the *only* authority which determines finally whether coal will not burn and whether it should be condemned. This means that

the same standard of unfitness is applied throughout the state through the medium of one central body, and that local influences or prejudices cannot enter into the determination of the question whether the coal will not burn and whether it should be condemned.

"The law is very similar to the so-called pure food law relative to the condemnation and seizure of meat, fish, vegetables, produce, fruit and provisions which are unfit for food, and which law has been in existence in Massachusetts for more than fifty years. Everyone now admits that the pure food law is an absolute necessity and that it works no hardship or inconvenience upon any honest or reputable dealer. The present coal law works in practically the same manner, except that coal may be condemned *only by one central authority*, the Department of Public Health.

"The law is designed to prevent coal which will not burn from being sold in this commonwealth. It has been in operation slightly less than three months and has amply demonstrated its efficacy in keeping non-burnable coal out of the consumers' hands. It has been administered in a reasonable and efficient manner, and with an increase in the force of the Department of Public Health, where all analyses of coal are made, the administration of the law will be still further expedited and much improved.

"No honest or reputable coal dealer or operator should have the slightest occasion to fear the working of the law or its effect upon his business or property. Dishonest dealers or operators who seek to fill the bins of the consumers with coal which will not burn will find that such coal will not be tolerated in Massachusetts."

Court Signs Reading Segregation Decree; Dissolution Ordered Within Six Months

Judges Buffington, Davis and Thompson, in the U. S. District Court at Philadelphia, signed the decree of the court segregating the Reading Company from the coal properties. The decree is based on the third modified plan submitted by the Reading Company, and orders the dissolution in six months from June 27.

The decree provides that after the new mortgages have been executed in place of the existing general mortgage, the tender of the new bonds in exchange for the present general mortgage bonds are to be held open for three months.

Although the decree is called a final decree, there may be further litigation in the case on a provision of the third modified plan increasing the interest on the new railway stock from 4 to 4½ per cent, and on the coal stock from 5 to 5½ per cent as a means of compensating the general mortgage bondholders for financial losses which will ensue from a separation of their security by the segregation.

Segregation of the Reading Company and its underlying railroad and coal companies from each other was ordered by the U. S. Supreme Court in 1920.

Utilities Consume 2,980,425 Tons of Coal In April; Power Production Declines

Electric public-utility plants consumed 2,980,425 net tons of coal during April, according to a report just issued by the U. S. Geological Survey. This compares with 3,351,462 tons consumed during March, according to corrected returns.

Fuel oil consumed by public-utility plants in April totaled 1,006,423 barrels, compared with 1,166,148 barrels in March. The average daily production of electricity by public-utility power plants during April was 149,300,000 kw.-hr., or 2 per cent less than the average daily output in March and about 3 per cent less than the record-breaking rate of February.

The average daily production of electricity for the first four months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent, and April, 149,300,000 kw.-hr., 39.8 per cent. The increase in the amount of water available for the use of hydro-electric power plants and the increase in the capacity of water-power plants is reflected in the increase in the proportion of the total amount of electricity produced by the use of water power.

Famous 226 Indictments Dismissed but Profiteering Case Against 125 Coal Men Is Continued

Criminal indictments against 226 coal operators, union officials, miners and coal corporations were dismissed in federal court in Indianapolis June 28 on motion of Harry M. Daugherty, U. S. Attorney General. The cases had been pending since the return of indictments by a federal grand jury Feb. 25, 1921. Charges that operators and miners had combined to control the soft-coal industry of the country in violation of the Sherman anti-trust law were contained in the indictments. Belief that a conviction could not be obtained was the basis of the motion to dismiss the cases, according to a lengthy statement read by Mr. Daugherty to Judge Albert B. Anderson.

However, indictments against 125 operators and union officials returned in 1920 under the Lever Act to prevent profiteering, remained on the court docket. The 125 defendants, practically all of whom were numbered among the 226 now relieved of the Sherman law indictments, are free on their own recognizance. The profiteering case is "indefinitely postponed." Attorney General Daugherty said he would take no action in this case "for some time."

The Attorney General said in his statement before moving dismissal of the 226 Sherman Act indictments that many things done at joint meetings of operators and miners constituted a conspiracy. Such practices will not be permitted by the government in the future, he said. In making the motion to dismiss, he said one of the reasons was to make it impossible to say that the legal branch of the government was unnecessarily impeding the progress of legitimate business.

GOVERNMENT TO ATTEND MORE TO PUBLIC'S RIGHTS

At the same time he denied that the government was taking a backward step in enforcing the Sherman Act. In the future, he said, the government would give more attention to the rights of the general public. He said many of the acts complained of in the indictments were to some extent due to the efforts of government officials during the war to bring about co-operation between coal miners, operators and the railroads to stimulate coal production.

At the conclusion of Mr. Daugherty's statement Judge Anderson granted the motion and ordered the cases *nolle prossed*. He made no comments and adjourned court immediately. The grand jury investigation which resulted in the indictments two and a half years ago was instituted on instructions from Judge Anderson.

Following the reading of the Attorney General's statement, Indianapolis lawyers who attended the hearing, June 28, said Mr. Daugherty said he believed miners and operators had been guilty of entering into illegal agreements and performing illegal acts, but that the best thing to do was to wipe the slate clean and begin over again.

Some paragraphs were particularly pertinent. One passage follows: "I have no hesitation in saying that usually many of the things agreed upon at the meetings between the representatives of the operators and representatives of the miners, but not often made public, constitute a conspiracy. The public is fed up with the idea that there is a great and stubborn controversy between the contracting parties, when in fact there is no real contest at all and the fake pretensions are intended only to alarm the public so that it will consent to give any price for coal in order to be insured against freezing.

"The intelligent people of this country have grown impatient with the constant quarrel—sometimes only a pretended quarrel—between operator and miner spokesmen, which takes place every few years and lately more frequently, resulting in great losses to industry and great losses to the workingman, to say nothing of the great hardships to everybody. Hereafter the government will give more attention than it has heretofore to the rights of those who suffer the greatest loss by reason of those unlawful acts and who are entitled to the first consideration.

"We may say, avoiding the burden of too much detail, that the government cannot deny in this case that the collective bargaining between the operators and miners, scales committees, the commonly called check-off system and the distribution of statistics, each set forth in the indictment as a means for the accomplishment of the unlawful conspiracies charged, were well known to the then responsible government officials and that to say the least, such acts were permitted by such government officials without protest.

"I believe the acts complained of were unlawful. I have, however, reached the conclusion that the evidence which the defendants would be able to submit to the jury is more or less convincing on the question of intent, and is more than necessary to create a reasonable doubt of guilt. That being so, I believe a verdict of not guilty would be the inevitable result of the trial of this case. I am, therefore, convinced it is my duty to enter a *nolle prosequi* in this case."

Institute to Discuss Inspection Problems

The program for the meeting of the Mine Inspectors' Institute of America to be held in Pittsburg, Kan., July 10, 11 and 12 will be devoted largely to sessions in which inspection problems will be discussed, but provision also has been made for entertainment features, including a banquet and a tour of the Pittsburg mining district.

The principal discussion topics and the leaders are as follows:

"Electric Machinery in Gaseous Mines and Its Limitation for Safety," James Dalrymple, chief inspector, Colorado.

"How to Recognize a Dusty Mine from the Standpoint of Danger," Robert Medill, chief of Department of Mines and Minerals, Illinois.

"Should the Use of Black Blasting Powder Be Prohibited in All Bituminous Mines?" Lawson Blenkinsopp, chief inspector of mines, Kentucky.

"What Can Be Done to Reduce Accidents from Falls of Roof, (a) by additional legislation; (b) by the operator; (c) by the miner; (d) by the state inspector," J. J. Walsh, chief of Department of Mines, Pennsylvania.

"Is Compensation an Aid in Reducing Mine Accidents?" Jerome Watson, chief of Division of Mines, Ohio.

"What Reduction in Accidents Has Resulted from Safety Organizations Conducted by the Operator and What Are the Main Features of Any That Have Proven of Benefit?" Robert Lambie, chief of Department of Mines, West Virginia.

"Is It Practicable to Frame a Basic Mine Law Suitable for All Bituminous Mine Conditions as a Model for Promotion of Uniformity in State Laws as They Relate to Accident Prevention and General Safety?" James Sherwood, chief mine inspector, Kansas.

"In What Manner Can the Federal Bureau of Mines Be of Greatest Assistance to the State Mine Inspectors?" Dr. J. J. Rutledge, chief of Bureau of Mines, Maryland.

Drop Burns Reorganization Plan

The officers and board of directors of Burns Bros., New York, have abandoned the proposed plan of readjustment of the capital structure of the company and the merger of the property with the National Coal Corporation. The plan was proposed by the Board of Directors and recently submitted to stockholders, the latter having voted their approval at a meeting held earlier in the month. M. F. Burns, president of the Burns Bros. organization, declined to comment on the matter. Consequently an official reason for dropping the plan is lacking, but according to reports in the New York financial district the recent sharp decline in the stocks of the company greatly upset the program which officials had in mind.

Must Keep Mines Working in Solving Hard Coal Problem, Say Operators

Declaring that the public will be satisfied with no solution of the anthracite question that does not insure uninterrupted operation of the mines, the anthracite operators through their counsel, Walter Gordon Merritt, submitted recommendations looking toward that end in a statement to the U. S. Coal Commission on June 4, just made public. "Were the diagnosis of the labor situation similar to that of other industries," says Mr. Merritt, "we would not urge remedies which look to any power or agency beyond the control of the parties directly interested but would place our confidence in the wish of these parties to work out some voluntary plan of co-operation. . . . The unfortunate experience of the immediate past, however, and an analysis of the reasons for this failure of existing arrangements demonstrate that the present psychological background requires some more authoritative remedy to restrain the disorders which we have portrayed."

Mr. Merritt then reviews the proposals to avoid general suspension on the termination of agreements, discussing in turn compulsory arbitration, prohibition of strikes and lockouts except where an offer of arbitration has been made and rejected, compulsory investigation with prohibition of strikes and lockouts pending investigation, as illustrated by the Canadian Industrial Disputes Act and the Colorado Industrial Commission Act, and concludes by saying that if none of these is adopted all strikes should be unlawful except when authorized by a two-thirds secret vote and that the anthracite industry should be kept independent of the bituminous-coal industry.

The fundamental defect in the present system, according to Mr. Merritt, is not the character of the agencies for settling disputes but lack of definite authoritative remedy to enforce the submission and collection of damages or indemnity. "Under prevailing conditions in the anthracite industry," he says, "no form of industrial government, however Utopian, will be of avail unless this defect is overcome." The operator, he states, is without the requisite authority to correct these conditions, for he may not join with his associates in declaring a sympathetic lockout as in the building trades, for the public must have coal. Mr. Merritt does not think that the remedy for this condition can be found within the miners' organization, the control of which is today deteriorating.

The remedy, Mr. Merritt concludes, must be supplied by the government in behalf of the public, and he recommends to this end legislation the essentials of which should be as follows:

"(1) It shall be the duty of the government (state or national, as the case may be) to collect for the public treasury from the district union having jurisdiction of the union men where an unlawful strike takes place \$1 per day per man for every day each union man is engaged in such strike.

"(2) It shall be the duty of the government to collect for the public treasury from any operator or operators engaging in a wrongful lockout \$1 per day per man for every day each person is so unlawfully locked out.

"(3) If the government should fail on request promptly to commence proceedings for the collection of such indemnity, any person, association or corporation may commence such suit, and after deduction of reasonable disbursements, including attorney's fees fixed by the court, shall pay over the balance to the public treasury.

"(4) The pendency of a private suit under the last paragraph shall not prevent the government from subsequently prosecuting a similar suit in its own behalf, and either or both sides may be prosecuted to a conclusion, provided that more than one indemnity shall not be collected.

"(5) In the event that the district union is obliged to pay such damages on account of the action of any local union or group of men belonging to any local, the district may in its discretion reimburse itself by collecting all or any part of said damages from the local union having jurisdiction of the men engaging in such unlawful strike.

"(6) The remedy prescribed in the proposed law should not be construed as an exclusive remedy to the derogation of any other remedy which any of the parties involved might otherwise have against each other."

Government Moves to Divorce Railroads From Ownership of Coal Lands

Before the U. S. Court of Appeals in Cincinnati on June 8 litigation begun by the Attorney General of the United States in 1911 to force the Lake Shore & Michigan Southern as well as other railroads to divorce themselves from all ownership interest in coal lands and especially those lying in the Hocking field in Ohio, which is alleged to be in violation of the Sherman Anti-Trust act, was renewed by Benson Hough, U. S. Attorney for the southern Ohio district, and a great array of legal talent.

The original case was heard by Judges Kappen, Warrington and Denison in the federal court at Grand Rapids. Judge Warrington has since died, so the case went before the other two and Judge A. M. J. Cochran of the northern Kentucky district.

In December, 1912, the court ordered the Hocking Valley and other railroads which were involved to dispose of the coal lands and a decree in this case was entered on March 14, 1914, confirming the sale of lands known as the Sunday Creek Coal Co. to John S. Jones, of Granville, Ohio, for \$50,000 and the assumption of a \$4,000,000 mortgage held by the railway companies.

Another decree was entered on Nov. 11, 1916, confirming the sale of the Buckeye Coal & Railway Co. to Mr. Jones for \$450,000. It developed that the Hocking Valley R.R. has a mortgage for \$20,000,000 on its property to protect its bondholders and that the mortgage contained a clause providing for the payment of 2c. a ton royalty on all of the lump coal taken from the mines.

The new litigation that was argued on this occasion was partly an action on the part of the government to force the Hocking Valley R.R. to get rid of this royalty connecting it with the coal companies, on the ground that it might be a temptation on the part of the road to give preference to the coal company in transportation facilities. In addition Mr. Jones as the owner of the Buckeye Coal Co. filed an intervening petition asking that the royalty provision be cancelled as illegal.

Attorney Charles Van Brunt, of New York, acting as counsel for the Central Trust Co. of that city, holder of the \$20,000,000 mortgage, contended that the royalty is valid and that it has so been held by the Common Pleas Court and Court of Appeals of Perry County, Ohio, and that this was due to be paid to the trust company. This royalty amounts to \$75,000 already and its total is estimated to run to \$400,000 on all the coal lands.

Attorneys John P. Wilson, of Columbus, and Lawrence Maxwell, of Cincinnati, represented the Hocking Valley R.R. and also contended that the royalty clause was valid and that this road was negotiating a \$50,000,000 mortgage to take up the \$20,000,000 mortgage and care for other debts.

After hearing all argument the judges took the case under advisement.

Commission Issues Consumers' Price Guide

With the idea that domestic consumers can determine for themselves whether or not they are being charged excessive prices for anthracite, the U. S. Coal Commission is issuing statements showing the cost of stove anthracite on dealers' sidings.

The first of these statements covers various towns in the New England states and shows by towns the mine price and the freight on stove anthracite for the last shipment received prior to May 15, 1923, as reported to the Coal Commission by the retail coal dealers.

The information is intended for local consumption and is a guide to the consumer to indicate whether he is paying a reasonable price for his coal.

What the Interstate Commerce Commission Decided

That assigned cars and private cars are not prohibited by the Transportation Act.

That, nevertheless, the practice of assigning cars, private or system, is unjust, unreasonable, unduly and unreasonably preferential to mines receiving the cars and unjustly discriminatory against and unduly prejudicial to mines not receiving them.

That after Sept. 1 all cars, including private cars, must be distributed on a pro-rata basis and that all cars placed must be counted against the mine's allotment.

That hereafter the Interstate Commerce Commission will assign cars to particular mines under its emergency powers as necessity arises.

The decision, by including private cars, is a complete victory for the Central Pennsylvania Coal Operators. The National Coal Association did not attack private cars.

The private coal-car owners are expected to seek an injunction to stay the commission from depreciating their investment by this ruling.

Seven of the Commissioners signed the decision; four—Hall, Daniels, Potter and Cox—dissented.

Important Step Toward Stabilization of Coal Industry Seen in Abolition of Assigned-Car Practice

The most important single step toward stabilization in the coal industry was taken when the Interstate Commerce Commission abolished the railroad practice of assigning cars. This seems to be the opinion of the great majority of coal producers. It is pointed out, however, that the retention of this great advantage is dependent upon the attitude of the coal producers themselves. If advantage is taken of the situation to exact unreasonable prices from the railroads or if the railroads should be able to demonstrate that they cannot fuel themselves properly without assigned cars, as they have contended, the same body which has issued this order has the power to undo it. This victory for the coal operators was attained on a seven to four decision. Should two members of the commission become convinced that this order was not working properly, revocation doubtless would be prompt.

There is no reason, however, to believe that the coal-producing industry is so lacking in vision as to attempt to gouge the railroads. From Sept. 1, the effective date of the order, the practice of buying coal with cars will cease. Cars, private and otherwise, must be counted against the distributive share of each mine. It is just possible that the private-car interests can delay the effective date by obtaining an injunction, but it is believed that the chance is small of obtaining an injunction which would endure during the life of the litigation which it is reasonably certain the private-car owners will bring. It is thought unlikely that the railroads will take the case to the courts.

Commissioners Hall and Daniels, in their dissenting opinions, simply argued the legal and technical points involved. It remained for Commissioner Potter, however, to go outside of the record and assail the coal industry in what is regarded by many as being partly gratuitous.

The commission has attached significance to the fact that the Pennsylvania, the New York Central, the Louisville & Nashville and other important carriers did not present during the consideration of the case any statement of the reason which have impelled them to adopt and maintain the practice of assigning cars. Very apparently the commission attaches much importance to the fact that a large number of carriers provide themselves with fuel without resort to this practice, as space is taken in the opinion to present in tabular form the names of those companies.

Heretofore the commission has clung tenaciously to its decisions in the Hocking Valley and Traer cases, in which the assigned-car practice was upheld. In this decision, however, it is frank to say that "the rule evolved in the early decisions was not the fruition of right experience." The commission does not hesitate to call attention to Commissioner Lane's statement in 1910 that the distribution of cars to coal mines was based largely upon interest, prejudice and pull.

While the majority of the commission held that the assign-

ing of cars does not contravene the Interstate Commerce Act, Commissioner Eastman is convinced that it does. "I am unable to escape the conclusion," he says in his concurring opinion, "that it was the intent and is the meaning of the law that in times of car shortage every mine should be limited to a pro-rata share of the available car supply and that in computing this share every car furnished to the mine, whether private car or railroad-fuel car, or car for commercial loading, should be counted. Under the assigned-car practice now in effect, however, it appears that the number of such cars placed at a mine may, and often does, exceed its pro-rata share of the available car supply. It does not seem to me that in such cases the cars are being counted 'against' the mine. The purpose, as stated by the House Committee, when the bill was reported, was to avoid 'any possibility of the recurrence of the evil of what is known as assigned cars.'"

Commissioner Potter thinks "assigned and private cars perform essential functions which cannot be accomplished without them. Next to labor, coal costs are the highest item of operating expense. No agency should leave undone anything within the legitimate exercise of its powers to bring about a reduction of coal prices. From every quarter there is demand upon the carriers for increased efficiency and reduced operating costs. At such a time we, the guardians of public and carrier interest, are compelling the carriers against their will to adopt practices which will impair efficiency and increase costs."

At another point in his opinion Commissioner Potter declares that "it is well known that mines assured of continuous operation favorable for low-production costs will contract at lower prices. Opponents of assigned and private cars object to that desirable result. In order to maintain unhealthy and uneconomic conditions in the coal industry they contend that they should have a part of the order of the buying roads at high prices, although the interests of the general shipping public, which pays the carriers' coal bill, requires low fuel prices. The opponents of the private and assigned car demand that the interest of the many be sacrificed for the interest of the few, and we have sustained them."

"No industry that tolerates unnecessary expense should expect to prosper," continues Commissioner Potter, "and the coal industry could not survive if it were not able to pass on to consumers the consequences of the industry's mismanagement. The industry should clean house. Many want to clean house. They cannot do it alone. We have the power to assist the worthy and compel the unworthy through revision of the rate structure and the extended use of assigned and private cars. We should do what the consumers' interests require and almost, it might be said, forget the producer. We should construe the law as directing us to

require the use of equipment as public interest demands to serve best the fuel need."

In the opinion of some the decision bears unmistakable evidence of having been rendered with an eye to the well-being of the coal industry. Some regard it as catering to mine labor.

Illinois Sees Good and Evil in Ruling

Wide divergence of opinion among Illinois coal operators greeted the decision of the Interstate Commerce Commission against the assigned-car rule. At first flush and before any of them had had a chance to read the decision in full, one group thought the decision had no teeth because the commission still has power to issue special rulings creating preferential car distribution whenever an emergency arises, thus practically nullifying the force of the new order of things. Another group felt that the decision would be of real effect in the Middle West only if it prevented railroads from giving car preference to their own mines on their own lines—a point that was not clear in the first news of the decision. The third group felt that the decision is a fine and constructive piece of work by the commission which is bound to help remedy the evils of the coal industry.

There is in the Middle West, however, a small group of operators who find themselves in a position different from the rest. They are the ones with long railroad contracts whose prices were fixed on an assigned-car basis.

"I approve of the abolition of the assignment of cars," said one of that small group, "but what effect is it going to have on our long-term contracts with railroads? The price was set low because we were to be guaranteed plenty of cars and steady running time. The question is, will car supply be so poor at times under the new decision that our running time will be knocked flat and our costs mount to a point where we will be giving away our coal? That's something to worry about, but the only thing we can do is just wait and see what happens."

The jobbers are the class that is consistently happy over the decision. Almost to a man they feel they are going to do more business this year than they ever do normally. They expect to see the percentage of coal traded on the spot market mount from 25 to 50 per cent during the next eight months.

Midwest railroaders still confess to many puzzlements and a great degree of dissatisfaction over the decision. They are certain to try to prevent the decision from becoming operative by applying for an injunction before Sept. 1. The railroad meeting in Washington July 10, where the legal talent of the carriers will assemble, is expected to produce some course of action for the lines to follow.

"Of course," said the vice-president of one of the biggest coal carriers in the country, "if this is going to prevent us from getting coal from our own mines, there's bound to be trouble. That certainly would be unwarranted interference with the rights of a railroad and would interfere with our giving the public and the coal producers the best service of which we are capable."

The railroads will claim that there is no essential difference between railroad coal in railroad-owned mines and railroad coal now in storage along the lines. They say that if carriers cannot give their own mines a full and free car supply, then, by the same sign, they cannot use their cars for unhampered movement of their storage coal from stockpile to point of consumption, and that surely the Interstate Commerce Commission is not empowered to regulate car supply to storage piles.

A high official of a Western line thinks that the I.C.C. can hardly restrict the movement of private cars, while Chicago coal companies owning no private cars say that if private cars run unrestricted, then there is no point whatever to the decision.

"Wouldn't it be foolish," queries this rail official, "if the commission said to my line: 'You can't move but 50 cars to day from a certain mine when that mine has 100 cars of its own standing right at the tippie? There would be the extra 50 cars ready to load; there would be the mine ready to load them; there would be our railroad able and willing to move the whole 100; but nothing could be done simply because there were not railroad cars enough to give

other mines in the same neighborhood also 100 cars that day. Seems to me the commission will modify its decision."

It is generally conceded among Chicago railroaders that railroads will be forced into greater storage this summer if the commission's decision actually covers car supply to railroad-owned mines. Up to the end of the week there was no change of plan on the part of railroads, because of the uncertainty in the situation. Only a few lines, such as the Illinois Central, the Burlington, the Wabash and the Big Four are storing. They may enlarge their storage and roads that had decided they couldn't afford to store may go in for a few hundred thousand tons. This remains to be developed in the next week or so.

Canada Has No Fear of U. S. Prohibiting Export of Coal to Canada

A special committee of the Canadian Senate, appointed to deal with the question of the fuel supply of Canada, in its final report declared that there is little danger that the United States would prohibit the export of coal to Canada.

"There is an abundance of evidence to the effect that the coal areas of Canada, east and west, are sufficient to supply the fuel needs of our entire population for an indefinite period of time," says the report. "A large percentage of the collieries now in operation—more particularly those in western Canada—are capable of increasing their output to a very considerable extent with little or no capital cost, and would undoubtedly do so if markets for their increased output were available.

"Within recent months the coal operators and transportation interests of Canada have been giving a good deal of consideration to the question of reducing freight rates, the desirability of providing further and better facilities for handling and storing coals, and the necessity of educating the public to use Canadian coal.

"As regards the duty of the state as represented by federal, provincial and municipal governments," the committee has no hesitation in recommending "that every possible effort be made by those in authority to encourage the public to obtain their supplies of coal or other fuel from Canadian sources. The fact that we imported for consumption last year 13,017,025 tons of coal at an approximate cost of \$61,112,428 from the United States and other countries should impress everybody with the necessity of utilizing our own fuel resources to the fullest extent."

An exhaustive examination was made of the possibilities of coke. "As every ton of such coke when made from Canadian coal, lessens our dependence on anthracite, we are hopeful that this process will be further utilized in Canada," is the conclusion of the committee.

New England Retail Coal Dealers Report on Labor Conditions

The New England Coal Dealers' Association has issued an interesting condensed report on labor conditions, obtained from information sent in by about 250 members. A digest of the facts with respect to wages and hours is:

Maine, 14 communities reporting—Eight-hour day in three; nine-hour day in ten; ten-hour day in one. Teamsters get from \$18 to \$24 per week; chauffeurs, \$21 to \$30; helpers, \$18 to \$24.

New Hampshire, 15 communities reporting—Eight-hour day in one; nine-hour day in ten; ten-hour day in one; varying hours for different firms in three towns. Teamsters get from \$18 to \$30, the latter being one exceptional case where the firm has double teams; chauffeurs, \$21 to \$31.50; helpers, \$18 to \$24.

Vermont, 11 communities reporting—Nine-hour day in ten; trucking contract in the other. Teamsters, \$18 to \$25.50; chauffeurs, \$18 to \$30; helpers, \$16 to \$21.

Massachusetts, 74 communities reporting—Ten-hour day in one; nine-hour day in fifty-five; eight-hour day in twelve; varying hours in other towns. Teamsters, \$17 to \$32; chauffeurs, \$21 to \$33; helpers, \$17 to \$20.

Anthracite Miners Demand 20-per Cent Wage Increase, Two-Year Contract and Full Union Recognition

High Lights in the Tri-District Convention

Spurred on by John L. Lewis, the convention threw three alleged Communists into the street, thereby vindicating the conservative character of the miners' union.

Voted 11 demands, including 20 per cent increase to tonnage men and 33 per cent to day workers and a series of others, all rejected in 1920 by the Thompson Commission.

Left their scale committee free to negotiate with operators but bound them to refer agreement back to vote of membership or to a reconvened Tri-district convention, thereby meeting specific request of U. S. Coal Commission.

Passed no strike vote, leaving the way clear for peaceful settlement.

Gave Lewis as good a "hand" as it gave Capellini, president elect of District No. 1 and reputed radical.

An increase of 20 per cent in contract wages, a \$2 daily increase for day laborers, uniformity and equalization of all day rates, a uniform eight-hour day and the weighing of coal in computing pay are some of the demands adopted by the anthracite mine workers at the convention held in Scranton June 26 to 29. These demands will be presented to the anthracite operators as soon after July 4 as possible, according to John L. Lewis, International president of the United Mine Workers of America, who presided over the convention the last two days.

The meeting was composed of over 500 delegates representing the workers in Districts 1, 7 and 9 and was held in Town Hall, the demands being adopted at the afternoon session of June 29.

The morning session of June 29 was enlivened by the presence of two men and a woman, alleged Communists. They were ordered to leave the hall and later were attacked and beaten in the Court House Square.

No action was taken regarding the continuation of work after Aug. 31, when the present agreement expires.

"The United Mine Workers of America are not approaching the coming negotiations with the anthracite operators in a spirit of apprehension," declared President John L. Lewis, at his first appearance on the convention floor on June 29. "We are not approaching those wage negotiations with any desire to bring about a suspension of coal production in the anthracite fields. None more than we appreciate the many grave responsibilities which will devolve upon the shoulders of the representatives of the Mine Workers and the operators in the conferences to come, and none more than we recognize the paramount interest of the American people in having effectuated, if possible, a satisfactory wage adjustment in order that these mines may continue to produce coal uninterruptedly."

Concluding, Mr. Lewis said: "The President of the United States last week addressed a letter to the U. S. Coal Commission bearing upon the anthracite situation and asking the Coal Commission to exercise its good offices in expediting matters. There can be no criticism of the President's action in the premises. He was merely articulating a point of view held by a great many people who suffered great inconvenience during the year past."

"The U. S. Coal Commission since the receipt of the letter from the President have addressed a communication through its chairman to Chairman Kennedy of the Tri-District convention. The letter has arrived this morning and I think it opportune at this moment, in closing my remarks, to call upon President Kennedy to read to the convention the letter of the Coal Commission and have it spread upon our records."

The letter from Mr. Hammond follows:

"On Jan. 11, pending negotiations between the operators and the bituminous miners on a new contract, this commission approached both sides, urging an agreement that would continue mining operations. It received assurances of support from both sides to the suggestion that by mutual co-operation an understanding should be reached that would protect the interest of each and at the same time save the public from the disaster of a suspension of mine operations."

"We now address you in the same spirit as regards the

necessity for the same co-operation in the settlement of the details of a new contract in the anthracite fields, the present contract expiring Aug. 31.

"This commission hopes that the prompt and satisfactory response received to its suggestions in the matter of the bituminous contract will be repeated in the negotiations about to be undertaken in the making of an anthracite contract. The public expects an agreement, and we have full confidence that both operators and miners will recognize their duty to the public and will be able to effect a speedy conclusion."

"You will receive within a few days the commission's report upon the anthracite industry. In the meantime we urge upon both sides that, in addition to the welfare of each, that of the great body politic of the American people is involved, and that public sentiment will not tolerate a suspension of its anthracite coal supply with the beginning of the fall and winter season."

"As the present contract provides 'the continuance of production after Aug. 31, 1923, shall be upon such terms as the parties may agree upon in the light of the report of the commission,' the commission confidently expects that all questions will be left open for consideration of the Joint Scale Committee."

NOTABLE ATTENDANCE OF YOUNG MEN

The convention opened on the morning of June 26 and Thomas Kennedy, president of District No. 7, was chosen temporary chairman. A noticeable feature was the presence among the 500 delegates of a large number of young men, which was generally commented on. Heretofore the majority of delegates have been men of middle age.

Mayor John H. Durkan welcomed the delegates. An effort was made early in the meeting to have Rinaldo Capellini, according to the unofficial returns the newly elected president of District No. 1, address the convention. Chairman Kennedy overruled the motion at that time but later in the day Mr. Capellini made a speech in which he said he stood for 100 per cent unity, 100 per cent effort to obtain better wages and 100 per cent brotherliness and love.

During the first day's sessions Chairman Kennedy appointed the scale committee, the committee on resolutions and the committee on rules. Capellini made a request that inasmuch as the newly elected officers of District No. 1 would be in office after the new wage agreement had been signed it would only be fair to allow them to sit in while the conference committee discussed the demands to be presented. Late on June 29 President Lewis announced that Capellini would be on the sub-committee that will confer with the operators.

At the session on June 27 Chairman Kennedy took up the cudgel against the National Retail Coal Merchants' Association, which on the day previous had adopted a resolution urging the incorporation of all labor unions, although the resolution did not name the mine workers' organization. He declared it as the unseen hand of the anthracite operators hitting at the mine workers. Mr. Kennedy said the United Mine Workers of America is not dealing in commodities, it is not a business organization for profit and that therefore there is no necessity for incorporation.

The convention referred to President Lewis a resolution that the United Mine Workers enter into an agreement with miners of foreign countries by the terms of which a coal supply would be shut off from America in case of a miners' strike. A resolution that the convention approve the John Mitchell Insurance Co., an organization about to be formed to supply insurance to mine workers at a reduced premium, was adopted. It was explained that the company was in no way affiliated with the miners' organization and that it will be a private enterprise catering to miners.

The demands which were adopted by the convention follow in full:

(1) That the next contract be for a period of two years with complete recognition of the United Mine Workers of America, Districts 1, 7 and 9.

(2) That the contract wage scales shall be increased 20 per cent; all day men shall be granted an increase of \$2 per day; that the contract laborers increase now being paid by the operators shall be added to the contract rates; that the differential in cents per day between classifications of labor previous to the award of the U. S. Anthracite Coal Commission shall be restored.

(3) Uniformity and equalization of all day rates and that skilled mechanics, such as carpenters, blacksmiths, etc., shall be paid the recognized standard rates existing in the region, which rates should not be less than 90c. per hour as a basis and that engineers and pumpmen who do repair work on their engines and pumps shall be paid the mechanics' rate quoted herein for this repair work; and that all day men shall be paid time and one-half for over time and double time for Sundays and holidays.

(4) That the provisions of the eight-hour clause in the present agreement shall be applied to all persons working in or around the anthracite collieries coming under the jurisdiction of the U. M. W. of A., regardless of occupations, and that in the bringing of these employees under the eight-hour day their basis shall be arrived at in the same manner as the basis was arrived at in the case of pumpmen and engineers, plus the increase demanded in Sec. 2 of this document; and further, that inside day labor shall work on the basis of straight eight hours underground.

(5) That where coal is paid for by the car it shall be changed and payment shall be made on the ton basis of 2240 lb. where dockage and penalties are now imposed for refuse, that the amount of such refuse to be permitted in any car shall be fixed by the mine committee and colliery officials in conformity with the agreement and that the present unreasonable penalties and dockage shall be abolished.

(6) A more liberal and satisfactory clause in the agreement covering the question of miners who encounter abnormal conditions in their working places, and that to correct this situation the following quotation: "Unless otherwise directed by the foreman." shall be stricken from the agreement covering this particular subject and that the consideration rate of each colliery should be equivalent to the average daily earnings of contract miners under

normal conditions and that for dead work performed by the contract miner he shall be paid this consideration rate.

(7) Payment for all sheet iron, props, timber, forepolling, extra and abnormal shoveling, where such is not now paid for, and that jackhammers shall be supplied to miners free of charge and that company workers shall be supplied with tools free of charge.

(8) That a uniform rate of 20c. per inch be paid for refuse in all kinds of mining up to ten feet wide, and that the rate for blasting top and bottom rock shall not be less than 30c. per inch with the understanding that there rates are to be the minimum, not affecting higher rates that exist.

(9) That after a grievance has been disposed of by the Conciliation Board and referred to the umpire that the umpire shall likewise render his decision within thirty days, said decision to be based upon equity if requested by complainant.

(10) That the wage schedules be brought up to date, containing all new rates and occupations, and that mine committees shall be authorized to meet with company officials and agree upon rates for new work, before such work is commenced, and that such rates shall be added to the rate sheet and complete copies shall be supplied the committees and filed with the Board of Conciliation. The foregoing section to likewise apply to new rates for pillar work.

(11) That employees of stripping contractors be brought under the general agreement on their present basis of wages plus the increase demanded herein and that stripping locomotive engineers shall receive a rate equal to that of the shovel cranimen with extra payment for looking after their engines previous to starting time, at noon time and after quitting time; and that the shovels and boilers to be assigned watchmen shall be restricted to a certain number to be determined upon between the contractors and the committee.

We recommend that our Scale Committee use every effort to have the operators agree to some provision in the agreement regarding the price of coal and rent to be charged the employees.

Supplementary Recommendations on Policy.—The committee recommends that the scale committee to negotiate the contract shall be composed of the officers, the Executive Board members of the three districts, together with the resident International officers and three mine workers from each district affected, the district presidents to select the three mine workers in each district subject to the approval of the Executive Boards. We further recommend that this committee shall decide as to whether the report shall be submitted to the rank and file by referendum vote or to a tri-district convention, with the further understanding that copies of the report of the scale committee shall be forwarded to all local unions in sufficient time for their information, previous to the referendum vote or the convention. We further recommend that the unofficially elected new officers in District 1 shall be permitted to become members of the scale committee from the start of the negotiations, subject to approval of the regular biennial convention of District 1. This recommendation is made without prejudice to any controversy that might arise concerning the election for officers of District 1.

Wage Parley at Atlantic City, July 6

Officials of the United Mine Workers will present to mine owners at Atlantic City, July 6, the demand for anthracite wage increases drawn up by the workers at Scranton, Pa., last week. Besides John L. Lewis, president, and other officials of the International union, the sessions will be attended by the three presidents of the anthracite district and most of the Miners' Scale Committee. S. D. Warriner of Philadelphia, is expected to head a delegation of eight of the principal coal producers.

Army Seeks Coal Bids for Midwest Posts

The Quartermaster Corps of the army has called for bids on coal for various government posts to be opened at the Chicago Depot, July 17, at 11 a.m., as follows: Fort Benjamin Harrison, Indiana, 8,000 tons; Fort Brady, Michigan, 1,650 tons; Chanute Field, Illinois, 2,100 tons; Fort Cook, Nebraska, 3,150 tons; Fort Wayne, Michigan, 1,200 tons; Camp Custer, Michigan, 1,200 tons; Fort Des Moines, Iowa, 4,800 tons; Erie Proving Grounds, Ohio, 1,250 tons; Fairfield Air Depot, Ohio, 4,600 tons; Fort Hayes, Ohio, 3,700 tons; Jefferson Barracks, Missouri, 5,500 tons; Fort Leavenworth, Kansas, 35,000 tons; Camp Knox, Kentucky, 1,000 tons; Little Rock Depot, Arkansas, 150 tons; McCook Field, Ohio, 4,500 tons; Fort Omaha, Nebraska, 400 tons; Fort Riley, Kansas, 14,000 tons; Fort Robinson, Nebraska, 1,500 tons; Rock Island Arsenal, 800 tons; Scott Field, Illinois,

3,600 tons; Fort Snelling, Minnesota, 6,000 tons; Selfridge Field, Michigan, 5,900 tons; Fort Sheridan, Illinois, 6,000 tons; Fort Thomas, Kentucky, 2,800 tons. In addition bids are asked for small quantities of anthracite at a large number of Middle Western army posts.

Class 1 Railroads Consume 9,373,000 Tons Of Coal in April at \$3.56 per Ton

Class 1 railroads of the United States consumed 9,373,000 net tons of coal during April, 1923, as charged to account 394, compared with 14,340,000 tons during the preceding month and 6,856,000 tons in April, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first four months of 1923 these roads consumed 39,530,000 tons as compared with 31,361,000 tons during the corresponding period of 1922. The delivered cost per ton in April last was \$3.56 compared with \$3.45 for the corresponding month of last year.

Consumption of fuel oil during April totaled 147,694,000 gallons compared with 155,949,000 gallons in March and 116,364,000 gallons in April, 1922. The totals for the first four months of 1923 and 1922 were 589,498,000 and 474,927,000 gallons respectively.

THE TROUBLE SEEMS TO BE that Mexico can't get along without American capital and can't get along with it.—*Passaic News.*

Coal Commission Postpones Submission of Report Until July 9; Government Developing Coal Sense

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

So as to make possible a stronger and a more comprehensive report, the President's Coal Commission has sacrificed compliance with the literal date set for its special anthracite findings and probably will release it for publication on July 9 instead of July 2, as had been planned. The report is expected to be in final form on July 4, but to insure a maximum amount of publicity it must be delivered in advance to the press so that copies may be mailed to publications for use on July 9.

While one of the causes of delay is the late receipt from certain companies of essential data, Chairman Hammond and Commissioner Smith made it clear in their statement to the press that the delay is in no way chargeable to dilatoriness on the part of those making returns. The task in some instances was greater than could be accomplished within the time limit. Some delay is chargeable to compilation and the commissioners themselves must have some time to digest and interpret the recapitulation which has been made.

In some quarters the delay in the issuance of the report is regarded as serious. This is based on the fact that it cuts down the time during which it could be considered by those engaged in the anthracite wage negotiations. Had the report been available promptly on July 1 it would have strengthened the position of the conservative leaders at Scranton, some contend. There is general feeling of regret that it did not come through on scheduled time. The plain terms of the law are that the report should be made on or before July 1. The fact that this was not done is certain to result in criticism. This is particularly the case since those engaged in the anthracite negotiations were keyed up to expect the report on July 1.

STRESS BEARING ON ANTHRACITE WAGE NEGOTIATIONS

The commission undoubtedly owes its existence to the anthracite situation. Had that not become acute at the time the legislation was under consideration the bill probably would not have passed. This is given as an additional reason why nothing should have been allowed to prevent the report coming out so as to give the maximum amount of time for its consideration at this particular stage of the wage negotiations.

The position of the commission apparently is that it is better to sacrifice a few days and have a much better report, one which will be of more service during the wage negotiations than would have been the case had it been issued with the material at hand on July 1. To issue the report on July 1 would have meant its completion on June 28 or 29 so as to provide the time necessary for publication release. As it is, the commission is keeping in particularly close touch with the situation in the anthracite region, where Judge Daniel M. Link, of Indiana, is acting as observer for the commission.

Judge Link was described at the commission as a man with eyes and ears and good judgment. Chairman Hammond, acting for the commission, addressed a letter to the officers and delegates at the Tri-district anthracite mine workers' convention at Scranton urging them not to bind their scale committee but to leave all questions open to consideration by the joint scale committee.

The extent to which the Attorney General may have been guided in dismissing the Indianapolis indictments by the recommendations of the Coal Commission is not known, but it is certain that the commission is very much of the opinion that nothing constructive could have been obtained from pressing that action and that its discontinuance would be in the public interest.

The fact that the Attorney General took counsel with the Coal Commission before action in that case and the fact that he dismissed the indictments is regarded as evidence that the government is displaying more practical sense than ever

before in the handling of coal problems. The existence of these indictments was one of the great impediments to settlement last summer, as it was the most valuable card in the hands of the diehards among the operators.

Ever since those indictments were brought it has been generally believed that they were ill conceived. Had they been pushed it would have thrown the industry into complete chaos. Judge Anderson is perhaps the only federal judge who would have taken them seriously. It has become increasingly clear, many contend, that large blocks of tonnage must be represented in any agreement when the coal from six states compete in a single city. It called for an interstate agreement, but along came the Attorney General of the United States professing to see restraint of trade in the well-established processes of collective bargaining.

The dismissal of the suit not only indicates that there is to be more sanity on the part of the Federal Government in the handling of coal problems but it emphasizes the conspicuous failures which have followed the efforts to deal legalistically with coal problems. It emphasizes the advantages of placing such matters on a plane of human understanding rather than on one of court procedure. The check-off and other indictments have been singularly barren of results, particularly when compared with the real results which followed Mr. Hoover's voluntary program, which prevented a runaway market when there was not a vestige of law to strengthen his arm.

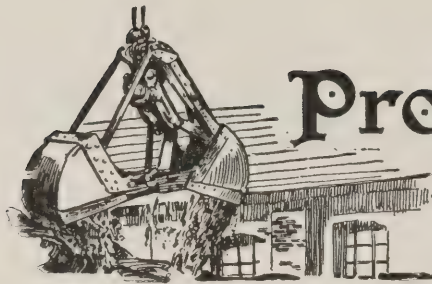
The President's speech at Cheyenne and the assigned-car decision are other signs that federal authorities are becoming educated in coal. The experience here during the last strike and the results in the Ruhr demonstrate beyond peradventure that coal cannot be mined with troops. The problems which confront the industry are myriad, but the Coal Commission is fully expected to urge a code of conduct which will take these disputes out of the realm of hostility into one of sane and practical negotiation.

During last week the commission conferred with a committee from the Massachusetts Legislature. The committee was composed of Senators and Representatives. John W. Haigis was its chairman. The committee discussed the anthracite situation in its relationship to New England.

Trade Commission Puts in More Evidence To Prove Charge Against Dock Men

The second week's hearing in St. Paul of the Federal Trade Commission's charges against the Northwest Dock Operators' Association continued to bring forth evidence tending to show that the dock association worked to eliminate independent coal concerns by refusing to make contracts with them and by making discriminating prices against them, also by attempts to bring about monopolistic control of the trade of this district. What is assumed to be an admission of similar position under the law is presented in the immediate withdrawal of the Pittsburgh Coal Co. from the association upon the Supreme Court decision that the hardwood lumber association was a conspiracy.

Evidence has been presented to prove that association members refrained from bidding direct on municipal steam business requiring team delivery in competition with the local retail dealer, and that they refrained from approving contracts with dealers except where the contract covered a public utility with a definite tonnage covered by contract between the utility and the dealer. About 1,000 or more documents are to be introduced in evidence by the prosecution. The defense professes to be quite secure in the propriety of its answer, and expects to offer complete and adequate explanations which will justify all actions that are admitted, and denies that any illegal methods or policies have been pursued.



Production and the Market



Weekly Review

The coal trade is fast losing its fear of a suspension of anthracite mining on Sept. 1, and soft-coal prices in the East are being dragged downward as this belief grows. It is generally conceded that if the anthracite operators and mine workers should announce the signing of a contract there would be an immediate slump in the demand for domestic anthracite and independent prices would drop from their \$11 peak to company circular.

Soft-coal trade as a whole has settled down to a normal summer grind differing only from pre-war conditions in that a much larger proportion of the coal is now going forward on spot purchases and the railroads and large industrials are accumulating stocks.

PRICES SHOW DOWNWARD TENDENCY

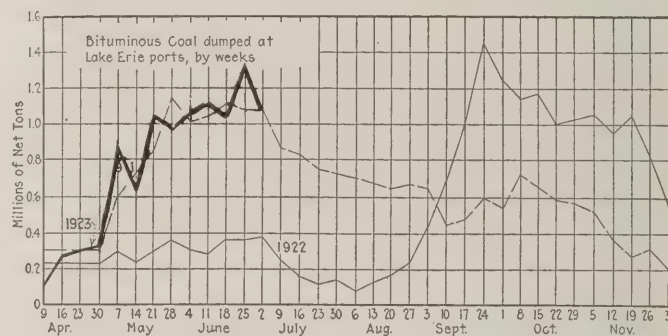
Prices are uneven and the general tendency downward. *Coal Age* Index declined two points last week to 203 on July 2, corresponding to an average price at the mines of \$2.46 per net ton. Quotations for Clearfield, Cambria, Somerset, Pittsburgh and Mount Olive district coals show no change from last week, but there were declines in Pocahontas, Pittsburgh No. 8, southern Illinois and eastern Kentucky coals and advances in Kanawha, Hocking and western Kentucky.

Production of soft coal is declining at about the same rate as prices. The estimated output in the third week of June was 10,411,000, with a decline indicated in the last week of the month. The output for the first half of the year was about 273,000,000 net tons, which is above the average of the same period of the three most prosperous years of recent times.

The feature of the week is the showing in the government statistics of coal exports in May of the large tonnages taken by Europe. More than 481,000 gross tons of bituminous coal cleared from ports of the United States for Europe in May. Of this 238,427, or nearly half, was destined for France, Italy received some 57,000

tons and The Netherlands 43,000 tons. The movement to South America was brisker in May than a year ago, partly because of the strike here last year and partly because England has not been able to meet market demands of her foreign customers. Federal Fuel Distributor Wadleigh will release a summary of the export situation the end of this week, to which will be added expressions of opinion from some of the leading American and British exporters.

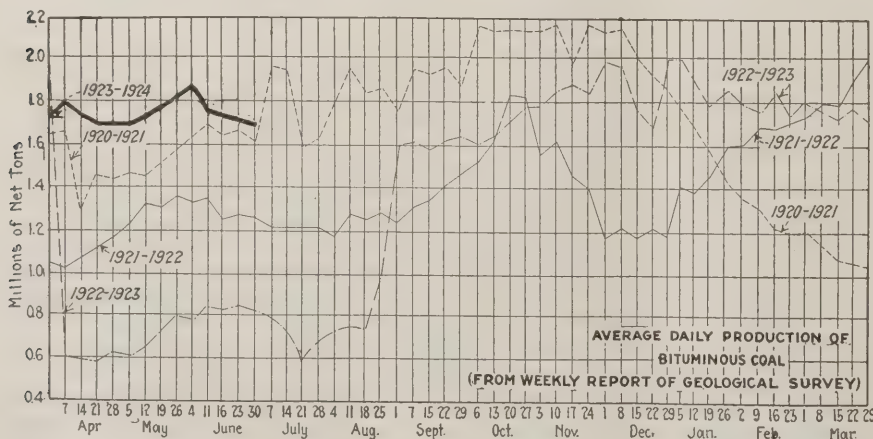
Buying in the Middle West is at low ebb. There is no demand and storing by large consumers has almost ceased. Curtailing of production by industries, particularly the textiles, in New England, has put a damper on business there. Receipts have diminished and new



business is scarcely heard of. In Pittsburgh the market is easier than a week ago. More mines are closing each week.

Lake dumpings continue heavy. Receipts at Milwaukee are so heavy and shipments so light that the docks will soon have received about 50 per cent of last year's season's total.

Dumpings at Hampton Roads for the week ended June 28 for all accounts were 355,961 net tons, as compared with 265,060 net tons the previous week. The feature of the Hampton Roads situation at the end of last week



Estimates of Production (Net Tons)

BITUMINOUS

	1922	1923
June 9.....	5,136,000	10,676,000
June 16 (b).....	5,013,000	10,575,000
June 23 (a).....	5,363,000	10,411,000
Daily average.....	894,000	1,735,000
Calendar year.....	182,624,000	262,903,000
Daily av. cal. year.....	1,230,000	1,775,000

ANTHRACITE

June 9.....	13,000	2,046,000
June 16.....	22,000	2,053,000
June 23.....	24,000	2,042,000
Calendar year.....	21,901,000	49,287,000

COKE

June 16 (b).....	106,000	407,000
June 23 (a).....	110,000	413,000
Calendar year.....	3,103,000	9,672,000

(a) Subject to revision. (b) Revised from last report.

was the large accumulation and the scarcity of tonnage awaiting coal.

Production of beehive coke increased during the third week of June, the total output being estimated at 413,000 net tons, an increase over the revised figure of the preceding week of 6,000 tons. Cumulative output during the year to date is 9,672,000 net tons.

Little Doing in Chicago

Trade continues flat in Chicago. There is no demand for anything. The few railroads and other large consumers who are storing have begun to ease a little, thus choking down about the only important outlet the producers of the Middle West have had for lump, egg and nut coals. Retail call amounts to nothing and is not expected to make itself felt for some time. Not only were Illinois prices not advanced July 1, as they were June 1, but it is a lucky producer indeed who manages to get the circular price. Screenings are the bane of the Middle West's life just now. Good Franklin County coal below nut size sells now for \$1.50 on this market. Smokeless and anthracite reach Chi-

cago in small but steady volume and are moving into consumers' cellars with a shade more celerity than is usual at this slack time of year, because of impending labor troubles in the anthracite fields.

Midwest Fields Full of "No Bills"

Southern Illinois mines are working two and three days per week, with "no bills" being carried everywhere. What little demand there is seems to be largely for lump, the "no bills" being carried largely in the egg, nut and steam sizes. Though the circular price is \$4.35 some of the larger producing companies are offering 6-in. lump at \$3.85, egg at \$3.85 and nut at \$3, while independents are offering lump at \$3.25, egg at \$3, and nut at \$2.50, with mine-run ranging between \$2.25 and \$2.50 and screenings being offered freely at \$1.50.

In Jackson and Perry counties better working time has been experienced by some of the operators in this district who have been successful in obtaining railroad storage orders. In the Standard field coal is actually being sold at less than cost, 6-in. lump being offered at \$2.25 per ton, 2-in. lump at \$2, steam, nut and egg \$1.75 per ton and screenings \$1.15@1.25.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 3 1922	June 18 1923	June 23 1923	July 2 1923†	Pitts. No. 8 mine run....		Market Quoted	July 3 1922	June 18 1923	June 25 1923	July 2 1923†
Smokeless lump.....		Columbus	\$3.65	\$6.25	\$6.10	\$5.75@ \$6.00	Cleveland...		Cleveland...	\$4.00	\$1.90	\$1.90	\$1.90@ \$2.00
Smokeless mine run.....		Columbus	3.45	3.90	3.60	3.50@ 3.75	Cleveland...		Cleveland...	4.00	1.20	1.25	1.20@ 1.30
Smokeless screenings.....		Columbus...	3.25	3.60	3.60	3.25@ 3.50							
Smokeless lump.....		Chicago	3.65	6.10	6.10	6.00@ 6.25							
Smokeless mine run.....		Chicago	3.40	3.85	3.85	3.50@ 4.00							
Smokeless lump.....		Cincinnati	3.75	6.35	6.00	6.00@ 6.50							
Smokeless mine run.....		Cincinnati	3.45	4.25	3.50	3.00@ 3.75							
Smokeless screenings.....		Cincinnati	3.25	4.10	3.25	2.50@ 3.50							
*Smokeless mine run.....		Boston	6.20	5.85	5.60	5.50@ 5.75							
Clearfield mine run.....		Boston	3.45	2.35	2.35	2.00@ 2.75							
Cambria mine run.....		Boston	3.70	3.00	2.85	2.50@ 3.25							
Somerset mine run.....		Boston	3.50	2.75	2.60	2.25@ 3.00							
Pool 1 (Navy Standard).....		New York...	4.80	3.75	3.75	3.50@ 3.75							
Pool 1 (Navy Standard).....		Philadelphia...		3.65	3.65	3.25@ 3.95							
Pool 1 (Navy Standard).....		Baltimore...	4.25										
Pool 9 (Super. Low Vol.).....		New York...	4.65	2.75	2.75	2.65@ 3.00							
Pool 9 (Super. Low Vol.).....		Philadelphia...	4.55	2.75	2.85	2.45@ 3.20							
Pool 9 (Super. Low Vol.).....		Baltimore...	4.00	2.80	2.75	2.50@ 2.75							
Pool 10 (H.Gr. Low Vol.).....		New York...	4.40	2.35	2.50	2.35@ 2.60							
Pool 10 (H.Gr. Low Vol.).....		Philadelphia...	4.25	2.20	2.25	2.05@ 2.35							
Pool 10 (H.Gr. Low Vol.).....		Baltimore...	4.00	2.45	2.45	2.15@ 2.35							
Pool 11 (Low Vol.).....		New York...	4.15	2.00	1.95	1.90@ 2.20							
Pool 11 (Low Vol.).....		Philadelphia...	3.90	1.90	1.90	1.70@ 2.00							
Pool 11 (Low Vol.).....		Baltimore...	3.90	2.25	2.25	2.00@ 2.10							
High-Volatile, Eastern													
Pool 54-64 (Gas and St.).....		New York...	4.25	1.80	1.80	1.60@ 2.00							
Pool 54-64 (Gas and St.).....		Philadelphia...		1.80	1.70	1.45@ 1.80							
Pool 54-64 (Gas and St.).....		Baltimore...	3.90	1.75	1.75	1.75							
Pittsburgh ac'd gas.....		Pittsburgh...		2.80	2.80	2.75@ 2.90							
Pittsburgh mine run (St.).....		Pittsburgh...		2.05	2.05	2.00@ 2.10							
Pittsburgh slack (Gas).....		Pittsburgh...		1.50	1.50	1.50							
Kanawha lump.....		Columbus	3.65	2.80	3.00	2.75@ 3.25							
Kanawha mine run.....		Columbus	3.40	2.05	1.85	1.75@ 2.00							
Kanawha screenings.....		Columbus	3.15	1.45	1.35	1.15@ 1.35							
W. Va. lump.....		Cincinnati	3.65	3.60	3.25	3.00@ 4.00							
W. Va. Gas mine run.....		Cincinnati	3.65	1.75	1.75	1.75@ 2.00							
W. Va. Steam mine run.....		Cincinnati	3.45	1.75	1.75	1.75@ 2.00							
W. Va. screenings.....		Cincinnati	3.25	1.25	1.10	1.00@ 1.50							
Hooking lump.....		Columbus	3.65	2.75	2.75	2.50@ 3.00							
Hooking mine run.....		Columbus	3.40	1.90	1.85	1.75@ 2.00							
Hooking screenings.....		Columbus	3.10	1.20	1.20	1.20@ 1.30							
Pitts. No. 8 lump.....		Cleveland...	4.25	2.75	2.70	2.10@ 3.00							
Midwest													
Franklin, Ill. lump.....		Chicago		4.05	4.05	3.50@ 4.35							
Franklin, Ill. mine run....		Chicago		3.10	3.10	2.75@ 3.25							
Franklin, Ill. screenings...		Chicago		1.80	1.80	1.50@ 1.85							
Central, Ill. lump.....		Chicago		2.60	2.60	2.50@ 2.75							
Central, Ill. mine run.....		Chicago		2.10	2.10	2.00@ 2.25							
Central, Ill. screenings...		Chicago		1.60	1.60	1.25@ 1.50							
Ind. 4th Vein lump.....		Chicago		3.35	3.35	3.25@ 3.50							
Ind. 4th Vein mine run.....		Chicago		2.60	2.60	2.50@ 2.75							
Ind. 4th Vein screenings...		Chicago		1.80	1.80	1.50@ 1.75							
Ind. 5th Vein lump.....		Chicago		2.85	2.85	2.75@ 3.00							
Ind. 5th Vein mine run.....		Chicago		2.10	2.10	2.00@ 2.25							
Ind. 5th Vein screenings...		Chicago		1.55	1.55	1.40@ 1.50							
Standard lump.....		St. Louis...		2.35	2.25	2.25							
Standard mine run.....		St. Louis...		1.80	1.75	1.75							
Standard screenings.....		St. Louis...		1.50	1.35	1.15@ 1.25							
West Ky. lump.....		Louisville...	4.40	2.25	2.25	2.15@ 2.35							
West Ky. mine run.....		Louisville...	4.40	1.75	1.75	1.65@ 1.85							
West Ky. screenings.....		Louisville...	4.40	1.35	1.15	1.10@ 1.30							
West Ky. lump.....		Chicago	4.45	2.35	2.35	2.25@ 2.55							
West Ky. mine run.....		Chicago	4.45	1.45	1.45	1.10@ 1.25							
South and Southwest													
Big Seam lump.....		Birmingham..	2.35	3.05	3.05	2.90@ 3.20							
Big Seam mine run.....		Birmingham..	2.15	2.05	2.05	1.85@ 2.25							
Big Seam (washed).....		Birmingham..	2.15	2.05	2.35	2.25@ 2.50							
S. E. Ky. lump.....		Chicago	3.65	3.25	3.25	3.00@ 3.50							
S. E. Ky. mine run.....		Chicago	3.40	2.35	2.35	2.25@ 2.50							
S. E. Ky. lump.....		Louisville...	3.75	3.50	3.35	3.00@ 3.50							
S. E. Ky. mine run.....		Louisville...	3.50	2.10	2.10	1.75@ 2.25							
S. E. Ky. screenings.....		Louisville...	3.50	1.35	1.35	1.00@ 1.50							
S. E. Ky. lump.....		Cincinnati...	3.70	3.60	3.25	2.75@ 3.50							
S. E. Ky. mine run.....		Cincinnati...	3.50	1.75	1.60	1.50@ 2.00							
S. E. Ky. screenings.....		Cincinnati...	3.20	1.35	1.10	75@ 1.25							
Kansas lump.....		Kansas City..	5.00	4.00	4.00	3.50@ 4.50							
Kansas mine run.....		Kansas City..	4.25	3.25	3.25	3.00@ 3.50							
Kansas screenings.....		Kansas City..	3.05	2.60	2.60	2.50@ 2.75							
* Gross tons, f.o.b. vessel, Hampton Roads. † Advances over previous week shown in heavy type, declines in italics.													

Midwest

Franklin, Ill. lump.....	Chicago.....	4.05	4.05	3.50@ 4.35
Franklin, Ill. mine run.....	Chicago.....	3.10	3.10	2.75@ 3.25
Franklin, Ill. screenings.....	Chicago.....	1.80	1.80	1.50@ 1.85
Central, Ill. lump.....	Chicago.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run.....	Chicago.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings.....	Chicago.....	1.60	1.60	1.25@ 1.50
Ind. 4th Vein lump.....	Chicago.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run.....	Chicago.....	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings.....	Chicago.....	1.80	1.80	1.50@ 1.75
Ind. 5th Vein lump.....	Chicago.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run.....	Chicago.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago.....	1.55	1.55	1.40@ 1.50
Standard lump.....	St. Louis.....	2.35	2.25	2.25
Standard mine run.....	St. Louis.....	1.80	1.75	1.75
Standard screenings.....	St. Louis.....	1.50	1.35	1.15@ 1.25
West Ky. lump.....	Louisville.....	4.40	2.25	2.15@ 2.35
West Ky. mine run.....	Louisville.....	4.40	1.75	1.65@ 1.85
West Ky. screenings.....	Louisville.....	4.40	1.35	1.10@ 1.30
West Ky. lump.....	Chicago.....	4.45	2.35	2.25@ 2.55
West Ky. mine run.....	Chicago.....	4.45	1.45	1.10@ 1.25

South and Southwest

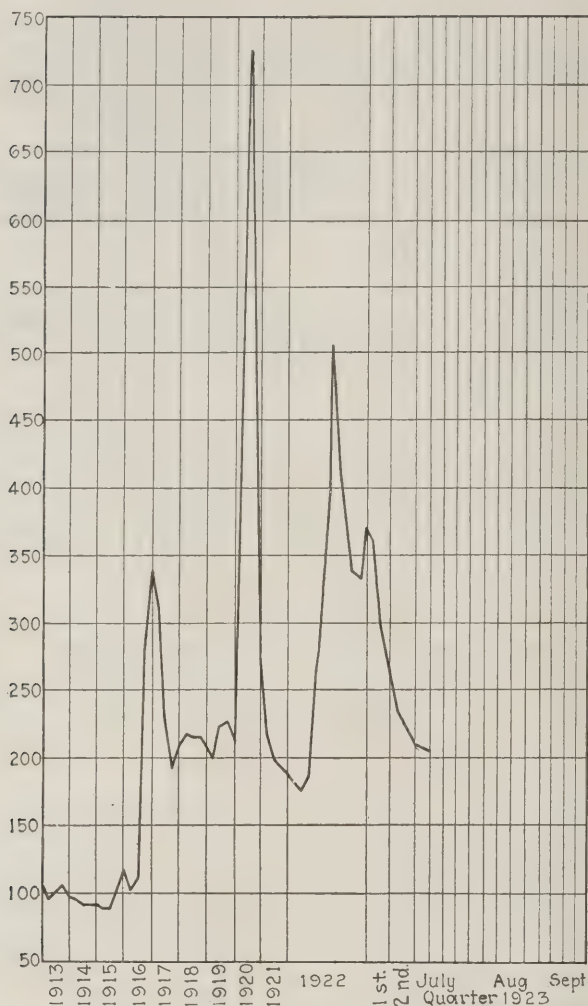
Big Seam lump.....	Birmingham..	2.35	3.05	3.05	2.90@ 3.20
Big Seam mine run.....	Birmingham..	2.15	2.05	2.05	1.85@ 2.25
Big Seam (washed).....	Birmingham..	2.15	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago.....	3.65	3.25	3.25	3.00@ 3.50
S. E. Ky. mine run.....	Chicago.....	3.40	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Louisville.....	3.75	3.50	3.35	3.00@ 3.50
S. E. Ky. mine run.....	Louisville.....	3.50	2.10	2.10	1.75@ 2.25
S. E. Ky. screenings.....	Louisville.....	3.50	1.35	1.35	1.00@ 1.50
S. E. Ky. lump.....	Cincinnati...	3.70	3.60	3.25	2.75@ 3.50
S. E. Ky. mine run.....	Cincinnati...	3.50	1.75	1.60	1.50@ 2.00
S. E. Ky. screenings.....	Cincinnati...	3.20	1.35	1.10	.75@ 1.25
Kansas lump.....	Kansas City..	5.00	4.00	4.00	3.50@ 4.50
Kansas mine run.....	Kansas City..	4.25	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City..	3.05	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest		Pre-Strike	June 25, 1923		July 2, 1923†	
			Independent	Company		Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34			\$7.60@ \$7.75		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia.....	2.39	\$7.00@ \$7.50	7.75@ 7.85	7.75@ 7.85	7.00@ 8.10	8.00@ 8.35	7.00@ 8.10	8.00@ 8.35
Egg.....	New York.....	2.34	7.60@ 7.75	7.60@ 7.85	7.60@ 7.85	\$8.50@ 11.50	8.00@ 8.35	\$8.50@ 11.50	8.00@ 8.35
Egg.....	Philadelphia.....	2.39	7.25@ 7.75	7.75	7.75	9.25@ 10.50	8.10@ 8.35	9.25@ 10.50	8.10@ 8.35
Egg.....	Chicago*.....	5.06	7.50	8.25	8.25	7.60@ 10.25	7.25@ 7.45	7.60@ 10.25	7.25@ 7.45
Stove.....	New York.....	2.34	7.90@ 8.20	7.90@ 8.10	7.90@ 8.10	8.50@ 11.50	8.00@ 8.35	8.50@ 11.50	8.00@ 8.35
Stove.....	Philadelphia.....	2.39	7.85@ 8.10	8.05@ 8.25	8.05@ 8.25	9.25@ 10.00	8.15@ 8.35	9.25@ 10.00	8.15@ 8.35
Stove.....	Chicago*.....	5.06	7.75	8.25	8.25	7.60@ 10.25	7.25@ 7.45	7.60@ 10.25	7.25@ 7.45
Chestnut.....	New York.....	2.34	7.90@ 8.20	7.90@ 8.20	7.90@ 8.20	8.50@ 11.00	8.00@ 8.35	8.50@ 11.00	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39	7.85@ 8.10	8.05@ 8.15	8.05@ 8.15	9.25@ 10.50	8.15@ 8.35	9.25@ 10.50	8.15@ 8.35
Chestnut.....	Chicago*.....	5.06	7.75	8.25	8.25	7.60@ 10.25	7.25@ 7.45	7.60@ 10.25	7.25@ 7.45
Ranges.....	New York.....	2.34				8.30		8.30	
Pea.....	New York.....	2.22	5.00@ 5.75	5.75@ 6.45	5.75@ 6.45	7.25@ 8.00	6.00@ 6.30	7.25@ 8.00	6.00@ 6.30
Pea.....	Philadelphia.....	2.14	5.50@ 6.00	6.10@ 6.25	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.35	6.15@ 6.20
Pea.....	Chicago*.....	4.79	6.00	6.25	6.25	6.25@ 7.25	5.30@ 5.65	6.25@ 7.25	5.50@ 5.65
Buckwheat No. 1.....	New York.....	2.22	2.75@ 3.00	3.50	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14	2.75@ 3.25	3.50	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York.....	2.22	2.00@ 2.50	2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Rice.....	Philadelphia.....	2.14	2.00@ 2.50	2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....	2.22	1.50@ 1.85	1.50	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia.....	2.14	1.50@ 1.75	1.50	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York.....	2.22		2.00@ 2.50	2.00@ 2.50		1.60		1.60



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

Index	1923		1922	
	July 2	June 25	June 18	July 3
Weighted average price	\$2.46	\$2.48	\$2.54	\$3.51

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

St. Louis

Domestic demand still quiet, brought about largely by the fact that there will be no increase in the price effective July 1. Dealers do not expect any increase in business before the middle or latter part of July. There is only a fair demand for anthracite in spite of the fact that Western shipments have been temporarily curtailed. Coke, while not plentiful, is easier and the demand has been better on account of the contemplated increase of 25c. per ton effective July 1.

Western Kentucky Screenings Advance

The general demand in the western Kentucky field is unsteady, operations being controlled by the activity of their selling organizations. Mines producing only mine-run are out of the running. Prices are generally firm all along the line in spite of lack of orders for prepared coal during the last few days. This has caused a slight slump in production of screenings. At the same time there probably has been a little better steam demand due to reduction of storage stocks, and screenings have advanced from \$1 a ton last week to \$1.25 now, with some houses quoting \$1.35. Mines haven't much business ahead as a rule and are operating on day-to-day orders, with frequent closedowns.

Eastern Kentucky Is Weaker

Eastern Kentucky coal is reported as somewhat weaker all along the line, slight breaks having been reported in egg and lump sizes, but block is firm. Mine-run is unchanged, but screenings weakened a little, as production of prepared has been quite fair, especially on movement to the Lakes in spite of the L. & M. embargo, and to the north and west. Car supply is excellent.

It is reported that an immediate delivery contract of 15,000 tons of Hazard screenings was taken at \$1 a ton during the week, but that the contract for the Cincinnati Water Works annual supply was taken on the basis of \$2.50 a ton.

At Kansas City the retail price of Arkansas semi-anthracite advanced another 50c. on July 1. This is the second 50c. increase since the slash of early spring, made in an effort to encourage summer buying and storage. So far the advances have not forced the domestic market. Operators, jobbers, wholesalers and retailers under the title of "The Associated Coal Bureau of Kansas City" by an intensive advertising campaign are trying to educate the public in the hazards of the coal business and the factors that determine the price of coal. The campaign has not been on long enough for results yet to be noticeable.

Utah weather is really hot now and dealers are doing very little business. The slack market is very soft at \$1.75. It will improve as soon as the sugar companies begin buying heavily. The coast business is fair. Lump and intermediate sizes are in demand there as well as locally.

Early Improvement Improbable in Ohio

The Cincinnati market is sluggish and refuses to respond even to drastic cuts made on lower grades of slack. West Virginia 2-in. lump was quoted \$2.50@2.75 on July 2, as compared with \$2.75@3 the previous week, and south-eastern Kentucky 2-in. lump at \$2.50@2.75 as compared with \$2.50@3 the week previous. There was little change in the Columbus and central Ohio situation. Buying is at low ebb and there are no immediate prospects of improvement. Steam trade is quiet and there is no disposition on the part of steam coal users to stock up. The best customers are the utilities and railroads although some tonnage is being taken by industries. The domestic trade is quiet, many householders believing that prices are going to be lower. Output in the Hocking Valley, Pomeroy and Crooksville district is around 25 per cent. At Cleveland the market is dull and operators say that while they are receiving some inquiries, little improvement is looked for in the immediate future.

Conditions at Pittsburgh are a trifle easier than a week ago. Demand in the open market is poor. The market at Buffalo continues inactive with a good-sized tonnage on the tracks unsold.

Car supply on the Chesapeake & Ohio, Virginian, Norfolk & Western and the Baltimore & Ohio in West Virginia shows some improvement, but is not giving producers as much concern as lack of orders. Additional high-volatile mines in West Virginia suspended operations late in June rather than sell their product at a loss.

New England Market Turns for Worse

In New England the current market has gone from bad to worse. Receipts have diminished, and there is almost an utter lack of new business. Industrial plants have curtailed in many directions and a surprisingly large number of textile mills have shut down for periods over the holiday. Buyers have little interest in the spot market except as their curiosity is piqued by quotations at new low levels. For the average sales agency the present state of trade here holds little encouragement for July and August, although there are those who are still predicting serious transportation difficulties in the autumn.

Central Pennsylvania coal quotations have changed very little. Most operators feel it better to shut down than sell at less than cost. A few of the higher grades are commanding about the same range of price that has obtained for the past sixty days, but even producers of these con-

cede that buying power has practically disappeared from the market.

Pocahontas and New River share the general depression. Accumulations continue heavy at Hampton Roads and prices the past week have shut off from \$5.50 to \$5.10 on second grades, with No. 1 Navy standard coals at only 25 to 35c. more. For distribution inland from Boston, Providence and Portland on car prices also slumped, \$7 to \$7.25 being the asking figure. No orders of any volume have materialized either f.o.b. or at this end, and there is a feeling that the new demurrage tax which goes into effect July 1 will tend to curtail shipments to the piers.

From Philadelphia as well as from Norfolk and Newport News the number of loadings recently has been notably less. Transportation continues in ample supply and today there seems no anxiety about coal coming forward in volume sufficient for all possible needs.

Seaboard Market Shows Little Life

Along the seaboard the market is quiet. At New York the daily number of cars at the terminals averages about 1,900, a slight increase over the previous week. Demand continues quiet. The Philadelphia market shows no added strength. There is a feeling that the railroads will come into the market soon. There are some bright spots in the market at Baltimore and some of the better grades, such as Pools 71 and 9, are hard to pick up at times. Despite this there is no real upward tendency with regard to prices.

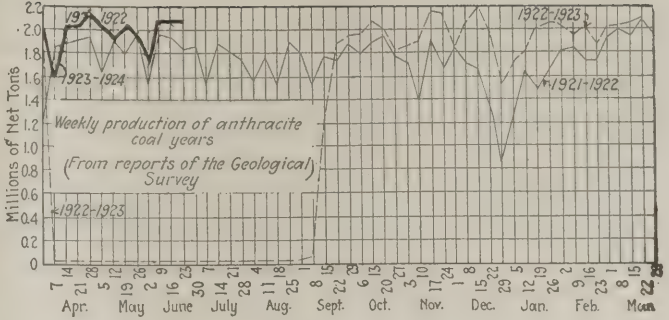
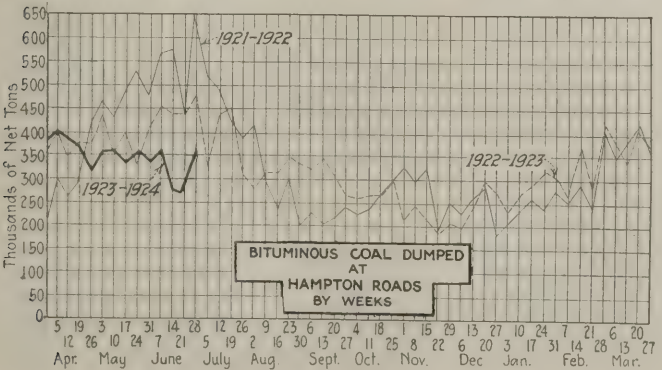
Dullness prevades the Birmingham market. Demand for steam coal is poor, while inquiry for the lower grades of lump and other domestic coals is easier. Regardless of the fact that there is scarcely any market for commercial coal and this class of mines is operating only about half time, production for the week ended June 16 was 359,000 tons. Mine labor is becoming scarce in some sections on account of the exodus of negroes to the North and West.

Heavy Dock Receipts at Duluth

The second largest week as far as dock coal receipts are concerned was scored at Duluth last week when sixty-four cargoes arrived, five of which were hard coal. Thirty-four others are reported on way, four of which are anthracite. It is estimated there are about 2,500,000 tons of bituminous and 150,000 tons of anthracite on the docks. Receipts at Milwaukee so far this season amount to about 1,329,870 tons of all coals, or about 50 per cent of last year's season total. There is much less buying of lake coal in the Pittsburgh district. Shipments of anthracite from Buffalo for the week were reported at 139,000 net tons, of which 59,000 tons were for Duluth and Superior, 43,700 tons for Chicago, 33,700 tons for Milwaukee, 1,400 tons for Sheboygan and 1,200 tons for Kenosha. Lake Erie dumpings during the week ended July 2 was 1,034,908 net tons of cargo coal and 57,239 tons of fuel coal, making the total dumpings this season 10,345,147 tons.

Anthracite Market Fails to Speed Up

The anthracite market fails to show any increased activity notwithstanding that the demands to be made on the operators by their employees have been announced. Consumers continue to be urgent for supplies, egg and stove sizes being the most wanted. Retail dealers are urging



shippers for deliveries. The steam coals are not moving easily. Some companies continue to store large tonnages, which enables the independent operators to dispose of their product easier.

"There was no slackening in the rate of anthracite production during the third week of June," says the Geological Survey, "and production again passed the 2,000,000-ton mark. According to reports from the principal anthracite-carrying railroads, 39,055 cars were loaded, and on this basis it is estimated that the total output, including mine fuel, local sales, and the product of dredges and washeries, was 2,042,600 net tons.

"The cumulative output during the present calendar year to date stands at 49,287,000 tons and compares favorably with the output in the years of great activity in anthracite mining."

Slight Increase in Coke Output

Practically the entire increase of 6,000 net tons in the production of coke during the week ended June 16 over that of the preceding week occurred in Kentucky and Alabama, says the Geological Survey, where the railroads reported loadings nearly as twice as large as those of the week before. Production in all other districts except Pennsylvania and Ohio was practically the same as in the week ended June 16.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Jan. 16, 1923 Inclusive	Week Ended Jan. 16, 1923
U. S. Total.....	55.7	36.3	41.3	58.8
Somerset County.....	74.9	57.3	58.5	64.1
Panhandle, W. Va.....	51.3	57.3	58.5	64.1
Westmoreland.....	58.8	65.8	60.1	76.0
Virginia.....	59.9	55.7	58.6	65.4
Harlan.....	54.8	22.1	23.1	37.0
Hazard.....	58.4	16.4	27.6	34.5
Pocahontas.....	60.0	36.6	40.6	48.8
Tug River.....	63.7	28.8	39.5	55.4
Logan.....	61.1	26.2	33.1	39.9
Cumberland-Piedmont.....	50.6	31.7	52.4	69.2
Winding Gulf.....	64.3	30.4	37.1	39.9
Kenova-Thacker.....	54.3	42.4	38.2	(a)
N. E. Kentucky.....	47.7	28.4	31.6	42.9
New River.....	37.9	31.6	38.4	36.7
Oklahoma.....	59.6	59.1	45.7	67.7
Iowa.....	78.4	75.9	70.0	69.1
Ohio, Eastern.....	46.6	40.8	43.3	67.2
Missouri.....	66.8	76.3	68.6	54.4
Illinois.....	54.5	49.9	41.8	32.9
Kansas.....	54.9	55.9	48.1	56.1
Indiana.....	53.8	37.7	46.4	39.7
Pittsburgh†.....	39.8	41.2	44.5	64.1
Central Pennsylvania.....	50.2	53.4	52.0	62.5
Fairmont.....	44.0	35.5	45.8	59.6
Western Kentucky.....	37.7	32.4	31.6	30.7
Pittsburgh*.....	31.9	56.1	67.4	75.3
Kanawha.....	13.0	15.6	25.8	41.3
Ohio, Southern.....	24.3	38.1	30.8	29.2

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended June 16, 1923.....	1,007,253	187,009
Previous week.....	1,013,249	190,149
Same week in 1922.....	848,657	91,177
	Surplus Cars	
	All Cars	Coal Cars
June 14, 1923.....	51,988	3,129
Same date in 1922.....	268,863	171,832
June 7, 1923.....	41,106	3,528
	Car Shortage	
	All Cars	Coal Cars
June 14, 1923.....	12,787	9,257
Same date in 1922.....	12,978	8,926

Foreign Market And Export News

British Coal Output Shows Slight Decline; May Exports Heavy

Great Britain's coal output for the week ended June 16 was 5,651,000 tons, says a cable to *Coal Age*. This compares with 5,654,000 tons the preceding week, a decrease of 3,000 tons.

The Welsh coal trade is quiet, due to the fact that the European demand has returned to something like normal. On the other hand the operators have plenty of orders in hand and are showing no anxiety. Exports to South America are particularly good. A new feature is the circulation of inquiries from Australia, on account of the labor troubles in that country. The introduction of the third shift at the docks has resulted in a much better clearance of coal, and ships are being got away on time.

With the exception of the gas coals section, the market in the north of England is particularly quiet. The European buyers are sitting tight waiting for prices to fall. Gothenburg has taken 25,000 tons D. C. B. at 32s. 7d. c. i. f. and Belgium is inquiring for 10,000 tons of best coking coals monthly for the rest of the year.

British coal exports in May amounted to 7,684,405 tons, which was the largest tonnage of coal ever exported from Great Britain in a single month according to official statistics of the British Board of Trade received by the Bankers Trust Company, of New York, from its English Information Service. A total of 33,220,230 tons of British coal were exported in the first five months of the present year, or 3,700,000 in excess of British coal exports during the same period of 1913.

Germany continues to be a heavy purchaser of British coal.

Market Quiet at Hampton Roads

Business at Hampton Roads was unusually quiet last week, with prices continuing to break, and with a seasonable dullness pervading the situation. Bunkers, only, appeared to be holding to the average, with coastwise and foreign trade at low ebb.

Considerable foreign movement on old contracts resulted during the week, but

no new orders were reported by shippers. The movement of coal to the West by rail continued to divert attention from the Norfolk & Western and Chesapeake & Ohio lines.

Although the approach to July 1 was expected to disclose a number of new inquiries for coal during the coming year, they failed to materialize. The inclination throughout the field was to depend largely upon the spot market and to take chances. The tone of the market was exceedingly weak.

United States May Coal and Coke Imports

(In Gross Tons)			
	1922	1923	
Anthracite.....	484	4,981	
Bituminous { free.....	41,654	18,438	
dutiabale.....		53,646	
Totals.....	42,138	77,065	
Imported from:			
United Kingdom.....	7,663	9,595	
Canada.....	29,136	53,646	
Japan.....	666	6,100	
Australia.....	4,189	1,600	
Other countries.....		1,143	
Coke.....	3,570	6,929	

United States May Exports by Custom Districts

(In Gross Tons)			
	Anthracite	Bituminous	Coke
Maine and New Hampshire.....	849	429	
Vermont.....	1,374	959	
Massachusetts.....	301		
St. Lawrence.....	146,336	279,746	2,995
Rochester.....	65,898	64,106	180
Buffalo.....	209,911	277,124	38,494
New York.....	6,724	1,201	1,135
Philadelphia.....	4,830	47,770	20,025
Maryland.....		271,113	69,875
Virginia.....		336,478	
South Carolina.....		28,845	
Florida.....			264
Mobile.....		1,000	
New Orleans.....	2	1,031	201
Sabine.....		10	10
San Antonio.....		445	
El Paso.....	107	2,880	1,113
Arizona.....		4,621	8,388
Los Angeles.....	14	3	
San Francisco.....		150	
Washington.....	1	161	
Alaska.....	1	1	
Dakota.....	99	1,840	267
Duluth and Superior.....	95	1,606	
Michigan.....	341	138,960	13,903
Ohio.....	10,605	788,235	5,011
Totals.....	445,813	2,249,001	163,249

United States May Coal Exports

(In Gross Tons)			
	1922	1923	
Anthracite.....	60,860	445,813	
Bituminous.....	399,551	2,249,001	
Exported to:			
France.....		238,427	
Italy.....	15,002	57,889	
Netherlands.....		42,788	
Other Europe.....		142,419	
Canada.....	272,146	1,582,879	
Panama.....	6,477		
Mexico.....	10,918	11,310	
Br. West Indies.....	9,950	5,903	
Cuba.....	38,020	43,608	
Other West Indies.....	12,018	17,219	
Argentina.....	2,291	38,130	
Brazil.....	19,898	53,397	
Chile.....	11,004	2,034	
Egypt.....		3,048	
French Africa.....			
Other countries.....	1,827	9,950	
Coke.....	21,798	163,249	

Export Clearances, Week Ended June 30, 1923

FROM BALTIMORE		Net Tons
For Brazil:		
Br. SS. Promus.....		5,625
For France:		
Br. SS. Senator.....		5,182
For Germany:		
Jap. SS. Texas Maru.....		9,339
Nor. SS. Hanna Nielsen.....		7,870
Ger. SS. Hameln.....		5,162
For Italy:		
Br. SS. Hightown.....		7,704
Ital. SS. Oceania.....		6,323
For Spain:		
Span. SS. Anro Mendi.....		8,036
FROM HAMPTON ROADS		
For Bahamas:		
Amer. Schr. Horace M. Bickford, for Nassau.....		481
For Brazil:		
Br. SS. Pentowy, for Buenos Aires.....		5,234
For Canada:		
Nor. SS. Ovre, for Montreal.....		6,817
For Cuba:		
Nor. SS. Halse, for Havana.....		3,234
Br. SS. Elswick Tower, for Havana.....		5,779
For West Indies:		
Dan. SS. Ribe, for Port au Spain.....		3,404
Amer. SS. Tachira, for Curacao.....		3,279
Nor. SS. Maud, for Kingston.....		1,674
Amer. Schr. Florence B. Phillips, for Sanchez.....		743

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:		June 21	June 28
Cars on hand.....		1,132	1,051
Tons on hand.....		67,979	61,210
Tons dumped for week.....		70,795	111,278
Tonnage waiting.....		12,275	3,175
Virginian Ry. piers, Sewalls Pt.:			
Cars on hand.....		1,676	1,820
Tons on hand.....		93,570	103,530
Tons dumped for week.....		118,279	80,896
Tonnage waiting.....		19,981	16,950
C. & O. piers, Newport News:			
Cars on hand.....		2,465	2,564
Tons on hand.....		124,873	127,579
Tons dumped for week.....		47,587	125,648
Tonnage waiting.....			9,090

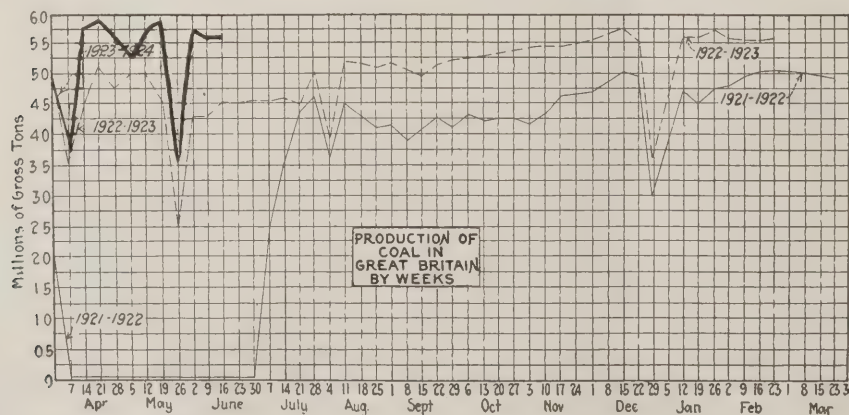
Pier and Bunker Prices, Gross Tons

PIERS		June 23	June 30†
Pool 9, New York.....	\$5.60@ \$6.00	\$5.60@ \$6.00	
Pool 10, New York.....	4.75@ 5.25	5.00@ 5.35	
Pool 11, New York.....	4.00@ 4.65	4.50@ 4.75	
Pool 9, Philadelphia.....	5.45@ 5.85	5.40@ 5.80	
Pool 10, Philadelphia.....	4.55@ 5.35	4.60@ 5.30	
Pool 11, Philadelphia.....	3.75@ 4.40	3.70@ 4.35	
Pool 1, Hamp. Roads.....	5.65	5.50	
Pools 5-6-7, Hamp. Rds.	4.75	4.50	
Pool 2, Hamp. Roads.....	5.40	5.35	
BUNKERS			
Pool 9, New York.....	5.90@ 6.30	5.80@ 6.30	
Pool 10, New York.....	5.05@ 5.55	5.30@ 5.65	
Pool 11, New York.....	4.30@ 4.95	4.80@ 5.05	
Pool 9, Philadelphia.....	5.85@ 6.05	5.80@ 6.00	
Pool 10, Philadelphia.....	4.85@ 5.60	4.80@ 5.55	
Pool 11, Philadelphia.....	4.00@ 4.75	3.95@ 4.70	
Pool 1, Hamp. Roads.....	5.75	5.60	
Pool 2, Hamp. Roads.....	5.75	5.55	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to <i>Coal Age</i>		June 23	June 30†
Admiralty, large.....	34s. @ 36s.	30s.	
Steam smalls.....	25s. @ 26s. 6d.	28s. @ 24s.	
Newcastle:			
Best steams.....	26s. 6d.	26s. 6d. @ 27s.	
Best gas.....	30s.	30s.	
Best bunkers.....	26s. @ 30s.	28s. @ 30s.	

† Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

ALABAMA

The DeBardleben, Empire and Corona coal companies, three of the largest operating concerns in the state, have been merged. Henry T. DeBardleben, president of the new company, announces the issuance of \$4,000,000 first mortgage 6 3/4 per cent gold bonds dated July 1, the proceeds of which will be applied to payment in part for the properties of the three companies absorbed. The new company represents an annual production of 2,000,000 tons and has valuable unopened seams.

The Imperial Coal & Coke Co., it is announced, will install a complete water works system at its Majestic Mines, in the northern part of Jefferson County, a reservoir or standpipe of 100,000 gallons capacity being provided, with the necessary water mains to cover the camp. Septic tanks or pit toilets also will be installed at all residences of employees at Bradford mines, as well as at Majestic mines, operated by the same interest and located near the Bradford pit.

The Galloway Coal Co. is constructing a brick commissary building and also a large warehouse at Carbon Hill, the location of extensive mining operations of the company, the improvements to cost around \$50,000.

Incorporation papers have been taken out here by the Consolidated Coal & Mining Co., with an authorized capital of \$50,000, business to begin when \$25,000 is paid in. Officers and incorporators of the new company, which will have offices at Birmingham, are: E. H. Douglass, Calxico, Calif., president; Torcuato Marcor, Chihuahua and Mexico City, Mex., vice-president, and J. J. Healey, Birmingham, secretary-treasurer. J. L. Croft and J. Hughes Croft, Gadsden, Ala., G. C. Healey and A. Eubank, Birmingham, are others interested in the organization.

The Pratt Fuel Company, with headquarters in Birmingham, has purchased the properties of the Dora Fuel Co. and the Kershaw Mining Co., at Dora, Walker County. The consideration is not given, but is said to be a large figure. The addition of these mines at Dora will give the Pratt Fuel Co. an output of 50,000 tons of coal per month. The announcement is made that Frank Marquis, who was president of the Dora company, and John Stone, of the Kershaw company, will be members of the Pratt Fuel Co., with Walter Moore as president. Mr. Moore also heads the Empire Coal Co., of Birmingham. Mr. Moore owned extensive mines near Dora previous to the purchase of these other mines. All of these mines will now be consolidated, under the head of the Pratt Fuel Co. Mr. Moore is said to be planning the erection of a big byproducts plant at Empire and other big enterprises. The mines at Dora have contracts on hand which will require at least one year of steady operation of the mines.

The Porter Coal Co., at Palos, of which Frank House is president, has increased its capital stock to \$100,000, and has commenced operations at the old Porter mine, in Walker County, where the Big Seam or Mary Lee seam of coal is being worked.

ALASKA

By a proclamation issued by the President and made public June 26, the Secretary of the Interior is authorized to operate the government railroad of Alaska, including branch lines, feeders, and telegraph and telephone lines connected with it. Vestment of this authority was made necessary by the completion of the construction of the line last week when the last length of standard-gage track was laid into Fairbanks, thus finishing all the engineering work.

CALIFORNIA

James F. Callbreath, secretary of the American Mining Congress, was the guest of honor at a banquet in Los Angeles, June 7, at the University Club, under the joint auspices of the Chamber of Mines and Oil, the Los Angeles Stock Exchange, and the American Institute of Mining and the Metallurgical Engineers. He spoke on the min-

ing industry. A. C. McLaughlin, president of the Chamber of Mines and Oil, presided.

COLORADO

It is confidently expected by some elements in the Colorado coal industry that the prospective building of the Moffatt tunnel will open to northwestern Colorado a large trade in bunker coal on the Pacific coast. Most bunker coal in American Pacific ports now comes from Australia and even Wales and sells often for as much as \$30 a ton. It is calculated that Routt County coal could be sold at Seattle and San Francisco for half that. The case obstructing the progress of the tunnel project is now before the United States supreme court. It may be decided during June. If the decision is favorable, Colorado is free to sell tunnel bonds and soon thereafter begin construction.

Having completed his term as State Commissioner of Mines, Horace F. Lunt has opened an office as consulting mining engineer at 617 Majestic Building, Denver.

CONNECTICUT

The Connecticut Blower Corporation, Hartford, has been incorporated under the laws of Delaware with a capital of \$250,000. M. E. Keeney, president; C. H. Keeney, treasurer; C. E. Keeney, secretary. The company has taken over the International Blower Co. and the Hartford Sheet Metal Works. The products manufactured and installed include blowers and exhaust fans, blower systems of all kinds, dust-collecting systems, exhaust systems, ventilating systems, etc. The plant of the International Blower Co. will be utilized until autumn, when a considerably larger plant will be occupied.

ILLINOIS

The Roanoke Brick Co., of Roanoke, has purchased the plant of the Roanoke Coal Co. and will operate the mine in the future. The mine now gives employment to 160 men and it is the intention of the new owners to develop the property.

W. R. Trapper & Co., Inc., Fisher Building, Chicago, is a new organization with capital of \$40,000. The incorporators are Sidney H. Ware, James Mayer and George Erickson. The company organizes to manufacture coke as well as mine coal and will deal in both coal and coke.

The Hi-Carbon Coal Co., Campbell Hill, has been incorporated with capital of \$30,000 to deal in and operate coal, fluorspar and fireclay mines and gas and oil wells. It has been organized by E. B. Dick, Byrd Thimig, J. B. Gustat and A. C. Mitchell.

The Abbott Coal Co. has been organized at Pekin by Charles Abbott and associates. A new mine is to be opened on the Abbott land southeast of Pekin, near the location of the Hawlet coal mine.

The Riverton mine of the Peabody Coal Co., which has been closed since May 1 while a new shaker screen was being installed, resumed operations June 15. J. F. Monahan is the district manager.

The Rutland Third Vein Coal Co., of Rutland, has been incorporated with capital of \$100,000 to operate the Rutland mine, which has been discarded for some months. J. L. Bane will be general manager of the company, and M. J. Proctor is the superintendent. J. L. Bane, F. W. Rohrer, F. W. Sauer and M. J. Proctor has been appointed a committee to purchase material for the new company. The steel tower which had settled 7 ft. at one corner since the mine closed down has been straightened. It is planned to resume operations by Aug. 15.

The Orton & Steinbrenner Co., 608 South Dearborn St., Chicago, manufacturers of locomotive cranes, dipper shovels and grab buckets, announce a reorganization of the company and the election of the following officers: P. A. Orton, president and general manager; E. B. Ayers, vice-president; Herbert Mertz, secretary and sales manager; Harry Shaffer, treasurer and purchasing agent; G. L. Niederst, chief engineer, and Alex. Orton, works manager. The reorganization is occasioned by the resigna-

tion of H. G. Steinbrenner as president and the disposal of his interest in the company.

Rumors that Williamson County Coal was pretty well mined out in the No. 6 seam resulted in an investigation which shows that while the west half of the county underlain with seam No. 6 probably will be exhausted by the existing mines in the next 30 years, the eastern half is practically untouched except in the Pittsburg area. Some of the mines now working No. 6 contemplate in time working No. 5, which is from 60 to 100 ft. deeper. This is a thin seam, averaging 5 ft., but is of higher quality than No. 6. The Harrisburg seam is No. 5. Constant mining of this seam will take from 75 to 100 years to work out Williamson County.

Directors of the Sullivan Machinery Co., Chicago, have declared a dividend of \$1 a share, payable July 16 to stockholders of record June 30, 1923.

INDIANA

The boiler room, the hoisting cable and machinery and other mining accessories of the J. & M. Mine, two miles southwest of Linton, Ind., were destroyed by fire recently, entailing a loss of about \$10,000, closing the mine for an indefinite period until new construction is completed. The mine is owned by the High-Grade Coal Co. of Terre Haute, in which Clem and Frank Richards and John T. Beasley are chief stockholders.

The Pine Ridge Mines Co., of Terre Haute, has filed preliminary certificate of dissolution.

The Clinton Coal Co., of Clinton, has arranged with Roberts & Schaefer, of Chicago, to build a four-track steel tippie at Clinton.

The Penna mine, opened about three months ago by the Templeton Coal Co. near Hymera, on the C. M. & St. P. R.R., is just getting into production. It is expected to develop into one of the big producers of that region.

IOWA

The Electric Mining Co. is building a switch from the Burlington tracks near Cuba. The switch is about two miles long.

The Razor Coal Co., of Tuscola, will erect a new office building.

KANSAS

A new steam shovel has been installed at the Moka pit near Mulberry by the Sheridan Coal Co. as a part of a program to increase tonnage.

KENTUCKY

The Consumers Red Ash Coal Co., of Pineville, capital \$2,000, has been chartered by T. P. and R. A. Cairns and B. F. Johnson. The Berger Coal Co., Harlan, has filed amended articles increasing its capital stock from \$150,000 to \$225,000.

Louisville retailers are watching with interest the erection of the first silotype coal handling plant in Louisville, this being erected by the Charles Buddeke Coal Co., at Logan and Breckinridge streets.

Fred J. Hinkebein after 14 years as secretary of the Atlas Coal Co., has resigned and gone with the Moll Wrecking Co., Louisville. He has been succeeded by W. W. Dant, formerly in the retail coal business and distillery business at Dant, near Lebanon.

The Louisville & Nashville R.R. is spending \$8,734,403 in double tracking 89.61 miles of its divisions in the very heart of Kentucky's coal-producing regions in order to facilitate fuel shipments and relieve congestion.

The Elkhorn Star Coal Co., of Pikeville, has increased its capital stock from \$125,000 to \$175,000. New Kentucky incorporations are the Castro Coal Co., of Pineville, capital \$30,000, by W. M. Freeman, E. A. Smothers and C. L. Gooch; the Cumberland Straight Creek Coal Co., Pineville, capital \$20,000, by Col. E. Shaffer, Eula Pursiul and H. J. Gibson.

The work of pouring concrete for the new tippie of Mine No. 1 of the Wasson Coal Co., Harrisburg, has started. The new tippie, which is being erected by the Jeffrey Mfg. Co., may be completed by Aug. 1.

The Old Ben Coal Corporation, one of the largest operating companies in southern Illinois, announces the opening of offices in the Central National Bank Building, St. Louis.

The two big issues that are being used in the platforms of the various candidates for Governor of Kentucky in the fall elections, in an effort to obtain the nomination, revolve around race-track gambling and a tonnage tax on coal. There may be some argument in favor of a tonnage tax, but there are many arguments against it. As a matter of fact a Governor has very little to say about the matter, as he can't make laws, and it is a question for the state legislature to decide on either issue. However, it is certain that there will be a number of bills before the next Legislature on these two subjects.

Charles Geis, of Zanesville, Ohio, and Peter C. McKinney of Oakmont, Pa., holders of one-fifth of the \$400,000 capital stock of the Rockport Coal Co., operating mines at Rockport and Centerstown, have instituted suit in the federal court against the Crown Coal Co., H. L. Tucker, Mrs. Zetta Tucker, James Danks, John T. May, L. D. Smith and Rodney D. Reid, stockholders, asking the appointment of a receiver and an accounting of the business. The petition alleges that H. L. Tucker and his associates have voted excessive salaries to the present officers of the company; that they formed the company known as the Crown Coal Co. and that later they entered into a contract with this company, giving it the exclusive right to sell all coal produced or controlled by the Rockport Coal Co. on which sales a commission of 8 per cent was paid and that these commissions have exceeded \$100,000. It is also alleged that Tucker and his associates have caused to be issued to them many shares of stock in the company for which no cash payment has been made.

The Kentucky & Indiana Terminal R.R. at Louisville has arranged to spend \$1,500,000 for better terminal trackage at Louisville and has ordered a number of switch engines to take care of severe traffic congestion which has been experienced in Louisville over the past few months as a result of heavy traffic and shortage of facilities for handling it. The road operates a bridge across the Ohio River at Louisville and switches for the B. & O., Monon and Southern railroads.

The Southeast Coal Co., of Seco, suffered damage of \$8,000 on June 9, when a large commissary store was burned. Part of the storehouse was saved.

Clifton Rodas, vice-president of the Pittsburgh Fuel Co., Louisville, lost by fire a home valued at \$25,000 Saturday afternoon, June 9. The home is on the upper River Road, and while city equipment answered the alarm, there was no water available.

Officials of the Louisville & Nashville R.R., Louisville, as well as of the Interstate R.R., of Stonega, Va., have denied press reports from Whitesburg to the effect that the L. & N. had obtained control of the Interstate, which would give it a connection from Norton, Va., to the C. C. & O. R.R., which has recently been leased by the L. & N., giving the latter a connection from southeastern Kentucky to the Atlantic coast.

MINNESOTA

An estimate of the number of oil-burning plants in domestic establishments in the Twin Cities places the present number at around 1,000. These plants burn from 50 to 150 gallons of oil a week, during the cold weather, representing, according to the oil concerns, from one-third of a ton to a full ton of coal in heating value. This represents a considerable diversion of business heretofore going to domestic coal.

The find of supposedly anthracite coal at Benoit, near Crookston, proves to be a soft coal of apparently the same grade as that found in the railroad yards nearby.

Albert Lea, comes forward with a find of coal, pronounced by a local geologist as being of the grade similar to that known as blacksmith's anthracite and worthy of a further investigation.

MISSOURI

The case against Fred W. Kleine, of the former St. Clair Coal & Mining Co., by the St. Louis water works for fraud in short weighting, has been dismissed by the prosecuting attorney. The water works weighmaster and Edwin F. Kleine, who were sentenced to two years for prosecution in these frauds have appealed, but the evidence was such that the attorney felt that he could not get a conviction in the case of Fred W. Kleine.

J. W. Alder has leased 2,600 acres of coal land near Amorel on the Kansas City

Southern R.R., and development work will start soon.

MONTANA

The Northern Pacific railroad is building a branch line from Forsythe, about 40 miles up Armell's Creek to Hobsonville, where more lignite acreage is to be opened and stripped with steam shovels.

NEW YORK

William E. Marks Coal Co., of Syracuse, was low bidder for 1,000 tons of buckwheat coal for use at the Onondaga Court House at the opening of bids on June 11. The company's bid was \$5.94 for immediate delivery, but the price for an optional order for 1,000 tons for future delivery was placed at \$6.19. E. J. Leonard bid \$6.04 in both cases, and the C. L. Amos Coal Co., \$6.15.

L. B. Foster Co., Inc., has moved its New York City offices into larger quarters on the 14th floor of the Tribune Building.

The Pennsylvania Coal & Coke Corporation reports a surplus of \$79,707 after all charges for May, against a deficit of \$91,473 last year. For the first five months of the year the surplus was \$549,319, against a deficit of \$48,296 in the same period last year.

OHIO

Papers have been filed with the Secretary of State increasing the authorized capital of the Cambridge Stripping & Mining Co., Cambridge, from \$5,000 to \$20,000.

The Southern Ohio Coal Exchange reports that out of 445 mines reporting for the week of June 9, a total of 227,090 tons were produced, with a full-time capacity of 752,993 tons. Of the shortage of 525,903 tons, railroad disability or car shortage caused a loss of 59,387 tons; labor shortage, 19,406 tons; strikes, 5,010 tons; mine disability, 14,574 tons, and no market, 427,226 tons. In the eastern Ohio field during the same week 16,562 cars were ordered, of which 14,047 were placed and 11,274 were loaded. This was an 85 per cent car supply.

Suit for \$150,000 damages has been filed in Common Pleas Court by the McIntire Coal & Builders' Supply Co., of Zanesville, against the Pennsylvania Railroad Co. and the Zanesville Terminal Railroad Co. for alleged failure to furnish shipping facilities to it at Zanesville since 1918. The coal company says, in the petition, it had an agreement with the Zanesville Terminal company for service over a belt line at Zanesville, and that when the short line was sold to the Pennsylvania Co., April 27, 1917, service was refused.

OKLAHOMA

The Gem Coal & Mining Co. is the firm name of a new coal mining concern just organized at Henryetta. The company is capitalized at \$75,000 and announces that it will develop coal mines near Henryetta. The incorporators are Duncan McKay, Elizabeth McKay and J. E. Thompson, all of Henryetta.

The Chicago, Rock Island & Pacific Ry. will abandon its coal mines in Oklahoma and Arkansas and convert its locomotives to oil burners, according to announcement by Peter R. Stewart, Arkansas Commissioner for the Southwestern Interstate Coal Operators. Opinion among coal operators is that the railroads in changing from coal to oil-burning locomotives and the use of fuel oil in many industrial plants has curtailed the consumption of coal in Oklahoma until the mine output will have to be restricted to prevent overproduction.

PENNSYLVANIA

J. O. Durkee, formerly with H. C. Frick and the Hillman Coal & Coke Co., has been appointed chief mine inspector with the Bethlehem Mines Corp.

The Suffolk Coal Co. has purchased 130 acres, including the Langcliffe colliery in Avoca, from the New York & Pittston Coal Co. Title carries with it the coal in the mines and surface title. Practically all the stock of the New York & Pittston company was held by Pittston families. The consideration has not been made public. The new owners have carried on mining operations on the land for some time.

Since acquiring the mine of the H. D. W. Coal Co. in Preston County the Preston Smokeless Coal Co., organized not long ago,

has materially increased the capacity of the mine which is now producing at the rate of 450 tons a day instead of at the rate of 150 tons a day as was the case before the mine was sold. Among other improvements made has been the installation of cable haulage. This company is developing approximately 125 acres of Freeport coal. Ira L. Weaver and others of Fairmont are interested in the new concern.

The following coal companies were incorporated at the State Department, Harrisburg, recently: **Thompson Run Mining Co.**, Ellwood City, mining and preparing bituminous coal for the market; capital, \$40,000; incorporators, Harry L. Clark, 216 Glenn avenue, Ellwood City, treasurer; Clyde Gibson, New Castle, and J. E. Drake, New Castle. **Universal Coal Co.**, Dravosburg, mining and quarrying coal and limestone; capital, \$6,000; incorporators, Anastasia Bielski, Dravosburg, treasurer; Vincent Bielski and Alexander J. Bielski, Dravosburg. **Noel Coal Co.**, Uniontown; capital, \$20,000; mining coal and manufacturing coke; incorporators, Dick Sherrick, Uniontown, treasurer; J. D. Sherrick, Connellsville, and Harry Strickler, Uniontown.

Since acquiring Mine No. 93 of the Consolidation Coal Co., the Connellsville By-products Coal Co., owned by the J. A. Paisley interests, has been making a number of improvements, with a view to increasing the production of this plant. Sixteen feet are being removed from the bank at Murray in order to provide for side-track facilities. It is also understood that the company has under consideration the question of constructing a large steel tipple with a capacity of 450 tons an hour, which will make it possible to increase the daily production of the mine from 500 tons a day to about 3,500 tons a day.

It is estimated that within a period of six weeks up to and including May 25 there were produced in northern West Virginia no less than 5,362,350 tons of coal, the largest production during that period being in the week ending May 19, when the output reached a total of 664,500 tons. It has been possible to produce that large a tonnage notwithstanding the fact that about half the mines in the northern part of the state are idle. Approximately 275 are not in operation and about 290 are producing.

Chief Walsh of the State Department of Mines, who is anxious to reduce mining accidents and to keep the department in the front rank in maintaining a high standard of safety work, has completed arrangements to have operators and miners in the anthracite region devote two weeks to a careful study of all phases of mining that have a bearing upon the safety and welfare of the employees.

A deal was closed recently whereby J. H. Weaver, of Philadelphia, became the owner of coal lands in Cambria County owned by Joseph and Michael Farren. The price was said to be \$165 per acre and the total consideration was \$85,000. The purchase also includes the Murry estate adjoining, which Michael Farren is executor. The coal will be mined near Ebensburg.

The Superior Coal Co. has closed down indefinitely its mine at Superior, Fayette County.

E. A. Siemon, of California, Pa., general superintendent of the Diamond Coal & Coke Co., a subsidiary of the Hillman Coal & Coke Co., has been appointed assistant general superintendent of the latter company, in charge of several mines, including the mines of the former company and several others.

The State Department of Mines is unaffected by the new administrative code which is now being put into effect at Harrisburg. The code originally made the department a bureau of the Department of Labor and Industry, but opposition to this plan resulted in an amendment that kept the activities of the commonwealth relative to mining under a separate department.

A State charter was issued recently at the State Department, Harrisburg to the Pilgram Coal Co., Pittsburgh, mining and preparing coal for the market. Capital, \$5,000. Treasurer, J. D. C. Miller, 213 North Elizabeth Street, Hazelwood, Pittsburgh. Incorporators: C. F. Kiefer, Pittsburgh; J. D. C. Miller, and David E. Meigs, Swissvale.

What promises to be the largest coal-mining operation in the Myersdale district of Somerset County was launched recently when application was made to the Governor for a charter for a corporation to be known as the Blue Lick Coal Co. The projectors of the new company are Frederick Rowe, Frederick E. Rowe, Clarence F. Rowe and Clyde J. Rowe, all well-known coal operators in the Myersdale field except Clyde J. Rowe,

who is operating at Wellersburg, Pa., and Mt. Savage, Md. The tract includes 1,300 acres and will be worked from a number of openings which will be connected with both the Baltimore & Ohio and the Western Maryland railroads by a broad-gage railroad four miles in length. It is thought the road will be finished in time to start three or four operations before cold weather sets in.

Russell A. Tippins has resigned as superintendent for the receivers of American No. 1 coke plant of the American Coke Corporation, at Linn, Fayette County. The duties of the position have been taken over by Gibson Hardy, of Orient, general superintendent of the American No. 1 and Orient plants of the company. The American No. 1 plant was closed down a few weeks ago and is now resuming operations again in full. The Orient plant has fired 80 more ovens and now has 250 out of a total of 480 in blast.

Officials of the United Mine Workers in the anthracite coal fields are reported to be planning to organize the John Mitchell Life Insurance Co.

Governor Pinchot has appointed T. Henry Walnut, of Philadelphia, as chairman of the state workmen's compensation board. Mr. Walnut, who is an attorney and former assistant United States district attorney, will take the place made vacant by Harry A. Mackey, who was appointed under the Brumbaugh administration.

Alex Campbell, of Pittston, general chairman of the Pennsylvania Coal Co. miners, has been elected international board member of the United Mine Workers, according to complete returns of the district election recently held. The contest between Campbell and Michael Kosik, of Dupont, was the only one not definitely settled early in the count. With the count completed, Rinaldo Cappellini's plurality over William J. Brennan for the district presidency is 9,530. Cappellini received 24,500 votes, while Brennan's total was 14,970.

Investigation of books and records of anthracite companies was ordered by Auditor General S. S. Lewis, June 21, as the result of discrepancies between market and reported value of anthracite. The aggregate of anthracite recorded for 1922 fell short of estimates, the Auditor General stated. Mr. Lewis intimated that charges in excess of 12 1/2 per cent were being passed on to the consumer. "It is my desire not only to determine the aggregate value but as well to standardize methods of reporting and to bring the whole practice into conformity with the law," the Auditor General declared. H. J. Cassidy and N. Nester Grimm, special investigators of the department, will make a tour of the anthracite field and report to Mr. Lewis.

An opinion by Deputy Attorney General J. W. Brown to Joseph J. Walsh, chief of the State Department of Mines, holds that if bituminous coal miners are using cars which are not of uniform capacity and cars which are not branded they are violating the law. The opinion states that the act of June 1, 1883, P. L. 52, in Sec. 2, provides as follows: "That at every bituminous coal mine in this Commonwealth, where coal is mined by measurement, all cars, filled by miners or their laborers, shall be uniform in capacity at each mine; no unbranded car or cars shall enter the mine for a longer period than three months, without being branded by the mine inspector of the district, wherein the mine is situated; and any owner or owners, or their agents, violating the provisions of this section, shall be subject to a fine of not less than one dollar per car for each and every day as long as the car is not in conformity with this act, and the mine inspector of the district, where the mine is located, on receiving notice from the check-measurer or any five miners working in the mine, that a car or cars are not properly branded, or not uniform in capacity according to law, are used in the mine where he or they are employed, then inside of three days from the date of receiving said notice, it shall be his duty to enforce the provisions of this section, under penalty of ten dollars for each and every day he permits such car or cars to enter the mine: Provided, That nothing contained in this section shall be construed or applied to those mines who do not use more than ten cars."

UTAH

The United States Fuel Co. is making a new opening in Panther Canyon and expects to be shipping coal from there soon.

George W. Hahn, of the United States Fuel Co., has been appointed chairman of the entertainment committee for the convention of the Rocky Mountain Coal Min-

ing Institute, to be held in Salt Lake City, Aug. 27 to 29, in conjunction with the international safety convention.

Two more miners have been convicted in connection with the killing of a deputy sheriff during the strike of last year. The cases were heard in Salt Lake City. The charge was reduced to manslaughter and the men were sentenced to one year in the state prison. Eleven more men are to be tried in connection with the same case.

Eli Taylor, of Salem, has been appointed to succeed Gould B. Blakely as register of the Federal land office in this state.

The United States is trying to recover control of 1,600 acres of coal land in the Fish Lake National Forest in cancellation proceedings against eleven persons. All of the defendants had been granted permission to mine for coal, but the government claims that they did not intend, as the law requires, each to operate separately. Also it claims they have not done any work.

WEST VIRGINIA

Sixteen new companies were formed in West Virginia to engage in the coal business during April, including two non-resident corporations, with an aggregate capital stock of \$2,011,000.

The New River Collieries Co., operating in the New River field of West Virginia, produced a total of 600,000 tons during January, February, March and April. During the first four months of the year the New River company had declared \$4.50 a share in dividends or \$330,546 in all on its 73,477 shares of preferred stock.

The Realization Coal Co., of New York, has been incorporated by Charleston interests in West Virginia. It will have a general office at 2 Rector Street, New York and has an authorized capital stock of \$150,000. The firm is empowered to operate coal mines in various counties of the state.

The Bethlehem Mines Corporation, of Philadelphia, is buying two Marcus screens to be installed in the company's new tippie at Richards.

The Farrell Fuel Co., which maintains offices in Philadelphia and Uniontown as well as Pittsburgh, Pa., announces the opening of a new office at Fairmont. James P. Burns, Jr., has been appointed manager.

Harrison County coal people have organized the Cummings-Bowers Coal Co., with capital of \$50,000, for the purpose of operating in Harrison County. The office of the company is to be at Clarksburg. Identified with the new concern are: A. H. Cummings, Calder A. Lyons, Stanley C. Morris, V. A. Miller, all of Clarksburg, and James H. Bowers, of Lumberport.

Operations on quite a large scale in the Logan field are contemplated by the Dwyer Coal Co., the headquarters of which are at Chapmansville. The company has a total authorized capital stock of \$100,000. The company was incorporated by John J. Dwyer, J. W. Dwyer, R. A. Dwyer, I. D. Dwyer and N. L. Ford, all of Lewisburg.

With a view to engaging in the coal business in the Monongalia field, the High Quality Coal Co. has been ushered into existence by Morgantown business men, this company having a capital stock of \$100,000. Morgantown is to be the headquarters of the company. Incorporators of the new concern were B. M. Chaplin, O. K. Sauerwein, G. H. Saville, H. W. Hunt and T. M. Jones, all of Morgantown.

The Banks Supply Co., Huntington, dealers in mine, mill and factory supplies, having found it necessary to enlarge its plant the second time within two years, is about to build a two-story brick and steel building 50 by 90 ft. on the lot on Eleventh Street adjoining the present property. This building will be used as a showroom for mine and road machinery.

The old pump house at the mouth of Beaver Creek near Gage, formerly used by the Davis Coal & Coke Co. to supply water for its Weaver plant, was burned down during the early part of June. It had not been in operation for some time.

Since the price began to drop, production of coke in northern West Virginia has begun to dwindle and many ovens have been drawn. That has been the case on the Connellsville Division of the Baltimore & Ohio between Fairmont and Morgantown as well as in other sections of West Virginia. Coke manufacturers expect no immediate improvement in the coke situation in view of prevailing low prices.

The Scotts Run Railway Co. is the name of a company recently incorporated with a capital of \$1,000,000, according to an announcement from Morgantown. The com-

pany intends to purchase the Morgantown & Wheeling Railroad Co. when it is placed on sale by trustees of the Monongahela County Circuit Court, July 6, to satisfy outstanding indebtedness, approximating \$1,500,000, it was announced. The incorporators are: H. C. Nutt, Pittsburgh, president of the Monongahela Railroad Co.; Albert Ward, of Pittsburgh, counsel for that company, and Judge Frank Cox, George C. Baker and Stanley R. Cox, of Morgantown, local counsel for the company.

WASHINGTON

Burnett mine hoisted 900 tons of coal June 15, which surpassed all production records for a single eight-hour shift in the history of the operation.

WASHINGTON, D. C.

The U. S. Civil Service Commission announced an open competitive examination for observer and computer in gas analyses to fill a vacancy in the Bureau of Mines, at Pittsburgh, Pa., and vacancies in positions requiring similar qualifications, at entrance salaries ranging from \$1,320 to \$1,620 a year, plus the increase of \$20 a month granted by Congress. The examination will be held throughout the country on Aug. 8. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or custom house in any city.

CANADA

Profits of the Crows Nest Pass Coal Co., Ltd., for 1922 were \$213,959, as compared with \$411,170 for the previous year, being a decrease of nearly 48 per cent. This is attributed to the five months' strike resulting in a reduction of production from 774,847 tons of coal and 66,569 tons of coke in 1921 to 569,339 tons of coal and 46,368 tons of coke in 1922. After provision was made for depreciation and taxes the profit and loss account shows a debit balance of \$94,874 as compared with a credit balance last year of \$93,725.

The investigation into the charges brought by the striking miners against the Edmonton city police in connection with the strike at the Penn mine, on Jan. 4, ended by a finding that exonerates the police. The charges were that the police brutally clubbed women in dispersing the crowd, that the chief constable fired into the crowd, and that the chief constable was drunk. The last charge was withdrawn during the investigation when it was found that the chief constable was a total abstainer. Justice Walsh found that the police force was acting within its jurisdiction, that no unnecessary violence was used, and that if any injuries were received by the miners or their wives the blame could be placed only on themselves.

According to a report just issued by the Ontario fire marshal, E. P. Heaton, too many substitutes for anthracite have caused the great increase in the number of fires throughout Ontario of late.

The Toronto Board of Education has decided that the entire 17,000 tons of coal required for the current year for the schools of the city shall be Pocahontas coal to be supplied by the Doan Coal Co.

Profits of the Sterling Coal Co., Toronto, which operates mines in Ohio and West Virginia, for the year ending March 31, 1923, including dividends and earnings from investments, and after deducting operating expenses, cost of management, etc., amounted to \$121,945.68, against \$6,788.20 last year. The balance at credit of profit and loss now stands at \$243,183 compared with \$200,672 last year. Current assets stand at \$313,004 and current liabilities at \$252,850.

Association Activities

At an executive meeting of the new board of directors of the National Coal Association held just before adjournment of the annual convention at Atlantic City, M. L. Gould, president of the Linton Coal Co., of Indianapolis, Ind., was elected as director from Indiana. He succeeds A. M. Ogle, president of the Vandalia Coal Co., Terre Haute, Ind., who will serve as director ex-officio during the terms of his four successors in office as president of the National Coal Association.

Trade Literature

Electric Capstan Car Puller. Gifford-Wood Co., Hudson, N. Y. Bulletin No. 74. Four-page folder illustrating and describing how the machine locates cars to be loaded or unloaded.

Erie Lubricated Caterpillar Type Mounting. Erie Steam Shovel Co., Erie, Pa. Bulletin S-60. Pp. 20; 8x11 in.; illustrated. Among the advantages claimed are: The tread links are automatically oiled from internal reservoirs, the link pins have hardened renewable steel bushings, the steel treads are practically indestructible and it can be steered by power from the cab.

Novo Air Compressor Outfits, Type H. Novo Engine Co., Lansing, Mich. Bulletin 153. Pp. 11; 8x11 in.; illustrated. Describes short belt drive with floating idler pulley and independent cooling systems. The engine can be used as an independent power plant if desired.

A trolley folder recently issued by The Yale & Towne Mfg. Co., Stamford, Conn., illustrates and describes its plain and geared types of steel plate roller bearing trolleys, also its cast-iron trolley, with details of tests to which the latter was subjected.

American Air-Tight Doors. Conveyors Corporation of America, Chicago, Ill. Four-page folder describing this non-warping, cast-iron door, particularly applicable to ashpits, coke ovens, boiler settings, dryers, etc.

Mellin Belt Conveyor Idler. Chillingworth Engineering Corp., New York, N. Y. Bulletin No. 3 A. Four-page folder describing both the troughing and return idler.

Circle Showers. The American Hinge Co., St. Louis, Mo. Pp. 12, 5 x 7 in., illustrated. Different types of showers, water heaters, drinking fountains, etc., are described.

Publications Received

Your Telephone—The Voice of Your Business, by Pauline Dunstan Belden, Blodgett Press, St. Paul, Minn. Pp. 71; 4 x 6 in. This little book gives some useful information concerning the telephone, how it should be used, etc.

West Virginia Geological Survey of Morgantown, West Va., has just issued a detailed report on **Tucker County**, by David B. Reger. The book contains 542 pages and is illustrated with 16 half-tone plates and 11 zinc etchings. A separate case of topographic and geologic maps accompany the report.

Bibliography of Petroleum and Allied Substances in 1919 and 1920, by E. H. Burroughs. Bureau of Mines, Washington, D. C. Bulletin 216. Pp. 374; 6 x 9 in.

Explosives, Their Materials, Constitution and Analysis, by C. A. Taylor and Wm. H. Rinkenbach. Bureau of Mines, Washington, D. C. Bulletin 219. Pp. 188; 6 x 9 in.; illus. Explosives are grouped as dynamites, black powders, propellants, detonators and primers.

An Investigation of the Fatigue of Metals, by H. F. Moore and T. M. Jasper. A report of the investigation conducted by The Engineering Experiment Station, University of Illinois, in cooperation with The National Research Council, Engineering Foundation and The General Electric Company. Bulletin 136. Pp. 97; 6 x 9 in.; illustrated.

The Geology of the Mokau Subdivision, by J. Henderson and M. Ongley. Dept. of Mines, Geological Survey Branch, New Zealand. Bulletin No. 24. Pp. 83; 8 x 11 in.; illus.; maps and tables. Informs the reader that the coal measures of the Mokau and Waitewhena districts are found to be of younger age than the Waikato coal measures and gives analyses of coals found.

The Star, Johannesburg, South Africa, on March 14, 1923, published its special annual commercial and financial supplement. Information pertaining to coal is found on page 8, covering the export trade and byproducts.

Third Standardization Bulletin by the Standardization Division of the American Mining Congress. Pp. 387; 6 x 9 in.; illustrated. Proceedings of the third national standardization conference, held in connection with the 25th annual convention of the American Mining Congress at Cleveland, Ohio, Oct. 9-14, 1922.

American Railway Association. Program of the railroads to provide adequate transportation service in 1923. Pp. 12; 8 x 10 in. Statement and resolutions adopted at member meetings of the association held in New York City April 5, 1923, with chart traffic forecast for 1923.

The Black Hills Engineer, formerly the **Pahasapa Quarterly**, published by The South Dakota State School of Mines, Rapid City, S. D. The March issue is almost wholly devoted to the subject of lignite. Results of tests made at the Mining Experiment Station of the State School of Mines on North Dakota lignite are given, also costs.

The Universal and the Fireman's Gas Masks, by S. H. Katz, J. J. Bloomfield and A. C. Fieldner. Bureau of Mines, Washington, D. C. Technical paper 300. Pp. 22; 6 x 9 in.; illustrated.

The coal beds in an area of 462 square miles in Belmont, Monroe, Guernsey and Noble counties, Ohio, not far from Wheeling, W. Va., are described in a report by D. D. Condit, just published by the Geological Survey as its Bulletin 720, entitled **"Economic Geology of the Summerfield and Woodsfield Quadrangles, Ohio."** A precise knowledge of the thickness, extent and purity of the coal beds is given, as well as their geologic structure or slope, their location with respect to routes of transportation, and the composition and heating value of the coal in the minable beds. The bulletin not only indicates the areas in these quadrangles where the Pittsburgh and other well-known coal beds of the northern Appalachian field attain workable thickness but describes the geologic formations and states the resources of building stone, limestone, clay and shale, and underground water.

Owing to the popular interest in the nature and operations of the **Industrial Court Law of Kansas** an account of the law and its workings through the period that it has been in effect has been published by the U. S. Bureau of Labor Statistics as Bulletin No. 322. The report gives the text of the law, which was passed in 1920, a synopsis of the cases filed on the industrial side of the court during 1920 and 1921 showing the methods and principles adopted by the court in its various actions, and an account of the legal proceedings arising in connection with the attendance of witnesses before the court and other activities of the court. A résumé also is given of the annual reports which have been published and a bibliography of books and articles relating to the court is appended. The bulletin is based only on official data and presents no other viewpoint or comment than that of the body under consideration or of the courts discussing it.

The Mines Branch, government of the Province of Alberta, at Winnipeg, has issued a brochure entitled **"Coal Truths,"** which was prepared primarily for the use of the domestic user of Alberta coals, although it is also expected to prove of value to large purchasers of coal, engineers and firemen. The brochure is designed to bring about a better understanding of fuel with a view to greater economy in use. It is profusely illustrated. The text and illustrations of the publication were prepared by Geo. R. Pratt, A. M. E. I. C., fuel engineer, Province of Alberta, Winnipeg, Manitoba.

Fires in Steamship Bunker and Cargo Coal, by H. H. Stoeck, Bureau of Mines, Washington, D. C. Technical paper 326. Pp. 51; 6 x 9 in.; illustrated. This report should be of value to steamship owners and to shippers and buyers of water-borne coal.

Increase of Population in the United States 1910-1920, by William S. Rossiter. Bureau of the Census, Washington, D. C. Pp. 255; 7 x 10 in.; tables, maps and charts. Study of changes in the population of divisions, states, counties, and rural and urban areas; also sex, color and nativity.

Year Book for 1917 and 1918, by Frank W. DeWolf, chief, State Geological Survey, Department of Registration and Education, Urbana, Ill. Bulletin No. 38. Pp. 474; 7x10 in.; illustrated, plates, map and tables. Contains administrative report and economic and geological papers.

Manual for Operators Under Oil and Gas Regulations, by S. E. Slipper, under the direction of O. S. Finnie, director of Northwest Territories and Yukon Branch, Department of the Interior, Ottawa, Canada. Pp. 73, 5x7 in., illustrated; with map showing natural gas resources.

"The Anthracite Strike of 1922," a 62-page pamphlet, has been issued by the Anthracite Bureau of Information, Philadelphia. The brochure is a chronology of the communications and negotiations between the anthracite operators and the United

Mine Workers, including the producers' reply to the miners' demands and embodying a plan for averting future suspensions; also the arbitration proposal—an offer by the operators to refer issues in dispute to a presidential commission; the government's proposal, indorsed by the President and offered through Senators Pepper and Reed; also the agreement of Sept. 2, an extension of wage contract and working conditions to Aug. 31, 1923, pending investigation by the U. S. Coal Commission.

Electric Brass Furnace Practice, by H. W. Gillett and E. L. Mack. Bureau of Mines, Washington, D. C. Bulletin 202; 334 pp.; 6x9 in.; illustrated. Records progress so far made in melting brass electrically.

Specifications for Petroleum Products and Methods for Testing. Bureau of Mines, Washington, D. C. Technical paper 323; 88 pp.; 6x9 in.; illustrated. The specifications noted were officially adopted by the Federal Specifications Board for the use of the departments and independent establishments of the government in the purchase of materials covered by them.

Traffic News

During 1922 fifteen new coal mines were opened along the lines of the **Norfolk & Western R.R.**, making 221 companies organized for producing coal and coke on the road, with a total of 328 separate mines, of which 324 were in actual operation, and 9,731 coke ovens of which 1,052 were in blast. The freight tonnage carried amounted to 37,357,078, an increase of 7,672,143 tons over 1921. Income from freight transportation showed an increase of \$10,451,025.22 over the previous year, while the operating revenues were \$90,314,742.34 and the operating expenses \$67,977,201.90, leaving net operating revenues of \$22,337,540.44. Fuel for yard locomotives for the year cost \$600,379.45, a decrease of \$323,997.40 when compared with 1921, and for train locomotives \$5,999,127.79, a decrease of \$1,771,686.60 for the same period. Fuel consumed by steam locomotives during the year was 2,758,804 net tons, an increase of 515,808 net tons over 1921. Among the securities owned by the railroad company are 9,994 shares out of 10,000 shares of capital stock of the Pocahontas Coal & Coke Co., which is valued at \$999,400. The balance sheet of that company shows a deficit as of Dec. 31 of \$2,037,198.63.

Coming Meetings

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Mine Inspectors' Institute of America will hold its 13th annual meeting July 10-12 at Pittsburgh, Kan. Secretary, J. W. Paul, 4800 Forbes St., Pittsburgh, Pa.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, JULY 12, 1923

Number 2

The Anthracite Report

WHATEVER points of difference the operators and the miners may have with the anthracite report of the Coal Commission they with the public will in the end, if not at once, recognize that Mr. Hammond and his associates have held themselves true to their trust as representatives of the public. A searching inquiry, an array of facts and impartial suggestions and recommendations characterizes the report on anthracite, carried in full in this issue of *Coal Age*. There is no "muckraking," no invective, but temperate, straight-from-the-shoulder statement of the facts as found. So many and complicated are the subjects considered that no brief summary is possible, and numerous matters of major import have been touched but lightly by the Commission at this time with the promise that they will be treated more fully in the final report due in September, which will cover the bituminous-coal industry as well.

Rejecting alike governmental ownership and operation of the anthracite mines, the Commission holds to the view that this industry is charged with a public interest. At the same time it pays public tribute to the many responsible shippers of anthracite who have conducted their business with "restraint and good judgment." The Hudson Coal Co. alone is cited as having obstructed the best efforts of the industry to function in the public interest. Publicity of accounts is recommended through a governmental agency, not so much because of past abuses but as a protection for the future, for the "Commission fears that the concentrated control of the anthracite industry may take indefensible profits." To this the majority of the hard-coal operators will not object. With the exception of the Hudson Coal Co. they have never opposed the efforts of the government to examine their accounts or to publish the results nor have they opposed legislation previously proposed looking to this end. Nor can it be held that the recommendation looking toward active governmental control of the production and distribution, and of prices and wages, during times of national emergency is a reflection on the anthracite operators. Again with the notable exception of the Hudson Coal Co. they have been active participants with the government, state and federal, in these matters in every national crisis in recent years.

The labor monopoly held by the United Mine Workers is described as fully as the natural monopoly of the holders of the unmined reserves of coal and the economic combination of the producers. It is proposed that the labor union be made responsible for its contracts, that where the operators and miners cannot agree and a suspension is in prospect, the matter in dispute be submitted to arbitration, as has been repeatedly urged by the operators and as often refused by the United Mine Workers.

The operators, too, are charged with having been

derelict in looking to the human relationships that tend to bring about better understanding, and in having at times neglected discipline and insistence on efficiency in the pursuit of profitable output. Both sides may well take the advice to "wipe the slate clean" and to try out the suggested plans in a spirit of fairness and tolerance. It is plainly stated that what will in the end be the judgment of the Commission as respects the United Mine Workers will depend upon the spirit they display in the pending conferences with the hard-coal operators.

The Commission has made no startling disclosures of fact. The statistical data and the historical information are not secrets laid bare for the first time. Most of it has been published or has been available in some form by no means entirely *ex parte*. What the Commission has done is to take material from original sources and bring it forth in a form and with a preciseness and detail that will inspire public confidence. Here is an authoritative assembly of facts that while they may not settle all vexed questions in the public mind should satisfy its curiosity.

But what the public may learn from a careful study of this report will be new to most people, fed up on strange tales about the "coal barons." Profits of the producers are given in cents per ton, and judgment as to the reasonableness of from 36c. to \$1.07 per ton is reserved until the corresponding investment can be determined. The mine price represents about half what the consumer pays at his curb—the remaining half is divided about equally between retail dealer and railroad. About 11c. of each dollar paid by the consumer of domestic anthracite is profit to the producer and local dealer, which on a \$16 curb price gives \$1.76, out of which the public pays profit to the industry on both ends and out of which must come the "gouge"!

The anthracite mine workers are not found to be downtrodden, poverty stricken slaves. On the contrary they enjoy, if they work, incomes around \$1,500 to \$2,000 and upward per year, live for the most part in sanitary conditions and are "no longer a submerged or exploited population." The only section of labor that suffers any measure of economic distress are the miner's laborers, whose rate of pay incidentally is largely determined by the miner himself.

The *tout ensemble* of the report will be confusing to the layman because it necessarily embraces such a wide range of subjects. There is a vast opportunity for a simpler set-up of the essential points as they affect and interest the ordinary consumer. The one simple, elemental fact that stands out is that it is strikes of the miners that are the causes of the important shortages of anthracite supply, although no attempt is yet made to assign responsibility for the strikes. Of the three parties at interest, public, operators and miners' union, each may draw a measure of consolation from the report, but the miners the least.

Anthracite Report Will Have Potent Influence on Whole Industry

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

AN HONEST, courageous document has come from the President's Coal Commission. The anthracite report, made public Monday, is destined, many believe, to exert a powerful influence on the entire coal industry. Its twenty-one recommendations indicate that the industry's ills have been diagnosed skillfully. There will be differences of opinion as to the benefits which would follow the application of these recommendations, but it must be admitted that the report suggests no resort to paternalism and places main responsibility on the persons in the industry to conduct it so that imperative public interests will be reasonably served.

The representative character of the Commission is expected to insure serious consideration of its findings by Congress, by the industry and by the public. The case of coal has been laid before a jury of six Americans. The jury forms a splendid cross-section of conservative thought in the country—a jury of men who believe in building on what we have and who take no stock in panaceas or short cuts to Utopia. They cannot be accused of being demagogues or cowards. No one could have brought pressure to bear on them successfully. Any effort to have done so would have been resented promptly and pointedly. It can be said most positively, however, that no such effort was made.

Even the President, who properly might have laid his own thought before the Commission, gave that body free rein and left it untrammelled with any instructions or suggestions. No public agency could have been more free from political influence of any kind. The report that the Attorney General had inflicted some of his ideas on the Commission was without any foundation whatever. Such a rumor was launched, it is believed, to prejudice labor against the report. Since the Attorney General is as a red flag to the United Mine Workers, there could have been no better way to embitter labor against the report than to create the idea that Mr. Daugherty contributed something to it.

The real truth of the matter is that the jury of six Americans moulded its own report. Other than the basic facts, no part of it is the product of the staff. One of the chief points of significance about the report is the fact that it represents the sober, carefully weighed conclusions of men who are representative of the American people and who have had at their disposal the most complete basic data to guide them. The conclusions that have been reached by a millionaire mining engineer, a Jeffersonian Democrat, the editor of the *Atlanta Constitution*, a down-East Yankee, a lecturer and economist reputed to be hostile to corporate interests, and a man who has steered a middle course between employer and employee for twenty years will not be greatly different from the conclusions which would be reached by the majority of American citizens if they had the same well-rounded understanding of the subject.

A mirror has been held up to the anthracite industry and to the coal business in general. Those who want to see their business as the American people see it may do so by gazing in that mirror. The anthracite

situation has been analyzed without reflecting the bitterness which has characterized the relationships of the mine owners and the mine workers. There is a flavor of tolerance throughout the document. It creates an impression of sympathetic understanding, but it expresses very firmly the belief that the public has a right to be insured service by the coal industry. It is made plain that the Commission does not want that service on any terms which will not give fair profits to the owners and wages to the workers in keeping with the American standards of living. It does indicate, however, that the public is in a mood to insist on a steady supply of coal.

It stands out all through the report that the Commission conceives the anthracite business as being affected by public interest and impressed with public use—phrases used several times in the report. One of the most significant statements in the whole report is this one: "Coal is quite as much a public necessity as gas, street-railway service or any other service or commodity that has been brought under public regulation." The Commission admits that there is not sufficient basis in knowledge or experience as to just how far control or regulation should be exercised in insuring maximum service to the public by the coal industry, but the industry itself is asked to modernize its wage agreements and the machinery for interpreting them; to set up an adequate inspection service of its own; to take hold of the problem of resizing and to improve its practices generally, but it also calls upon the public to take a healthy interest in looking out for its own welfare.

The Commission does recognize that any failure on the part of the industry to discharge properly its own responsibility, thereby stopping the flow of coal long enough to imperil the public interest, would justify the government in taking over "the operation of the mines and the transportation and distribution and marketing of the product with full power to determine the wages to be paid the mine workers, the prices at which the coal shall be sold and, subject to court review, the compensation to be paid to land and mine owners." Not more than a month ago the Supreme Court of the United States, in the Kansas Industrial Court case, said that since the adoption of our Constitution the vocations of the coal miner and the coal operator have not been regarded as public callings. The utterance of the Court is a historical fact, but this jury of six representative Americans has decreed something different for the future. That jury holds "that a limited natural monopoly like anthracite, held by a relatively small number of individuals, estates and companies, and supplying a necessity of life for millions of our people cannot continue to be treated as if it were not affected by a public interest."

Of the 21 recommendations, 15 constitute disinterested counsel to men in the coal business. Two of them deal with regulation, two with emergency powers, one with the uniform ton and one is a recommendation to the Interstate Commerce Commission for an investigation of freight rates.

Full use was made of the work of the staff and of the engineering services of outside experts, but the report bears no trace of those contributions. The Commission has worked without respect for the 8-hour day. There was one sitting from 9 a.m. to 6 p.m., with no interruption for lunch.

Report of U. S. Coal Commission on Anthracite

TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES:

The U. S. Coal Commission renders herewith as directed by law, its 'separate report on the anthracite industry.'

Both the Congress and the American people are concerned in the questions whether in the anthracite industry a reasonable return on investment can be paid to the owners and operators, decent living conditions and an adequate wage based on American standards furnished to the mine workers, a proper return made to the railroads and the dealers, and coal be delivered to the patrons of the industry at lower prices than those now charged. Furthermore, they want to know what can be done to assure an ample supply of anthracite with a constant flow from mine to consumer. Peace with justice in the industry is the first requisite and economy is the second. To these inquiries the Coal Commission has directed its attention.

Ownership or Regulation?—The fundamental fact in the anthracite coal problem is that heretofore these limited and exhaustible natural deposits have been in the absolute private possession of their legal owners, to be developed or withheld at will, to be leased for such royalties as could be exacted, to be transported and distributed at such rates and in such manner as a double-headed railroad and coal combination might find most advantageous from the point of view of private profit, to be sold at such prices as could be maintained by the restriction of output and the elimination of independent competitors, through such means as the maintenance of freight rates burdensome except to those who, owning both mines and railroads, could afford to be indifferent as to whether their revenue came from the one source or the other.

The Commission does not recommend the abolition of existing property rights, however much might be said for the view that mineral deposits should have been held from the beginning as national rather than individual property. The Commission does not recommend government ownership either by purchase at present value or by expropriation. It does, however, hold the view that a limited natural monopoly like anthracite, held by a relatively small number of individuals, estates and companies, and supplying a necessity of life for millions of our people, cannot continue to be treated as if it were not affected by a public interest.

Coal is quite as much a public necessity as gas, street-railway service, or any other service or commodity that has been brought under public regulation. There should be no secrets from the public in regard to mining costs, profits, salaries, wages or corporate relations. Banks and insurance companies are privately managed because we find by experience that they can be managed more efficiently and economically on the principle of individual responsibility. But, like railroads, they are required to report to a public authority and they are subject to such regulation in the public interest as experience may show to be necessary and public opinion may from time to time approve. The guiding principle in such enterprises is no longer maximum profit to owners but maximum service to the public.

The time has certainly come to establish the same controlling idea in the anthracite-coal industry. There is not as yet a sufficient basis in knowledge or experience to determine what form of control or regulation

will ultimately be most advantageous. What is clear is that in the operation of coal mines, as in the operation of railroads, telephones, water companies or banks, the public interest must be respected and served, and that this requirement places limitation on the rights of owners of coal lands, operators, mine workers, carriers, and dealers. The Commission believes that the principle of individual and corporate responsibility should be maintained as most likely to insure economical and efficient management of the industry, and that the public interest may be adequately safeguarded by the creation of a governmental authority with power to require financial and operating reports, to prescribe uniform methods of cost accounting, and determine conditions on which coal may be shipped in interstate commerce.

The President of the United States should be authorized by act of Congress to declare that a national emergency exists whenever through failure of operators and miners in the anthracite industry to agree upon the terms of employment or for any other reason there is a suspension of mining operations, seriously interrupting the normal supply of anthracite fuel in interstate commerce; and to take over the operation of the mines and the transportation and distribution and marketing of the product, with full power to determine the wages to be paid to mine workers, the prices at which the coal shall be sold, and, subject to court review, the compensation to be paid to land- and mine-owners.

On these subjects more definite recommendations will be reserved for the final report of the Commission since they apply to both branches of the industry.

Prices.—The well-known increase in anthracite prices in the last ten years or so is frequently attributed to profiteering and frequently to increases in wages, but there have been insufficient facts available with which to measure the justice of either accusation. How great has been the actual rise in price, how this rise is related to the general price movement, what items are included in the price the consumer pays for his coal, and especially what profits come out of that price, are questions properly asked.

The average retail price of stove anthracite in 1913 in Boston and Washington was \$8.25 and \$7.50, respectively, the former, however, being the price of a short or net ton, the latter that of a long or gross ton. In 1923 the corresponding retail prices are \$15 for Boston and \$15.39 for Washington. Since 1913 the freight rates from the anthracite mines to these two cities have increased \$1.25 and \$1.14. Eight of the larger coal companies, most of them still closely affiliated with the railroads, are grouped together in price quotations and their product is known as "company" coal, in contrast with the "independent" coal produced by 100 or more smaller "individual" companies. In 1913 the average mine price of stove anthracite was \$3.53 a gross ton; today the quotations are \$8 to \$8.35 a gross ton for "company" and \$8.50 to \$11.50 for "independent" coal.

Thus, in ten years both the retail and the wholesale prices of stove coal have practically doubled. This is in line with the general advance in commodity prices, except that while the wholesale price of metals, for instance, reached its peak in 1917; of chemicals in 1918, of farm products in 1919, and of other commodities in 1920—all with subsequent declines, usually large—the price of anthracite has continued steadily upward.

Anthracite Consumer's Dollar Analyzed—Production, Distribution and Freight Costs

The Consumer's Dollar.—An analysis of the consumer's dollar based on an examination of the books of retail dealers in several of the larger cities may serve to show the component parts of the price he paid. For example, in November, 1922, in Boston the average retail price of stove coal at the customer's curb was \$15.68 a net ton. At this rate a dollar paid for 128 lb. of coal. Of this dollar 45c. represented the sales price at the mine, 23c. the charge for freight, and 32c. the share of the dealer. In New York the average price was \$13.77. Here the dollar paid for 145 lb. of coal, and 56c., 18c., and 26c. represented the division between mine, railroads, and dealers. In Philadelphia the price, figured on a net ton basis was \$12.93, so that the dollar paid for 155 lb. of coal, with 61c., 16c., and 23c. as the respective shares of mine, railroads, and dealers. In Washington the price figured on a net ton basis was \$14.20, and the consumer's dollar paid for 141 lb. and included 58c. as mine price, 20c. as freight, and 22c. to the dealer. In Chicago, at the greater distance from the mines, the consumer's dollar paid for only 120 lb. of coal and included 49c. as mine price, 30c. as freight, and 21c. as dealers' costs and profits. In St. Louis, with a price per ton 44c. lower than in Chicago, the dollar contained only 15c. for the dealer. This abstract of a much larger exhibit is sufficient to show that from 15 to 32c. of every dollar spent for Pennsylvania anthracite remains with the local dealer or possibly in part with a wholesaler from whom he obtained the coal, and between 45c. and 60c. goes to the producer.

It is interesting to the public to know what part of the consumer's dollar commonly goes for profit of operator or retail distributor. A buyer of domestic anthracite in Boston in November, 1922, paid something like 11c. out of every dollar in the form of profit to the producer or retailer of coal. Of this about 4c. went to his local retailer and nearly 7c. to the producer, for his profit on mining and sale at wholesale. Practically the same figures hold for Washington, where the same month the householder paid 3 c. out of every dollar in profit to the retail coal merchant and nearly 9c. out of every dollar as profit to the producer and wholesale distributor of coal.

Another inquiry made by the staff of this Commission has furnished facts intended to be of immediate service to the local buyer of coal. Tables have been made public showing the present wholesale cost of stove anthracite as reported by retailers in nearly a thousand towns and cities from Maine to Minnesota. The items shown include the mine cost of the last shipment received prior to May 15, 1923; the freight charges, and the total cost of this shipment on the dealer's siding. The range of latest quotations to these dealers on May 15 are also given, from which it will be seen, for example, that in New England the more common wholesale prices quoted were from \$10 to \$11.50, and in Pennsylvania from \$8.30 to \$9.50. All these prices are necessarily given for the long or gross ton of 2,240 lb., the unit in which anthracite is sold at the mines and on which freight is paid, although in all but a few cities and towns outside of Pennsylvania the same coal is sold at retail by the short or net ton of 2,000 lb. In using this cost-to-dealer information, allowance must therefore be made on the one hand for the dealer's losses by degradation, for his cost items, and for a fair margin of profit, and, on the other, for this difference of 240 lb. in the ton used.

The Commission urges the Congress to fix a uniform standard of weight for anthracite and bituminous coal throughout the country. Bituminous coal, except in the export and tidewater business, is mined, transported and sold by the net ton of 2,000 lb. Anthracite is mined, sold at the mine, and transported by the gross ton of 2,240 lb., but is retailed in some places by the one unit and in some by the other. To guard against temporary opportunities for injustice, the change should be accompanied by the widest publicity.

Cost of Distribution.—The expense of distributing the coal is the item of cost nearest home, and yet it is an item that the consumer may overlook. The city retailer may have provided extensive storage in his coal yard or pocket and delivery trucks sufficient to meet promptly every call for immediate delivery in midwinter; the small dealer may own neither yard nor delivery equipment, simply selling from the car to the customer's own truck or a hired truck. Such a variation in service naturally involves a variation in gross margin or difference between the cost of anthracite on the dealer's siding and his price to the consumer. The field agents of this Commission have found that these margins are as high as \$3.50 or more per ton and as low as \$1, or even less. The larger service rendered to the city consumer includes unloading, storage, screening, and delivery.

In five of the larger cities examination of the books of dealers handling anthracite almost exclusively showed that the average gross margin per ton was \$2.88 in 1920; \$2.55 in 1921, and \$2.41 in 1922. The average expenses of these

dealers for these three years were \$2.39, \$2.26, and \$1.99, respectively, showing a decrease since 1920, and net margins of 49, 29, and 42c. respectively for the three years. Returns received from retailers throughout the country show that in the past five years there has been in general an increase in gross margins in the later years, amounting for some dealers to \$1 or more. Generally there also is a considerable diversity in the margins reported, due either to price competition among dealers or to the varying cost to dealers, depending on whether the coal was purchased from big companies or from independents or from jobbers. Were it not for these wide differences in wholesale prices the normal effect of competition would tend to narrow this spread of margins in the retail trade. The source of the anthracite, as determining the cost to the dealer, may have more to do with his success than the relative efficiency of his business organization. *The characteristic feature in the retailing of anthracite is the lack of uniformity in margins both within the same city and between cities.*

Of the anthracite domestic sizes 24 per cent is sold directly from mine to retailer or consumer, and 53 per cent through sales agents, and 20 per cent is handled by wholesalers, whose margins vary widely from city to city and from year to year. Reports from representative wholesalers in 5 cities showed an average margin of 23c. in November, 1921, and over 27c. in November, 1922. In these two months the high and low margins for individual companies were, in 1921, 70c. and 18c., and in 1922, \$1.40 and 6c. One feature in this wide spread is the fact that the wholesale trade has to dispose of steam sizes, sometimes at a loss, along with the more profitable domestic sizes. The trend of wholesalers' gross margins in the last three years has been downward, with a decrease of 13c. from 1920 to 1921 and a recovery of 3½c. in 1922. Nevertheless, the margins of wholesalers and retailers in recent years have been high and they have been relatively higher on domestic sizes of anthracite than on the steam sizes of anthracite or of bituminous coal, indeed it is a fairly common practice to make up on sales of domestic anthracite any losses on steam coal.

The speculative activity of the independent wholesaler in time of shortage adds to the wide spread in the prevailing prices of anthracite, and this activity may result not only in largely increased profits for individual jobbers but in pyramiding profits by multiple sales among jobbers. The Commission's study of carloads of high priced coal selected at random from shipments to New England during the past fall and winter disclosed considerable buying and selling among jobbers with consequent pyramiding of their margins, varying on different sales from 15c. to \$4.25, the amount which a Boston jobber in December, 1922, added to the \$9 mine price of a car of stove anthracite. A considerable number of sales were reported at margins from 75c. to \$1.50 a gross ton. It must not be forgotten that the jobber of this type physically handles no coal whatever; his is only a credit and bookkeeping business.

Freight Charges.—The item of freight alone in the examples cited takes from 16 to 30c. of the consumer's dollar. The question whether or not the existing freight rates on anthracite are excessive is one that comes under the jurisdiction of the Interstate Commerce Commission. The three years painstaking investigation of these rates by that body, on which its decision of July 30, 1915, was based, developed the pertinent fact that all the conditions in the transportation of anthracite—the vast quantities in trains of maximum tonnage and in cars of large capacity originating with relatively large shippers—tend toward lower operating costs. More than forty years ago President Gowen of the Philadelphia & Reading referred to this traffic as "very profitable," and in later years anthracite has been termed by the carriers their "backbone traffic." Throughout the history of the industry there has been no change in the attitude of the carriers toward this very desirable business, the active competition for which explains most of the history of combination.

As so large a part of the anthracite consumer's dollar goes as freight charges, a material reduction in the price of coal might come through a reduction of freight rates. With a keen appreciation of the public demand for the scrutiny of every item in the cost of anthracite, the Coal Commission urges upon the Interstate Commerce Commission, the duly constituted agency of the Federal Government, a re-examination of the reasonableness of anthracite freight rates. The pending separation of carriers and mining companies in the three larger systems makes opportune the reconsideration of the subject by the Interstate Commerce Commission.

Cost of Mining.—The mine price of anthracite, which is the first item of cost on the retailers books, is an item concerning which the consumer rightly desires unbiased testimony. The Commission has obtained reports on costs,

sales realizations, and margins covering the period Jan. 1, 1919, to March 31, 1923, from all but one of the important operators. (Reports covering operations of the Delaware, Lackawanna & Western R.R. Co. during part of this period have yet to be received.) By making certain allowances for differences in accounting practice these reports can be compared with returns made by the same companies to the Federal Trade Commission for the years 1917 and 1918. For twelve companies—nine railroad coal companies and three large independents shipping from 60 to 70 per cent of the total anthracite—the comparison can be carried back to 1913. The cost figures here presented for the years beginning with 1919 are those reported to the Coal Commission by the operators without revision.

The mine cost as it stands on the books of each mining company and as reported by the company represents the average cost of the total output, all sizes, of anthracite. Egg coal has, for example, at least five times the market value of barley, but these sizes are mined together and their costs cannot be separated. Mine costs directly reflect the conditions under which these deposits of coal are recovered for the use of man. Even within the few counties in which anthracite is found there is a conspicuous range of natural conditions, involving economic and even social consequences.

The distinction between the Northern, Middle, and Southern field, or, as they are also termed, the Wyoming, Lehigh, and Schuylkill regions, is primarily geologic and topographic, but the effects of the natural conditions largely control costs. The attitude of the rock beds, including the seams of anthracite, practically determines the method of mining the coal and the type of mine equipment, which in turn involve a corresponding variation in costs of mining and even in the skill of mine workers.

The contrast is great between some of the level-lying beds of moderate but fairly constant thickness under the broad Wyoming Valley, where mining and underground haulage present relatively simple problems to the engineer, and the steeply pitching or overturned and faulted beds of changing thickness in the Schuylkill field, where crushed coal and treacherous roof multiply the difficulties of mining and increase the unavoidable waste. Even more direct is the connection between geologic processes working in the past and the differences in the character of the coal as mined today, the varying proportions of large and small sizes demanding in turn differences in preparation and resulting in corresponding differences in marketing problems and in average prices realized for the product of the mines.

Waste in Mining.—The engineering staff of the Commission has carefully studied the subject of waste and has determined the proportion of the coal deposit which is lost

in the processes of mining and preparation. It is gratifying to find that while forty years ago estimates of the percentage of recovery were 27 per cent to 40 per cent, and twenty years later the Roosevelt Commission predicted that with better mining methods and the utilization of former waste material a 50 per cent recovery could be expected in the near future, the present study shows that this estimated higher recovery has been in fact exceeded, and that the practice of today in mining and preparing the coal for market yields an average recovery of about 61 per cent, the greater percentage of waste being in the Southern Field, where the steeply pitching beds of crushed coal place a natural limitation on recovery. It must be kept in mind, however, that this type of conservation engineering, which increases the percentage of recovery and adds to the expected life of the limited reserves of anthracite in the ground, may involve an increase in the cost of mining.

It is found that all the factors involved in mining costs contribute to the increase in mine prices. In the 10 years under review by the Commission's accounting staff, labor costs in the production of fresh-mined coal have risen from \$1.56 a gross ton in 1913 to \$4.12 in the first quarter of 1923, the cost of supplies from 35 to 71 cents, and general expenses from 32 to 92 cents. Labor cost bears about the same relation to total mine cost in 1923 (71.7 per cent) as in 1913 (70 per cent); supplies cost relatively less in 1923; and general expenses are relatively higher in 1923.

The total range in the average mine cost of a ton of coal with the nine railroad companies has been from \$2.23 in 1913 to \$5.75 in 1923. With three independent companies for which there are continuous cost records, the corresponding change has been from an average cost of \$2.50 in 1913 to \$6.32 in 1923. Examined in detail, the increase in mine costs for these twelve companies was moderate until 1918, when for three successive years there was an annual jump of approximately a dollar. To these increases, changes in wage rates, rising prices for supplies, and increasing charges for royalty and depletion have all contributed, and the discussion of the first and largest item, labor costs, leads to the most extensive inquiry which this Commission has undertaken, covering the living conditions of the miners' families and the earnings and other labor conditions of the mine workers.

Sociological Studies—Composition of Mining Population, Living Costs and Wage Rates

The Census of Mining Population.—The decennial Federal Census secures and publishes much valuable information regarding the population as a whole which it is not practicable to present by industries in the general census report. With the consent and the co-operation of the Director of the Census, agents of the Commission have gone to the original schedules returned by the enumerators during the census of 1920 and have taken therefrom certain information relating to the nationality, places of domicile, ages, marital status, etc., of mine workers.

The 1920 returns show 147,456 anthracite mine workers. These together with their families number approximately five hundred thousand persons. The mine workers themselves constitute about one-half of the occupied males in the communities in which the mine workers live; and they and their households together constitute about one-half of the populations of the counties in which the anthracite coal fields lie.

Of these 147,456 mine workers, 102,485 live in incorporated towns or cities of a population of 2,500 or over. The remaining 44,971 live in communities of less than 2,500 population. The census thus classified 69.5 per cent as urban and 30.5 per cent as rural. Of the urban population, 16,456, or 11.2 per cent of the total number of mine workers, live in places of 50,000 or more population; 41,526, or 28.2 per cent, in places of from 10,000 to 50,000; 30,629, or 20.8 per cent, in places of from 5,000 to 10,000; and 13,874, or 9.4 per cent, in places of from 2,500 to 5,000. The small, isolated mining community, located on the company property, unincorporated and company controlled, and not easily accessible by trolleys, such as are found in the bituminous fields, is exceptional in the anthracite field. While 98 company-controlled communities were reported less than 15,000 mine workers were living in these communities; and less than 7,000 of these were living in communities that are as much as two miles from an incorporated town of a population of 2,500 or over.

Railroad service is frequent and interurban trolleys connect up the towns in the greater part of the anthracite field. Thus approximately 90 per cent of the anthracite mine workers live in communities that are independent of the employing companies. They live just as the mass of other Americans live, in free self-

governing communities where their civic rights are within their own keeping. Comparatively few of the mine workers live in company-owned houses so that they are free to go from one mine to another to work without its having any effect on the tenure of their domicile. Very many of the mine workers live a good ways from their work and go back and forth by trolley just as workers in our cities do. It is not unusual to find them trolleying back and forth to and from their work anywhere from five to ten or twelve miles.

In connection with the study of the kinds of communities in which the mine workers live, a study was made of the extent to which they lived in company-owned houses. Reports secured from 124 out of 129 mining companies showed that 112 of these companies owned dwelling houses. The number of employees reported as on the payrolls of these 124 companies is 162,724. This number is some 15,000 greater than the number reported in the census. But the larger figure represents a date in the early part of the present year, 1923, while the census represents a period in 1920. The 112 companies out of the 124 that reported ownership of company houses represented 98 per cent of the employees of the 124 companies; and these 124 companies employed approximately 98 per cent of the total number of anthracite workers. This report on company-owned houses, therefore, covers 96 per cent of all the mine workers.

The total number of family dwellings reported by these 124 companies was 10,246; and the number of mine workers living in these company-owned dwellings was 15,486, or 9.7 per cent of the total number of mine workers employed by the 124 reporting companies. Less than 10 per cent of the total of all anthracite mine workers are thus shown to be living in company-owned dwellings. This is one of the few items in which there are any perceptible differences between the divisions of the anthracite fields, as only 5.3 per cent of the employees in Northern field are reported as living in company-owned houses as against 15.8 per cent in the Central and Southern fields taken together. Of the 10,246 company-owned dwellings, 3,156 (housing 4,696 mine workers) are located in incorporated places of 2,500 or more population.

Of the 147,456 mine workers reported by the 1920 census, 2,039, or 1.4 per cent were under 16 years of age; 3,690, or 5.9 per cent were sixteen or seventeen years of age; 7,974, or 5.4 per cent, were eighteen or nineteen years of age; 17,393, or 11.8 per cent were from 20 to 25 years; 39,334, or 26.7 per cent, were from 25 to 35 years; 35,413, or 24 per cent, were from 35 to 45 years; 23,994 or 16.3 per cent, were from 45 to 55 years; 9,825, or 6.7 per cent, were from 55 to 65 years; and 2,660, or 1.8 per cent, were 65 years of age or over. The age of the remaining 134 was reported as unknown.

Nationality and Citizenship.—Of the mine workers reported by the 1920 census, 69,645 were native-born whites, 46 were native-

born colored, while 77,765 were foreign born. Thus 47.3 per cent of the total number of mine workers were native born as against 52.7 per cent foreign born. Of this 77,765 foreign born, 26,562, or 18 per cent of the total number of mine workers, were born in Poland; 15,450, or 10.5 per cent were born in Russia; 9,645, or 6.5 per cent, in Italy; 8,333, or 5.7 per cent, in Austria; 7,356, or 5 per cent, in the British Isles; 5,330, or 3.6 per cent, in Slovakia; 1,700, or 1.2 per cent, in Hungary; 1,286, or 0.9 per cent, in Germany; the remaining 2,103, or 1.4 per cent of the total mine workers, were born in countries other than given above. Approximately 42,000, or 28.5 per cent of all the mine workers reported in the census, were of Polish or of Russian birth; and of the total foreign born, approximately 55 per cent have been furnished by these two countries.

Of the 77,765 foreign-born mine workers, only 431, or 0.6 per cent had been in the United States less than five years at the time of the 1920 census; 14,275, or 18.4 per cent had been here from five years up to ten; 17,330, or 22.3 per cent, had been here from ten to fifteen years; 16,007, or 20.6 per cent had been here from fifteen to twenty years; 27,620, or 35.5 per cent, had been here twenty years or over; while the years of residence of 2,102, or 2.7 per cent, is reported as unknown. These figures indicate that for the three five-year periods from 1900 to 1915 there was a steady and fairly uniform flow of foreign-born workers into the anthracite fields. In the five-year period from 1915 to 1920 there was an almost complete cessation of this flow as well as an exodus from these fields.

Of the above-described foreign-born mine workers, 31,446, or 40.4 per cent, had become naturalized by 1920; 10,483, or 13.5 per cent, had taken out first papers; while 34,322, or 44.1 per cent, had remained alien, not having even made a declaration of intention to become citizens. These percentages are based on the total number of foreign-born mine workers reported by the census, while the age figures of mine workers show that 10,729, or 7.3 per cent of the total number, were under eighteen years of age, there are only 996 foreign-born mine workers in the group under eighteen. Formal declaration of intention to become a citizen can be made at the age of eighteen, although naturalization cannot be obtained before twenty-one. The foreign born under eighteen should, therefore, be disregarded in computing the percentage of naturalization figures. But making allowance for those under eighteen years, the percentage of foreign born who have remained completely alien would remain approximately 44 per cent.

Of the 69,691 mine workers born in the United States, 98.9 per cent can read and write. Of the 7,431 born in the British Isles, 95.4 per cent can read and write; while of the 70,334 born in countries other than those given, 45,477, or 64.7 per cent, can read and write, 2,319, or 3.3 per cent, can read but not write, and 22,538, or 32 per cent, can neither read nor write. Further, 9,824, or 14 per cent of those born in countries other than the United States and the British Isles, do not speak English. When it is remembered that 99.4 per cent of the mine workers had been in the United States five years or more, this appears a high percentage unable to speak English; and this fact takes on an added significance when we consider the hazardous nature of the occupations in which they are engaged. Over 22,500 of the foreign born cannot read any language, so that safety notices or instructions would be meaningless to them; and nearly 10,000 of them cannot speak English and would have difficulty in understanding their foremen unless these spoke their particular language. These figures suggest, therefore that there has been remissness somewhere in the matter of teaching the foreign born the language of the country, just as there appears also a lack of energy on the part of the various organizations that might properly be looked to in the matter of stimulating their interest in acquiring American citizenship.

Social Status.—Of the total mine workers reported by the census, 83,877 were maintaining homes. Of the 69,691 native born, 30,605, or 43.9 per cent, were maintaining homes; of the 77,765 foreign born, 53,272, or 68.5 per cent, were maintaining homes. A very much larger percentage of the foreign born are maintaining independent homes than of the native born.

TABLE I—MARITAL AND DOMICILE STATUS OF THE TWO GROUPS MAINTAINING HOMES

	Native born—		Foreign born—	
	No.	Per cent	No.	Per cent
Single.....	2,345	7.7	581	1.1
Married, wife present....	27,213	88.9	51,103	95.9
Married, wife not present....	178	.6	364	.7
Widowed or divorced....	850	2.8	1,212	2.3
Marital status unknown....	19	....	12	....

TABLE II—MARITAL AND DOMICILE STATUS OF 63,579 MINE WORKERS NOT MAINTAINING SEPARATE HOMES.

	Native born—		Foreign born—	
	No.	Per cent	No.	Per cent
Total boarding with family.....	30,390	....	3,702	....
Single.....	29,632	97.5	3,579	96.7
Married, wife present....	84	.3	4	.1
Married, wife not present	313	1.	56	1.5
Widowed or divorced....	170	.6	40	1.1
Marital status unknown	191	.6	23	.6
Total boarding with a family other than their own....	8,696	....	20,791	....
Single.....	5,671	65.2	12,770	61.4
Married, wife present....	1,681	19.4	935	4.5
Married, wife not present	453	5.2	5,590	26.9
Widowed or divorced....	868	9.9	1,414	6.8
Marital status unknown	23	.3	82	.4

Out of 39,086 native-born workers who are not maintaining homes, 30,390 are boarding with a family of which they are a part; while out of 24,493 foreign-born workers who are not maintaining homes only 3,702 are boarding with such family.

Of the 83,877 mine workers who maintain homes, 27,142, or 32.4 per cent, own their homes. Of this number, 8,734 are native born and 18,408 are foreign born. Of the native born who maintain homes, 28.8 per cent own their homes; of the foreign born who maintain homes, 34.5 per cent own their homes. Of the homes owned, 64.5 per cent are free of mortgages, and this percentage applies approximately alike to both native and foreign born.

TABLE III—PERCENTAGE OF FAMILIES MAINTAINING HOMES AND NUMBER OF CHILDREN

	Total Maintaining Homes	Percentage of mine-workers maintaining homes who have specified number of children							
		None	One	Two	Three	Four	Five	Six	Seven or Over
Native and foreign born	83,877	13.1	14.4	16.8	15.9	13.4	10.6	7.4	4.3
Native born..	30,605	19.	20.2	19.2	14.6	10.3	7.3	4.6	2.5
Foreign born..	53,272	9.7	11.1	15.4	16.6	15.2	12.5	9.	5.4

As shown above, there are 30,605 native-born mine workers who maintain homes. In 62.4 per cent of the families maintained in these homes there is only one member gainfully employed, that is engaged in an occupation from which he secures a money return; in 22.6 per cent of these families there are two members gainfully employed; in 8.8 per cent there are three members so employed; in the remaining 6.2 per cent there are four or more members gainfully employed. In 50.8 per cent of the families of the 53,272 foreign-born workers who maintain homes there is only one member gainfully employed; in 28.8 per cent there are two such members; in 11.6 per cent there are three, and in the remaining 7.8 per cent there are four or more members gainfully employed. These figures show a marked difference between the native and foreign born, as nearly two-thirds of the families maintained in homes by native-born mine workers are supported by the work of a single breadwinner while this is the case in only one-half of the families maintained in homes by the foreign-born mine workers.

In a very considerable number of cases the additional worker in the family aside from the father is the mother. As already shown, of the families maintained in homes by 30,605 native-born mine workers, there are 11,497 in which there were two or more members gainfully employed. But it also develops that the wives of 4,405 native-born mine workers who maintain homes are gainfully employed as well as their husbands. This leaves 7,092 families of native-born mine workers whose support is contributed to by members other than the father and mother. Of the families maintained in homes by the 53,272 foreign-born mine workers, there are 26,187 in which two or more members are gainfully employed. In 12,138 of these families the wife of the mine worker is reported as gainfully employed as well as the husband, leaving 14,049 families maintained in homes by foreign-born mine workers to the support of which a member other than the father or mother contributes.

There are 27,144 native-born mine workers who maintain homes with the wife present, and 83.8 per cent of these homes the wife is not employed in any gainful occupation. Of the 16.2 per cent of wives who are reported as gainfully employed all except 109, or 0.4 per cent, are employed in work within their own homes. The occupations of the 109 require them to go out from their homes to other places of work.

There are 51,041 foreign-born mine workers who maintain homes with the wife present and in 76.2 per cent of these homes the wife is reported as not employed in gainful occupation. As in the case of native-born workers, practically all of the wives of these foreign-born workers who are reported as gainfully employed are so employed within their own homes. Of the 23.8 per cent of the wives reported gainfully employed only 159, or 0.3 per cent, are reported as in occupations that take them out of their homes.

Of the 30,605 homes maintained by native-born mine workers, boarders or lodgers were taken in 4,955, or 16.2 per cent. Of the 53,272 homes maintained by foreign-born workers boarders or lodgers were taken in 12,308, or 23.1 per cent. Of these families taking boarders or lodgers, 58 per cent of the native born and 53 per cent of the foreign born took only one such boarder or lodger; 23.5 per cent of the native born and 26.7 per cent of the foreign born took two; 10.8 per cent of the native born and 11.2 per cent of the foreign born took three, and 7.7 per cent of the native born and 9 per cent of the foreign born took four or more boarders or lodgers.

Cost of Living.—In order to measure wages against cost of living in the anthracite fields an investigation was made of the principal items of expense in mine workers' families.

A list of the food supplies purchased by 550 families for six months last winter (October-March) was obtained from storekeepers' records, and prices of foods on Dec. 15, 1922, were secured from 83 stores patronized by the families of 16,469 mine workers, numbering approximately 100,000 people. The lowest prices were found in the cities of 2,500-10,000 population; the highest in the small mining village, with the cities of Wilkes-Barre and Scranton not far behind. In the small village the winter's supply of food cost 2 per cent more than in the two large anthracite cities; in the towns of 10,000-50,000 it cost 3 per cent less, and in the smaller towns of 2,500-10,000 it cost 4 per cent less.

Compared with prices in Philadelphia and Pittsburgh, as collected for the same date by the U. S. Bureau of Labor Statistics at stores located among wage-earning population, it was found that it cost something like 10 per cent more in Scranton and Wilkes-Barre than in Philadelphia; 11.4 per cent more than in Pittsburgh; and that in the group of anthracite towns where the prices were lowest they were 3½ per cent higher than in Philadelphia, and 4.8 per cent higher than in Pittsburgh.

It is not practicable to compare the cost of clothing, furniture and similar items in the same way, because of the difficulty of finding identical articles in different places.

It was discovered, however, that retail dealers in the smaller mining villages allowed for higher gross margins in fixing prices than are usually allowed, for example by merchants in Washington, on many items of wearing apparel, notably men's shoes, men's underwear and goods sold by the yard.

Rent ranks next to food and clothing in the expenditures of the anthracite miner's family. Among the 712 families whose budgets were secured, those paying rent in Scranton and Wilkes-Barre paid on the average \$14.71 per month; those in cities of 10,000-50,000 paid \$14.39, whereas families in cities of 2,500-10,000 paid \$11.36. The rent for company-owned houses was always less than for others, the average paid being \$5.57. A comparison of rentals, even in the same region, is difficult, because so much depends on the location, the equipment and the state of repair of the particular house. The prevailing type of dwelling occupied by anthracite-mine workers is a two-story frame detached house of five or six rooms. Such a house with running water in the kitchen and electricity will rent for \$20 if favorably located and in good repair, while one of the same description located on the flats may rent for only \$10.

Excluding families living in company houses, the prevailing rent in Scranton and in the towns of 2,500-10,000 population was \$10 and \$12; in the cities of 10,000-50,000 it was \$15. These rents are for houses without a bathroom, to secure which adds approximately \$5 a month to the rent, aside from the extra cost of the water connection. As a matter of fact, however, a bathroom is the exception in the houses offered for rent in the anthracite region, and even if a miner wishes to meet the additional expense he would at present have difficulty in finding a house with it.

In the purchase of coal the mine worker's family had an advantage. The average price paid by them for chestnut coal delivered in Scranton in December, 1922, was \$7.30, and it averaged \$6.71 per ton in cities of from 2,500 to 10,000 population.

Taxes were found to be an appreciable amount in the family expenses of the mine worker. Every adult person in the anthracite region pays a direct tax. An occupational tax must be paid by every miner and a school tax by both the miner and his wife, whether or not they own property. Among the families studied taxes represented about 2 per cent of total expenses.

These topics and others connected with the cost of living are discussed more fully in an appendix to this report, but a summary table is included here, showing the principal items of expense last winter in the budgets of the 712 families interviewed by agents of the Commission. The budgets covered the six months beginning Oct. 1, 1922. In the table the 712 families are divided into four groups, according to the amount of income.

TABLE IV—MONTHLY DISBURSEMENTS OF ANTHRACITE MINE WORKERS' FAMILIES DISTRIBUTED ACCORDING TO INCOME OF FAMILIES

Expenses:	Family Income Less Than \$100		Family Income \$100 and Under \$150		Family Income \$150 and Under \$200		Family Income \$200 and Over	
	No. Families	per Disbursed Family	No. Families	per Disbursed Family	No. Families	per Disbursed Family	No. Families	per Disbursed Family
Rent.....	37	\$13.24	152	\$13.51	160	\$13.06	74	\$14.60
Fuel.....	55	5.53	217	6.57	224	7.10	186	8.37
Gas, electricity or kerosene	56	1.90	217	1.86	225	2.08	195	2.53
Water.....	20	.97	88	.92	92	1.25	130	1.26
Taxes.....	45	2.72	194	3.04	217	3.19	187	5.11
Food, clothing, personal supplies, upkeep of household equipment....	56	49.55	225	80.93	236	115.40	195	184.67
Maintenance of health (physician, hospital, nurse, dentist, oculist, glasses, prepared or prescribed medicines.....)	46	5.83	168	7.17	191	9.50	157	11.18
Education (parochial, private schools, school books, music lessons.....)	8	3.04	42	3.37	53	5.63	42	4.11
Church contributions.....	34	1.96	166	2.62	158	2.54	160	3.61
Labor organizations.....	55	1.44	218	1.48	233	1.93	191	1.95
Other organizations.....	18	1.77	87	1.50	65	2.60	87	2.53
Carefare.....	26	2.14	132	2.49	152	2.64	127	3.76
Recreation.....	23	3.94	124	3.21	141	5.89	137	13.54
Insurance.....	46	4.94	207	5.16	214	6.73	179	7.47
All other items.....	16	7.39	71	4.01	77	11.59	76	17.04
Totals.....	56	85.32	225	120.34	236	165.10	195	247.79
Debts paid.....	13	14.45	72	18.58	76	26.35	77	30.66
Investments:								
Payments on houses.....	3	23.33	23	31.40	25	42.27	33	37.17
Other investments.....							1	29.17
Bank deposits.....	2	1.00	17	12.05	28	20.28	33	28.20

The income as well as the expenses of the 712 families interviewed by the agents of the Commission was secured from the mine worker or his wife and the wages of the mine workers were checked against the payroll. The chief wage earner in every family was employed in the mines. In 33 per cent of these families he was a contract miner; in 34 per cent he was a company miner or a skilled or semi-skilled day worker; in 33 per cent of the families he was classified as a laborer. These proportions are approximately the same as they are in the total body of mine workers. Sixty per cent of the mine workers in these families worked the entire 26 weeks covered by the study; 20 per cent worked from 22 to 26 weeks, and only 23, or approximately 3 per cent, were employed in the mines for less than half of the period. The lack of employment was due in large part to the failure of certain mines to reopen when the strike was ended because of the "cave-in" law which was then being contested in the courts and which has since been annulled.

The prevailing household was one of six members—usually four children with the father and the mother, but sometimes three children and an adult relative or a boarder. Half the families

were dependent entirely on the father's earnings in or about the mines, while the other half had some additional income either from boarders or from earnings outside the home by other members of the family. About a quarter took boarders. The custom of turning the weekly pay envelope over to the mother prevailed in most of the families, and in all but a few cases, therefore, the earnings of the various members of the family were spent or distributed by her for the benefit of the family as a whole.

Exclusive of families living in company-owned "patches," one in every ten families owned a house other than the one occupied and secured some income—about \$15 a month—from rentals.

Taken together, the families depended for 80 per cent of their income on the father's earnings; 11 per cent was added by other members of the family earning outside the home; 8 per cent was secured by the mother through keeping boarders, and 1 per cent came from investments.

The average income from all sources was approximately \$176 per month; 41 per cent had as much as this or more; 59 per cent had less. Nine families, or 1.2 per cent of the total families visited, had an average monthly income during the six months of less than \$75; forty-seven families, or 6.6 per cent, had from \$75 to \$100; ninety-nine families, or 14 per cent, had from \$100 to \$125; one hundred and twenty-seven, or 17.8 per cent, had from \$125 to \$150; one hundred and thirty-seven, or 19.2 per cent had from \$150 to \$175; one hundred, or 14.1 per cent had from \$175 to \$200; and one hundred and ninety-three, or 27.1 per cent, had \$200 or over.

Occupational Names.—To facilitate understanding of the labor sections of this report an explanation is given of terms peculiar to the anthracite industry. Pick and machine miners, together with their assistants, are paid on a piece-rate basis and are what would be termed in other industries *piece workers*. In this report they are referred to as either *contract men* or *tonnage men*. While some contract miners are paid by the *car* and others by the *yard*, instead of by the *ton*, they are all grouped together under the term *tonnage men*. Every colliery has some miners, employed in various kinds of work, who are paid by the hour and not by the piece. These are called *company miners*, and are included under day workers, and not under *tonnage* or *contract men*.

There is a third class of miners, between the contract miner and the company miner. These are contract miners who because of abnormal conditions in their working places have been placed temporarily on a day rate, usually somewhat above the day rate of company miners. The rates at which they are paid are known locally as *consideration* rates and these miners are called *consideration miners* during the time they are on the day rate. But as ordinarily they are on a day rate for a comparatively short time and go back to their contract rates as soon as conditions in their working place become normal, their earnings on the whole represent the earnings of piece workers rather than day workers. In the tables, therefore, they have been grouped with contract miners.

Most miners employ a *laborer* who is an employee of the miner and not of the company. These *laborers* load the coal blasted down by the miner, assist him in his work and are employed, disciplined or dismissed by the miner. They usually are paid a percentage of the miner's earnings. The miner turns in a statement of the amount due his laborer and this amount is deducted by the company from the miner's earnings and paid to the laborer directly by the company. The miner's laborers are piece workers and are included under the general term *contract men* or *tonnage men*. Practically all the other employees around the mines are paid by the day or hour and are, therefore, time workers. These time workers are referred to sometimes as *day men* but more frequently as *company men*.

All contract men, or *tonnage men*, are underground workers. *Company men*, or *day men*, are subdivided into *inside men* and *outside men*, according to whether their working places are underground or on the surface.

Development of Wage Rates.—From the standpoint of industrial relations, and for an understanding of the present structure of wage rates in the anthracite industry as well as the relation of these rates to changing living conditions, it is necessary to take the award of the Anthracite Coal Strike Commission in 1903 as dividing the history of wage making into two distinct periods.

The labor organizations that had been a strong factor in the industry in the seventies had disappeared by 1880, and the steady inflow of widely differing races from Europe, beginning at this time, made any immediate reorganization of the wage earners practically impossible. For the twenty years prior to 1900 therefore, contract rates, wage rates and conditions of employment were determined not by collective bargaining but by the individual employee seeking employment pitted against the individual management. The industry was demoralized by an oversupply of labor and by an overdevelopment of the mines, with the result of both a low wage rate and a limited opportunity for work.

In the five years ending 1895 the mines had averaged only 197 working days per year, and in the five-year period ending 1900 had averaged only 160 days. Thus, in the first period they had worked less than two-thirds of the working days of a year, and in the second barely more than one-half. But this does not mean that the collieries worked this number of days consecutively and that the employees were accordingly free to find other employment the rest of the year. The starts made by collieries were generally scattered throughout the year, a few days in one week, a few in another, just as is the case in much of the bituminous field at the present time. Even when the whistle called the mine workers to the colliery to begin a day they could not assume that it meant a full day's work.

Figures published in the report of the Anthracite Strike Commission reflect the situation for the year 1901, in which the anthracite mines together average 196 working days. One of the large companies, in its colliery that made the best showing, reported 288 starts within the year; but all starts taken together equalled only 232 full ten-hour days. In another colliery making 286 starts the total time represented by these starts equalled only 178 ten-hour days. In another instance a colliery making 227 starts worked only the equivalent of 102 ten-hour days. Under such conditions it was inevitable that the wage structure which had grown up during the twenty years prior to 1900 should be more or less haphazard and that the differentials between collieries for the same occupations and within a colliery as between different occupations should be somewhat erratic.

A partial organization of the anthracite workers was effected by the United Mine Workers by 1900 and a strike in that year resulted in a 10-per cent increase for all mine workers, but left the wage structure and working conditions otherwise unchanged. The Anthracite Coal Strike Commission, appointed in October, 1902, as a result of the nearly six months strike of that year, handed down an award fixing wage rates and working conditions for a period of three years from April 1, 1903. Special provisions were made for certain limited classes of employees, but the great bulk of the mine workers came under one or the other of two general provisions of the Award. Contract miners and their laborers secured a flat increase of 10 per cent in their rates. Company men, not covered in the special provisions, were given a nine-hour day with the same wages for the nine hours that they had been receiving for their former ten-hour day.

The award also provided for a sliding scale giving to all classes of workers a further increase of 1 per cent on their rates for each 5c. increase above \$4.50 in the selling price of prepared sizes of coal at New York harbor. This sliding scale gave an average increase of approximately 45 per cent during the nine years it continued in existence. The award represented an actual increase in earnings of contract miners and their laborers, if they could send out as many cars of coal in the nine hours as they had sent out in ten hours; and many, if not most of them did. But while the provision of the award reducing the company men's day from ten to nine hours gave these employees an increase of 11 per cent in their hourly rates, it gave them no actual increase in earnings if they worked no more days per year than they had been working. It merely allowed them to earn in nine hours the same amount that they had formerly earned in ten.

In 1906, after a suspension of nearly five weeks, an agreement was reached to continue the award of the commission in effect without change for another three-year period. Again in 1909 the award was continued for another three-year period with a few changes which, however, did not affect either wages or hours. In 1912, after a suspension of over five weeks, an agreement was entered into for four years which gave an increase of 10 per cent to all classes of employees, but as this agreement also abolished the sliding scale under which the mine workers had secured approximately 4.5 per cent, their net increase was around 5½ per cent.

In 1916 a new agreement was entered into running for another four years and expiring March 31, 1920. This agreement gave to the great bulk of the company men an eight-hour day, with the same wages as they had been receiving for nine hours, and gave an increase of 3 per cent on top of this. To certain other company men who received no reduction of hours it gave an increase of 7 per cent, and it gave an increase of 7 per cent to contract workers. The increase to the day workers who had received a reduction in hours from nine to eight, plus 3 per cent, was an increase of approximately 16 per cent in their hourly rates, but it was an increase of only 3 per cent in their actual earnings per day. As in the case of the award of the commission in 1902, the reduction in hours gave no actual increase in a day's earnings but allowed company men to earn in a day shortened by one hour the same amount they had earned in their longer day.

Although this agreement ran to March 31, 1920, the rapid and unprecedented increase in the cost of living brought on by our entrance into the war, and the difficulty of maintaining an adequate force of mine workers in the face of wages being paid in outside industries, led the parties to the agreement, in conference with the Federal Fuel Administrator [sic] to enter into a supplementary agreement effective May 1, 1917, which gave increases to all classes of workers.

The effects of this series of agreements may be summarized in terms of the increase per dollar of earnings which they brought to the different classes of mine workers. For the contract miner and his laborer, assuming that they were able to send out as many cars of coal in the eight- and nine-hour day as they did in the ten-hour day, the dollar of earnings of April 1, 1902, was increased by the award of the commission of 1903 to approximately \$1.15; by the agreement of 1912 to \$1.21, and by the agreement of 1916 to approximately \$1.30; a total increase of 30 per cent.

For the company men, or day men, the effect of these increases is very different, according to whether we consider their hourly rates or their day's earnings. The effect on the hourly rates was to increase the dollar of 1902 to \$1.16 in 1903, \$1.22 in 1912 and \$1.42 in 1916—a total increase of 42 per cent as compared with the increase of 30 per cent for contract miners and their laborers. But this 42 per cent increase in the hourly rate of company men was not necessarily reflected by any means in their actual earnings.

The reduction in hours given them in 1902 and again in 1912 gave no actual increase in a day's earnings, so that the increase in earning power of company men from 1902 up to May, 1917, would have been only 13.3 per cent if the mines had continued to work the same number of days as they worked in 1902 and 1903. There was, however, a considerable increase in the number of days worked per year in 1916 and thereafter as compared with the period prior to 1903. The number of days worked by all the anthracite mines in the five-year period ending in 1902 averaged 167 per year, while in the five-year period prior to 1917 the average was 243 days. The economic conditions of the mine workers had been bettered between 1902 and 1917 by this increase in their opportunity to work more than it was by increases in rates.

The supplementary agreement of May 1, 1917, gave increases in rates to all classes of mine workers. Another supplemental agreement in November, 1917, gave new increases; a third in November, 1918, gave still further increases, and an agreement in September, 1919, continued these increases in effect until March 31, 1920. The agreement of November, 1918, gave to contract workers an increase of 40 per cent and to various classes of company men increases of \$1.80, \$2 and \$2.20, respectively, over their rates as fixed in the agreement of May, 1916.

On March 31, 1920, the operators and mine workers had been unable to agree upon a new contract to replace the one expiring on that date. Fruitless negotiations were continued until June 1, when it was mutually agreed to submit the matters in controversy to a commission appointed by President Wilson. On Sept. 2, 1920, the operators and mine workers entered into a new agreement incorporating the award of this commission, this contract being retroactive to April 1.

The outstanding increases given in this 1920 contract are as follows: Contract miners were given an increase of 65 per cent over the rates established by the agreement of May 5, 1916. All increases of \$1.80, \$2 and \$2.20 per day granted to the different classes of day workers respectively by the supplemental agreements made during the war period were retained. To the new rates made up by the addition of these respective increases to the rates of 1916 a further increase of 17 per cent was added. Another provision of the contract fixed a minimum wage of 52½c. per hour for all company men whose rate under the agreement of May 5, 1916, was \$1.54½ or more per day, thus fixing a minimum of \$4.20 per day for those covered by this provision. The hourly rate of company men receiving less than \$1.54½ per day under the agreement of May 5, 1916, was increased 4c. per hour.

This agreement ran until March 31, 1922. After a five months' suspension, beginning April 1, 1922, it was continued in effect until Aug. 31, 1923.

The actual wage rates in effect for company men during March, 1923, were secured for 53,159 company men from 180 collieries distributed through the three anthracite fields. Of these, 24,087 were outside men and 29,072 inside men. All weekly or daily rates reported were, for purposes of comparison reduced to an hourly basis. While there is a very wide range in these rates—from 23c. an hour to \$1.11 an hour—the real range is between 27 and 71c. per hour, only one employee being reported as below 27c. and only 977 above 71c. Of these above 71c., only 26 are above 89c. These 53,158 workers fall into four groups as follows:

TABLE V—NUMBER OF ANTHRACITE MINE WORKERS RECEIVING SPECIFIED RATES PER HOUR.

	27c. to 39c.	39c. to 51c.	51c. to 71c.	71c. and over	Total
Outside Employees	4002	286	19,193	515	24,086
Inside Employees	921	106	27,583	462	29,072
	5013	392	46,776	977	53,158

The great bulk of them—88 per cent—receive 51-75c. per hour. Of the 5,405 who receive less than 51c.—approximately 10 per cent—at least 4,133 are boys, including about 3,000 slate pickers who work in the breaker above ground, and about 800 door boys underground who open and close the doors of the haulageways. Of the adult employees, therefore, approximately 95 per cent receive hourly rates between 51 and 71c. per hour. As most of these employees are on an eight-hour day, their daily rate is \$4.08-\$5.68.

In further analysis of the rates of these 46,595 adult employees, they are subdivided in the following tables, first into ten groups and then into five:

TABLE VI—NUMBER OF ADULT ANTHRACITE MINE WORKERS RECEIVING CERTAIN SPECIFIED RATES PER HOUR

	51c. to 53c.	53c. to 55c.	55c. to 57c.	57c. to 59c.	59c. to 61c.	61c. to 63c.
Outside.....	8597	1752	1770	990	1875	996
Inside.....	307	823	2418	1751	5394	7498
Total.....	8904	2575	4188	2741	7269	8494
	63c. to 65c.	65c. to 67c.	67c. to 69c.	69c. to 71c.	Total	
Outside.....	736	1069	1044	297	19126	
Inside.....	2134	2560	3478	1106	27469	
Total.....	2870	3629	4522	1403	46595	
	51c. to 55c.	55c. to 59c.	59c. to 63c.	63c. to 67c.	67c. to 71c.	Total
Outside.....	10349	2760	2871	1805	1341	
Inside.....	1130	4169	12892	4694	4584	
Total.....	11479	6929	15763	6499	5925	

To summarize: 24 per cent of the adult employees paid by the hour receive 51-54c. per hour; 15 per cent, 55-58c. per hour; 34 per cent 59-62c. per hour, and 13 per cent, 67-71c. per hour.

The appendix shows rates by specified occupations in considerable detail. The above figures have grouped employees together regardless of occupation, merely for the purpose of showing the opportunity for earning afforded by the anthracite industry irrespective of the particular name by which a worker's occupation may be called. Many of the occupations are peculiar to mining and no valuable purpose would be accomplished by enumerating them here. But for purposes of comparison it may be well to refer to some of the occupations that are found in outside industries as well as in anthracite mines.

For 101 blacksmiths working underground, for example, the rates range from 61 to 81c. per hour, 70 per cent falling between 65 and 69c. Of 448 blacksmiths working above ground, 258 received from 65 to 69c. Of 67 carpenters working underground, 50 received from 67 to 71c., of 1,762 carpenters working above ground, 86 received from 51 to 59c., 314 from 59 to 63c., 634 from 63 to 67c., 609 from 67 to 71c., and the remainder, 71c. and over. Of 126 electricians working underground 57 received under 63c. per hour, and 69 over that rate. Of 110 electricians working outside, 11 received under 59c. per hour, 83 between 60 and 71c., and the remaining 16, 71c. and over. Of 1,861 firemen, 117 received less than 57c. per hour, 1,394 from 57 to 61c. an hour, 289 from 61 to

65c. an hour, and the remaining 61, 65c. an hour and over. Of 628 outside machinists, 35 received less than 55c. an hour, 129 from 55 to 59c., 149 from 59 to 63c., 158 from 63 to 67c., 113 from 67 to 71c., 20 from 71 to 75c., while the remaining 24 received 75c. and over. Of 2,530 men classified as laborers working underground, 28 received less than 51c. per hour, 96 from 51 to 55c., 343 from 55 to 59c., 1,914 from 59 to 63c., 130 from 63 to 67c., 19 from 67 to 71c. Of 4,001 outside laborers, 26 received less than 51c., 3,801 received between 51 and 55c., 135 between 55 and 59c., 39 received 59c. and over.

To show the actual rates being paid to certain representative groups of employees as well as the change in these rates from 1903 to the present time, tables are given below for outside laborers and for company miners at different collieries. The first two columns give the actual hourly rates paid April 1, 1903, and 1923. Thus in the first table, covering outside laborers, the hourly rate fixed by the award of the commission in colliery No. 1 was 16½c. per hour. The various increases granted by the successive agreements have brought this up to the present rate of 52½c. per hour. The second set of columns show relative rates, on the base of the rate fixed in 1903. Thus, if we take the rate of outside labor shown for colliery No. 1 as being the equivalent of 100 on April 1, 1902, the rate under the agreement of 1912 was equivalent to 110 and the present rate to 318, indicating a total increase of 218 per cent.

TALBE VII—RELATIVE RATES OF PAY FOR OUTSIDE LABORERS (a) IN THE ANTHRACITE FIELD, 1903, 1912, 1923 (1903=100)

No. of Operation	Hourly Rates		Relative Rates		
	1903	1923	April 1, 1903	May 20, 1912	April 1, 1923
1	.165	.525	100	110	318
2	.170	.525	100	110	309
4	.180	.532	100	110	296
5	.150	.381	100	110	254
9	.160	.525	100	110	328
	.170	.525	100	103	238
	.180	.525	100	110	309
	.200	.562	100	110	281
23	.171	.525	100	110	307
	.183	.536	100	110	293
42	.130	.525	100	110	404
	.143	.525	100	110	367
62	.178	.532	100	111	299
64	.163	.525	100	110	322

(a) Stripping operation laborers not included.

TABLE VIII—RELATIVE RATES OF PAY FOR COMPANY MINERS IN THE ANTHRACITE FIELD, 1903, 1912, 1923 (1903=100)

No. of Operation	Hourly Rates		Relative Rates		
	1903	1923	April 1, 1903	May 20, 1912	April 1, 1923
1	.235	.643	100	110	274
2	.235	.643	100	110	274
10	.245	.658	100	110	269
11	.230	.636	100	110	277
23	.266	.689	100	110	259
28	.222	.664	100	113	299
42	.252	.668	100	110	265
58	.258	.678	100	110	263
64	.244	.656	100	110	269

While it is not practicable to show the actual rates paid contract miners because of the wide variety in these rates and of the differing bases on which they rest in different collieries, a table is appended showing the relative rates of contract miners. The rates of 1902 are taken as 100. The increases granted by the various awards are then applied to this basis up to and including the agreement now in effect. The various agreements have made the relative rate of 1923 213.6 as compared with base rate of 100 in 1902.

TABLE IX—RELATIVE WAGE RATES OF ANTHRACITE CONTRACT MINERS*

(April 1, 1902=100)		
1902	100.0	121.0
1903	114.4	121.0
1904	114.8	129.5
1905	114.3	142.5
1906	114.9	161.9
1907	114.2	181.3
1908	114.4	181.3
1909	114.5	213.6
1910	114.4	213.6
1911	115.0	213.6
1912	121.0	213.6
1913	121.0	

*Relative numbers for years 1903 to 1911 inclusive are based on the increase granted by the Award and the average annual increases resulting from the operation of the sliding scale.

Opportunities for Employment in Anthracite Mines.—

The improvement in the economic condition of the anthracite mine worker is not fully reflected by the increases in contract and wage rates. A further and much more important increase in his earning power is due to the increased opportunities afforded him to work. The following table shows the average days worked by anthracite mines from 1890 to 1921, both years included.

As concerns regularity of employment, the condition in the anthracite industry from 1890 to 1903 was very similar to the present demoralized conditions in the bituminous field. Only twice in those fourteen years—and those were the first two years of this period—did the number of working days average as many as 200. After 1891 the average went down, until in 1897 it was only 150, less than half the full working year, and it did not reach 200 again until 1903.

TABLE X—AVERAGE DAYS WORKED BY ANTHRACITE MINES 1890—1921

(Based on statistics of the U. S. Geological Survey)

Year	Days worked	Year	Days worked	Year	Days worked	Year	Days worked
1890	200	1900	166	1910	229	1920	271
1891	203	1901	196	1911	246	1921	271
1892	198	1902	(a) 116	1912	231		
1893	197	1903	206	1913	257		
1894	190	1904	200	1914	245		
1895	196	1905	215	1915	230		
1896	174	1906	195	1916	253		
1897	150	1907	220	1917	285		
1898	152	1908	200	1918	293		
1899	173	1909	(b)	1919	266		
Average	183	Average	190	Average	254		

(a) Strike

(b) Not available.

Dividing the table into five periods beginning with 1901, we find that in the first period the average was 197 days, or less than two-thirds of a full year; in the second, ending in 1900, only 163 days, little over half a year. In the next period although this included the strike of several months in 1902, it was 186 days; and in the period ending 1910, with figures for one year missing, 211. In the next period ending 1915, it rose to 248 days, and for the six years ending with 1921 it was 273, approximately 90 per cent of a full working year. The average number of days for all the mines in 1921 was 271 days; and approximately 40 per cent of the employees worked in mines that operated 290 days or over.

The following table shows the percentage of employees who had opportunity to work a specified number of days in the year 1921:

TABLE XI—PER CENT OF ANTHRACITE EMPLOYEES IN COLLIERIES OR WASHERIES WHICH WORKED EACH SPECIFIED NUMBER OF FULL-TIME DAYS IN 1921.

(Based on operator's annual reports to the U. S. Geological Survey)

Days worked by colliery or washery	Cumulative Per cent of all Anthracite employees	Days worked by colliery or washery	Cumulative Per cent of all Anthracite employees
300	6.1	200 or over	94.6
290 or over	40.3	180 or over	95.9
280 or over	59.4	160 or over	96.2
270 or over	67.3	140 or over	97.2
260 or over	76.8	120 or over	97.5
250 or over	87.5	100 or over	98.0
240 or over	90.4	80 or over	98.0
230 or over	91.9	60 or over	98.4
220 or over	92.6	40 or over	(a) 100.0
210 or over	93.1		

(a) The number employed on operations working less than 40 days was only 28, or one-sixteenth of one per cent.

TABLE XII—CLASSIFICATION OF EARNINGS FOR CONTRACT AND CONSIDERATION MINERS SHOWING AVERAGE STARTS PER MAN AND NUMBER OF MEN FOR THE ANTHRACITE INDUSTRY IN 1921

Earnings	Average Starts per Man	Number of Men
Under \$100	8	9162
\$100 and under 200	26	4563
200 and under 300	41	3605
300 and under 400	55	3070
400 and under 500	70	2560
500 and under 600	83	2648
600 and under 700	94	2495
700 and under 800	106	2002
800 and under 900	121	1760
900 and under 1000	138	1535
1000 and under 1100	154	1351
1100 and under 1200	172	1415
1200 and under 1300	189	1425
1300 and under 1400	204	1534
1400 and under 1500	217	1763
1500 and under 1600	231	1928
1600 and under 1700	238	2136
1700 and under 1800	246	2362
1800 and under 1900	249	2379
1900 and under 2000	254	2353
2000 and under 2100	257	2253
2100 and under 2200	259	1903
2200 and under 2300	261	1719
2300 and under 2400	263	1331
2400 and under 2500	265	1199
2500 and under 2600	266	856
2600 and under 2700	268	633
2700 and under 2800	271	524
2800 and under 2900	272	394
2900 and under 3000	272	282
3000 and under 3100	271	226
3100 and under 3200	271	185
3200 and under 3300	272	155
3300 and under 3400	276	103
3400 and under 3500	279	99
3500 and under 3600	281	72
3600 and under 3700	287	52
3700 and under 3800	280	39
3800 and under 3900	276	22
3900 and under 4000	297	23
Over 4000	288	163

Earnings of Anthracite Mine Workers Classified by Main Occupations

Earnings.—In the preceding pages the *rates* of wages for employees paid by the day or the hour have been given in considerable detail. When an hourly rate is given it is possible to compute what can be earned in a day of given length and to compare the rate with rates for the same occupation in other collieries or in other industries. It is not practicable to give a similar statement of *rates* for contract miners. They vary widely, not only between different collieries but also between different sections of the same colliery, as they are determined by the varying conditions in the veins in which miners are working. The base upon which the rate is fixed varies also, in some instances being by the ton, in others by the car, and in still other instances by the year. Moreover, in one colliery the rate per ton or per car may include setting props and doing other dead-work while in another there may be specific rates for different classes of dead work in addition to the rate per car. It, therefore, seems useless to undertake to give rates for tonnage workers.

Reports showing earnings were secured from 216 of the 254 operations in the anthracite region that employed 75 men or over during the year 1921; all the operations in the Lehigh district, 100 out of the 128 in the Wyoming, and 83 out of the 96 in the Schuylkill district. These reports show the name of every employee appearing upon any payroll during the calendar year 1921: the earnings for each one and the number of days on which he started work. The tables which follow classify the men according to the amount of their earnings and show also the average number of the men in each earning group.

Obviously tables made up on this basis do not give the total earnings for the year of many of the employees included. For example, if a man worked ten days in colliery A, six weeks in colliery B, and ten months in colliery C, he would be reported by all three collieries and would appear as three units in the table, but no one of the three reports would represent his total earnings for the year. It would not be practicable to follow each mine worker from colliery to colliery to secure his total annual earnings.

The total number of men reported in the table is of course in excess of the number required to fill the positions, since one individual may be reported from two or more collieries. In the detailed tables published in the appendix the employees in each of the earning groups are shown under the colliery in which they worked, and the collieries are grouped according to the number of days they operated. From these detailed tables a fair idea may be derived of the annual earnings of those who work approximately through the year. From the summary tables it is possible to derive an approximate idea of the possibility of earnings by those employees who work a full year.

One way to avoid some of the difficulties that are inherent in the method that has been adopted would be to report the earnings of only those employees who work throughout the entire year. But this would make an inaccurate showing. A considerable number of employees lose some time during the year through illness, accident, shutdown, bad condition of working places, or other causes beyond their control. Frequently when a contract miner finishes driving his working place it may be some time before he secures another place to work. To give the earnings, therefore, only of those who work for the full year would eliminate all loss of

earnings which were beyond the mine workers' control, would reflect only the cream of the earnings, and would give an exaggerated idea of the earnings of mine workers under the actual conditions of their every day life.

It was deemed preferable, therefore, by the Commission to tabulate all names on the payrolls, since whatever defects there may be in this method are obvious and can be taken into account in studying the tables; and a corrective appears on the face of the tables by the figures showing the average number of starts made by the men in each group. The table on page 49 shows by classified groups the earnings reported for 64,279 names of contract and consideration miners.

As has been stated, this does not represent 64,279 separate miners, since the same man may be included more than once. The very large proportion of men given in the lower wage groups indicates a large amount of "turnover" in the mines, a subject which is considered more fully in a succeeding section of this report. Over 9,000 men are shown as earning under \$100 and as having worked an average of only eight days. This means that many men appeared on the payrolls of different mines and earned less than \$100 in each of these mines. The table also shows that this group made on the average only eight starts in the mines on whose payrolls they appear. Similarly, 4,563 are shown as earning between \$100 and \$200, and as having worked on the average only 26 starts.

The average starts made by all the anthracite mines during the year 1921 was 271 days, some mines having started more than this number of days and some less. The earnings, therefore, in the upper wage classifications where the average number of starts was above 250, may be taken as approximating toward the annual earnings in these groups, and this may be true in the groups immediately below 250. The fact that over 9,000 men appear on the various payrolls as having earned under \$100 in individual mines and as having worked on the average in these mines only eight days, shows that a very large number were going from mine to mine, seeking better opportunities for earning, and through this shifting must have lost no inconsiderable amount of working time.

A comparison of the average starts made by the men in each of the wage groups with the earnings classification gives an approximate idea of the earnings per start made by the different groups shown in the table though the average earnings per start cannot be computed with exactness; one of the significant things disclosed is the increasing

TABLE XIII—CLASSIFICATION OF EARNINGS FOR CONTRACT AND CONSIDERATION MINERS' LABORERS SHOWING AVERAGE STARTS PER MAN AND NUMBER OF MEN FOR THE ANTHRACITE INDUSTRY IN 1921.

Earnings	Average Days Per Man	Number of Men
Under \$100	7	33679
\$100 and under 200	27	11625
200 and under 300	45	7014
300 and under 400	63	4618
400 and under 500	80	3542
500 and under 600	97	2624
600 and under 700	115	1865
700 and under 800	133	1525
800 and under 900	151	1243
900 and under 1000	167	1160
1000 and under 1100	185	1031
1100 and under 1200	202	980
1200 and under 1300	222	1036
1300 and under 1400	239	1037
1400 and under 1500	252	920
1500 and under 1600	256	710
1600 and under 1700	262	539
1700 and under 1800	261	297
1800 and under 1900	260	190
1900 and under 2000	265	135
2000 and under 2100	268	93
2100 and under 2200	276	55
2200 and under 2300	290	34
2300 and under 2400	280	28
2400 and under 2500	327	16
2500 and under 2600	295	10
2600 and under 2700	293	5
2700 and under 2800	260	1
2800 and under 2900	274	1
2900 and under 3000	332	3

76,016

average wage per start as the earnings groups ascend. In the \$1,500 to \$1,600 group, the average earnings per start approximate \$6.75 and they rise until the average in the \$2,500 to \$2,600 group is around \$9.50; and in the \$3,000 to \$3,100 group it would go above \$11. This steady increase of average earnings per start, with the increasing earnings classes, represent the more skilled miners, or possibly those working in exceptionally favorable places.

The next table gives the earnings of miners' laborers in the same form as the earnings for miners were shown. This table indicates even more strikingly than the one for miners a tremendous shift from one place to another. Over 33,000 miners' laborers are shown as having earned under \$100 in the individual collieries on whose payrolls they appear and as having averaged only seven starts per man. The miner's laborer is the employee of the miner rather than of the company, and the large turnover indicated here shows that the laborers were moving around at an astonishing rate. This condition is more fully reflected in the later section of this report dealing with turnover.

The table given below shows the earnings of outside company men, that is, men paid by the day or the hour, whose place of work is outside the mine and above ground. The first glance at this table shows a marked contrast in steadiness of employment between the outside day men and the inside men. It has been shown in a previous section of this report, dealing with hourly rates, that for similar occupations inside men have slightly higher rates than those outside. The same fact is reflected in this table by the number of outside men who may be considered as working approximately a full year. The earnings of the outside men who may be considered as having worked to the full extent of their opportunity ranges from \$1,100 to \$1,700. Therefore, with the exception of some ten men, all of the groups of these outside day men shown as earning \$1,700 averaged more than 365 days. As in the case of inside men, the

earning of those working over 365 days represent men working more than an eight-hour day, and the earnings, therefore, represent over-time as well as the earnings of a normal day;

TABLE XIV—CLASSIFICATION OF EARNINGS FOR OUTSIDE MEN FOR THE ANTHRACITE INDUSTRY IN 1921.

Earnings	Average Starts per Man	Number of Men
Under \$100	10	5006
\$100 and under 200	35	3286
200 and under 300	58	2907
300 and under 400	81	2153
400 and under 500	105	1990
500 and under 600	128	1816
600 and under 700	152	1440
700 and under 800	177	1279
800 and under 900	207	1288
900 and under 1000	228	1330
1000 and under 1100	251	1929
1100 and under 1200	272	2638
1200 and under 1300	291	2804
1300 and under 1400	309	2401
1400 and under 1500	327	2347
1500 and under 1600	346	2258
1600 and under 1700	363	2141
1700 and under 1800	373	2149
1800 and under 1900	383	1569
1900 and under 2000	396	1091
2000 and under 2100	407	709
2100 and under 2200	408	543
2200 and under 2300	433	276
2300 and under 2400	444	151
2400 and under 2500	453	80
2500 and under 2600	452	42
2600 and under 2700	464	27
2700 and under 2800	459	14
2800 and under 2900	470	6
2900 and under 3000	444	2
3000 and under 3100	...	...
3100 and under 3200	395	1
3200 and under 3300	326	1
3300 and under 3400	...	...
3400 and under 3500	...	...
3500 and under 3600	292	1
3600 and under 3700	...	...
3700 and under 3800	...	...
3800 and under 3900	308	1
3900 and under 4000	...	...
4000 and over	380	2
		45,678

Labor Turnover and Overtime Employment

Turnover.—A study of turnover in anthracite mines has been made from reports from 127 mines and ten washeries located in the three fields and representing 40 per cent of the total production. By turnover is meant the changes in personnel due to men leaving the employment and others being hired to take their place. The extent of turnover is expressed in a percentage. If there are 100 positions and only 10 changes in personnel during the year the rate of turnover is 10 per cent. If 50 men leave and 50 are hired in their places, the rate of turnover is 50 per cent. If changes go on so rapidly that 125 men are hired to fill the places of men leaving, the rate of turnover is 125 per cent.

The variations in turnover in the 127 operations studied are so wide as to make any average useless. The variations occur not only between the different regions but also between different mines and between different occupations in the same mines. The tables given in the appendix classify the mines by the number of employees, showing on a percentage basis all separations from the payroll that occurred in the year 1921; the number of complete separations, that is employees who did not return during the year; the number who left but were re-employed; the number of new men hired, and the percentage of the normal force that remained at work continuously throughout the year.

Mine workers in their status as employees, are divided into two general classes: (1) Those who are employed directly by the companies, and (2) the laborers who work with the contract miners as their helpers, and are employed and discharged directly by the miner.

This distinction is important in studying figures of turnover, since the management of a colliery has no control over the extent of turnover that may occur among miners' laborers, and there is a tremendous difference between the company employees and the miners' own employees in this respect. In one colliery, with a percentage of turn-

over among company employees of only 39 per cent, which is comparatively low, the turnover of contract miners' laborers was 263 per cent. In another colliery, with a turnover of 68 per cent for all classes of company employees, the turnover rate for contract miners' laborers was 416 per cent.

The wide range in turnover rate both among collieries and among groups of employees is illustrated by figures for the Lehigh region. In the collieries reporting from that region the turnover ranges from 8 per cent to 114 per cent for contract miners; from 11 per cent to 156 per cent for inside day men; from 14 per cent to 52 per cent for outside day men; and from 60 per cent to 416 per cent for contract miners' laborers. Comparing the three regions into which the anthracite fields are divided for all classes of company employees, the turnover ranges in the Lehigh district from 21 per cent to 83 per cent; in the Wyoming region from 8 per cent to 255 per cent, with an even higher percentage at one washery, and in the Schuylkill region from 29 per cent to 194 per cent.

Although in many instances the turnover is above 100 per cent, this of course does not mean that every employee of the colliery left during the year and that there was a consequent change of personnel in every single position. On the contrary, in practically all cases the turnover is limited to a certain percentage of the positions; for example, in a force of 100 employees, 80 of them might remain in their positions without change during the year while the remaining 20 positions might each be filled five different times during the year. This would establish a turnover of 100 per cent, although 80 per cent of the working force was not affected and the plant might be considered as having a more than ordinarily stable force. The tables all indicate the percentage of the total force involved in the turnover by showing in each case the percentage of men who remained at work continuously throughout the year.

In the study of earnings attention is called to the very large number of men who appeared on the payrolls as working less than two weeks. These figures should be taken into account in connection with the study of turnover. In other parts of the report references are made

to the very wide variety of conditions not only between the different mines but in different parts of the same mine and even in different parts of the same vein. Attention also has been drawn to the wide variety from colliery to colliery in the range of rates paid in the different occupations of day men.

When a new contract miner comes to work in a colliery he may find that the better working places are filled. If he is not satisfied with the working place assigned to him, he is likely to quit and go on to another colliery hoping to better himself. He may repeat this attempt over and over, thus becoming a factor in the turnover rate of one colliery after another. In the same way, day men, knowing of better opportunities in another colliery, leave their positions when they hear of a vacancy at a better rate elsewhere. Ordinarily the turnover reflects the demand for labor. When jobs are scarce men do not readily give up a position to seek another, and the turnover at such a time is low. On the other hand, when labor is scarce, when there are more jobs than there are men and when jobs are beckoning from every side, the natural instinct of a man to better his position will reflect itself in an increased turnover.

The output of anthracite coal in the year 1921 was greater than it was in either 1919 or 1920. It was not so large as in 1917 and 1918, but with the exception of these two years it was higher in 1921 than in any year since 1914. It is probable, therefore, that the turnover shown in 1921 may be somewhat above the average. The median turnover point in the three regions—that is the middle percentage for both turnover and stability—is as follows:

	Turnover, per Cent	Stability of Force, per Cent
Lehigh region	55	71
Wyoming region	100	58
Schuylkill region	115	54

These figures mean that in the Lehigh region, for example, the 71 men out of each 100 in the working force remained in the employment of the same company throughout the year, while 29 positions out of each 100 had to be refilled more than once during the year, 55 men being required to fill these 29 positions. In both of the other regions turnover was considerably higher and stability considerably lower.

While the turnover in these collieries seem high, and is high absolutely, it is not so relatively. A study of labor turnover in 157 industrial concerns made by Brissenden and Frankel shows a turnover of approximately 115 per cent for the year 1913-14; for the year 1917-18, under war-time conditions, approximately 180 per cent. A study of eleven firms in Philadelphia for the year 1921 made by the Industrial Department of the Wharton School of the University of Pennsylvania shows a labor turnover ranging from 22 per cent to 183 per cent with the median point at about 66 per cent.

Excessive Hours.—While a general eight-hour day was established by the agreement of 1916, there are still a considerable number of employees working nine or more hours per day. A report covering fifty-five specified occupations was secured to develop the number of employees in these occupations working nine hours or over. The following table gives the returns received from this query. Some companies, but not all, reported occupations in addition to the fifty-five included in the questionnaire, and these have been grouped under miscellaneous. As most of the companies reported on the classes covered in the questionnaire and as reports from a few of the companies show other occupations having a day of nine hours or more, the figures given in this table probably would show less than the total

TABLE XV.—ANALYSIS BY OCCUPATIONS OF THE 907 EMPLOYEES WORKING OVER EIGHT HOURS IN THE ANTHRACITE INDUSTRY
APRIL, 1923*

	Length of Working Day in Hours										Total Number Of Men
	9	9½	10	11	11½	12	12½	13	13½	14	
Ashmen.....	8	1	6	18	...	17	...	...	...	...	49
Carpenters.....	1	...	...	...	...	...	...	...	...	...	1
Chute bosses.....	1	...	...	...	...	...	...	...	...	...	1
Electricians.....	7	...	...	...	...	...	...	...	...	...	7
Electricians' helpers...	4	...	...	...	...	...	...	...	...	...	4
Engineers, breaker.....	3	...	...	...	...	1	...	...	...	...	4
Engineers, locomotive (motormen).....	44	...	1	...	...	...	...	...	...	...	45
Engineers, plane.....	14	...	4	...	...	...	...	...	...	...	18
Engineers, power house	1	...	...	...	...	83	...	...	...	...	84
Engineers, shaft.....	5	...	...	...	...	...	...	...	...	...	5
Engineers, slope.....	26	...	...	...	...	7	...	...	...	...	33
Firemen.....	2	...	...	...	...	17	...	...	...	...	19
Firemen's helpers.....	...	...	...	...	...	6	...	...	...	...	6
Footmen.....	2	...	1	...	...	1	...	...	...	...	4
Headmen.....	...	1	...	...	...	4	...	...	...	...	5
Jig runners.....	1	...	...	...	...	...	...	...	...	...	1
Machinists.....	4	...	...	...	...	...	...	...	...	...	4
Oilers (men).....	1	...	...	...	1	...	...	...	...	...	2
Pumpmen.....	5	...	5	...	...	28	...	...	...	...	38
Stablemen.....	12	...	18	34	...	110	...	12	...	1	187
Stablemen's helpers.....	...	...	1	...	...	7	...	...	...	...	8
Watchmen.....	7	...	14	3	...	201	1	21	2	28	277
Miscellaneous (1).....	7	...	7	3	...	88	...	...	...	...	105
Totals.....	158	1	57	58	1	570	1	33	2	29	907

* Information regarding the length of the basis working day was supplied to the Commission by 148 collieries covering the employees in 54 occupations and their subdivisions. The total number of wage earners reported was 44,003.

(1) Includes all the inside and outside employees not otherwise classified for whom the length of the basic working day was specified.

number of men actually working nine hours or more in the 148 collieries reported.

In the face of the principle of the eight-hour day properly accepted in successive agreements since 1916, there can be no justification for the employment of a considerable number of men on shifts of twelve hours or more.

Hazards.—Although the act establishing this commission does not specifically mention mine accidents among the subjects to be investigated, the Commission cannot refrain from calling attention to the hazards to life and limb in the anthracite-mining industry and to the need for reviving and intensifying interest in safety precautions. Notwithstanding the striking absence of great disasters, such as occur in bituminous coal mines from dust explosions, the daily toll of the lives of miners and miners' helpers from falls of coal and slate and from gas and powder explosions in the working places carries the aggregate of fatalities to a higher rate than prevails among bituminous miners in the same state in which the anthracite mines are located. The thick pitching seams of many of the anthracite mines make for special dangers from falls and from accumulations of explosive gas. Generally, on account of the harder nature of the coal, more explosives are used. Accidents in haulageways and on the surface follow in importance those caused by falls and explosives. After 1916, when workmen's compensation insurance became effective in Pennsylvania, there was some decrease in underground fatalities.

There is no positive evidence that the anthracite miners suffer from special occupational disease. In other words, if accidents can be reduced the average anthracite miner would apparently have a normal expectation of life.

Firebosses and section foremen hold the key to the company side of underground safety; but the active participation of miners in any safety-first campaign is essential. The education and training of miner and mine official in the prevention of hazards have a moral as well as a practical value. A safety committee in every colliery, composed of officials and miners, would be helpful. A pooling of experience and ideas among the different mines of each company and among the companies operating in a district under similar conditions would be desirable. The lesson in prevention which every injury or death might teach if the industry were organized to profit by them should not have to be taught repeatedly by further preventable injuries and deaths.

Safer conditions will not come in a day, as the result of any startling innovations, but rather through long-continued effort on the part of miners' organizations, safety committees, night schools, mining institutes, company officials' meetings, state and federal agencies, all working together and aided by a strong moral support from miners and operators alike. Safety should be a common meeting ground of operators and miners working to a common end through training, education and habitual exchange of ideas and practices.

At the same time the importance of legislative protection and reasonable and well-administered compensation for injuries cannot be overlooked. It is greatly to the credit of the miners' organizations in the anthracite field that they originated and secured in 1869 the passage of the first act in the United States for the state inspection of mines. In the past twelve years the state anthracite law has had little or no revision, efforts in this direction having been defeated by lack of agreement between operators and miners. During this time electricity has been extensively introduced into mining and has brought its new hazards. The anthracite law still has no electrical code in contrast with the bituminous law, which has an elaborate electrical section.

Under the accident compensation law of Pennsylvania practically all of the larger mining companies elect to carry their own risks. The state insurance fund and the commercial insurance companies in which the smaller mine companies are insured maintain a compensation rating and inspection bureau. The insurance rate for a particular mine is based on the degree of adherence to safety standards by the mine in question and on its actual accident experience. This creates an economic motive for safety. Unless this motive and an ordinary decent respect for human life gradually become more effective in making the mines safe for miners there will inevitably arise the question as to whether more drastic legislative interference may not be necessary even if this would mean less coal mined per man and at a higher cost.

The Commission will submit as an annex a brief special report on safety in anthracite mining.

Living Conditions.—Whether the earnings and working conditions are such as to enable the anthracite mine workers and their families to maintain a decent and satisfactory—what is frequently called an American—standard of living is one of the questions on which the Commission has sought information both by personal visits of members in the region and by painstaking investigation of field agents.

The anthracite miners are not, like some of the bituminous miners, a segregated population. They do not live in isolated communities cut off by mountains or by distance from easy communication with others. They are an integral part of the Commonwealth of Pennsylvania, sharing the benefits of the school system, churches, courts of justice, street railways, highroads and other public and voluntary local insti-

tutions. At the same time they constitute so large a part of the population of the five counties, and the mines, directly or indirectly, furnish the means of livelihood to so large a proportion of the residents, that it is fair to speak with qualifications of Scranton, Pittston, Wilkes-Barre, Hazleton, Shamokin, Shenandoah, and Pottsville, as well as the smaller towns and villages, as predominantly anthracite communities.

Their churches, charities, lodges, schools, roads, home life and leisure-time activities are all greatly influenced by the dominating occupations of the men. The great culm piles, the towering breakers sometimes, where modern wet processes of preparation have not been introduced, with black dust rising from them like smoke, the discolored streams carrying black silt, and the broken surface of roads, building lots and fields from subsidence and caving, obvious as all these are to the casual traveller, are, to the trained observer, not more evident than are the effects of the anthracite industry as a whole on the family and community life of the mine workers.

The miner himself works often far underground, exposed constantly to various kinds of physical danger, under conditions not permitting the factory kind of close supervision. He is likely to be controlled in an exceptional degree by local traditions, practices and prejudices, justly proud of his skill and jealous of his rights. He is familiar with rough and ready methods of settling personal differences; and because of diverse national and racial origins he suffers from factional and partisan divisions, which are no doubt less in evidence now than formerly, but are still a disturbing factor both in industrial and in social relations.

The miner's work is severe while it lasts and it influences the character of the recreation and amusements which he seeks when he is free from it.

The domestic life of the mining population has of course all the lights and shadows of any large number of families. It is no longer a submerged or exploited population, whatever may have been true of the period before 1900, when the series of wage increases described elsewhere in this report began. The earnings of full-time workers set forth in the tables of the appendix certainly permit the essentials of a reasonable standard of living. Those who take full advantage of their opportunities to earn in the various occupations connected with the industry and are not handicapped by serious misfortune need not suffer for shelter, food, clothing or other decencies and comforts of life, even without supplementary earnings of wife or children.

On the other hand, many of the families of the miners' helpers or laborers have a very uncertain and inadequate income. These families, often large, are frequently in economic distress. District nurses and social workers are frequent callers at their homes. The scarcity of labor, which the Commission has elsewhere called the limiting factor at the present time in the production of anthracite is precisely in this class of labor. The connection is obvious between the irregular and low earnings and the supply. The industry and the public are especially interested in this aspect of the wage problem for the reason that miners' helpers are the only ones who can get the experience and training to become qualified and certificated miners, and if their wages and conditions of employment are not such as to recruit the right type of men, the future supply of miners is unfavorably affected at its very source.

Operators and unions have the remedy in their own hands. Some adjustment of wages and of the terms of employment which will bring larger and more assured incomes to these laborers is the first step in increasing their number and efficiency. To increase production is not the only or main reason for this readjustment, but if it has that effect consumers of anthracite will have no reason to complain.

The impression which a fair-minded and sympathetic observer in the anthracite region will gain is of drab and bleak exterior conditions, imposed not by lack of earnings or incomes but by the very character of the industry. The communities are not without electric lights, water supply and sewer systems, or churches, schools, libraries and playgrounds, although a considerable part of the population are less supplied with such facilities of community life than is desirable and less than the prosperity of the industry as a whole would permit, if public spirit and civic responsibility were aroused and directed toward supplying the

deficiencies. Detailed information on these subjects will be found in the appendix on living conditions and cost of living.

Sanitary Conditions.—For 19 sample communities of the 116 in which the anthracite miners live, a comparative rating of sanitary conditions has been secured from the U. S. Public Health Service together with definite suggestions for improvements based upon special studies made at the request of the Commission. The 19 communities selected for this purpose include one of the two larger cities (Wilkes-Barre), 8 small company-owned settlements with an average population of 530, and 10 towns with population ranging from 1,080 to 28,000.

The combined sanitary ratings—based on weighted estimates of water supply, sewerage, sanitary control, activities for the prevention of disease, and environment and habits of the population—range from 80.8 out of a possible 100 points in Wilkes-Barre, down to 21 in a company-owned town of about 500 population. Only six of the 19 have ratings above 60—four with a population of over 7,000 and two small company-owned places of less than 400. In general the larger places show an advantage over the smaller in this matter of sanitation, which does not often receive much consideration from the miner, as well as in the educational, social and economic facilities, of which he is more conscious. The average total rating for the eleven larger places is 58.8; for the eight smaller, 49.7. The average weighted mean, taking into account the factor of population, is 67.9 and 49.2 respectively.

Good water is available in most of the communities, and credit for this is assigned chiefly to the natural advantages of the district and to the fact that water is essential to the operations of the collieries. If it were not for the relatively high ratings which could be given for this point, the general ratings of sanitary status would be even lower than they are. Except in five or six places, the sewerage ratings are low. Even where sanitary sewers are available, the majority of the houses are not connected. Privies of poor construction, rarely cleaned and more rarely inspected, are the rule.

With few exceptions, very little is done to insure purity in the milk supply, to protect foodstuffs from contamination, or to keep down the number of flies. Heaps of manure within a few feet of dwellings; garbage and other refuse awaiting collection for days in open boxes, barrels, or tubs; swarms of flies and clouds of dust; meat, bread, fruit and vegetables exposed for sale not only in unscreened groceries but unprotected on hucksters' wagons in the streets; lack of competent supervision of milk, and prevalence of the "one-cow dairy," are conditions which contribute to the low ratings on these points.

Only four of the 19 communities have full-time health officers, and seven have no semblance of organized public health work. Medical inspection of school children is general and in many places there are nurses attached to the mining companies, the Red Cross, the Metropolitan Life Insurance Co., the State Department of Health, or a local society, but for the most part their efforts are uncorrelated and scattered, and hence less effective than they should be.

These facts should awaken a sense of serious responsibility on the part of public officials and citizens.

The exceptions to the general statements given above, the differences between the individual communities, and much more material of interest and value, will be found in the report of the Public Health Service which is presented as an appendix.

Economic History of the Anthracite Industry

Anthracite a Natural Monopoly.—The basis for the Commission's recommendation that mining and marketing of anthracite shall henceforth be regarded as affected by a public interest rather than left to the unqualified and uncontrolled operation of the laws of supply and demand under free competition is the fact that there is and can be no such free competition because the supply is limited and controlled. The conditions are wholly unlike those under which wheat, for example, is produced.

Four facts stand out. Nature has given to eastern

Pennsylvania a practical monopoly of anthracite, the only other producing region worth noticing being Wales, where a few million tons are mined each year, the greater part of it for export to the Continent. The underground reserves of Pennsylvania anthracite are less than fifteen billion tons, about two-thirds of the original deposits. The coal lands are owned by a small number of corporations, estates and individuals, who seldom offer even small tracts for sale and who enjoy the full unearned increment caused by increasing demand and by differential advantages. Ninety per cent or more

of the unmined coal is controlled by eight coal companies and affiliated corporations. There is a unified control of mine labor, the entire region being for practical purposes 100 per cent organized for collective bargaining. For better or for worse the fact to be faced today is that wages, hours, and working conditions must be satisfactory to the workers.

Under such circumstances some of the operators who want peace at any price in order to continue their profitable operations fail to insist on exacting from the workers that honest day's work which in the long run is as much in the interest of the worker as it obviously is in the interests of the public. Together with the land and labor monopoly there is finally a concentration of coal mining in a small group of large companies.

It is this present control of the supply, an economic combination founded on a community of interest, which has brought the Commission to the conviction that the degree of public regulation which it has recommended in normal times and provision for prompt and effective action in an emergency are essential. A brief summary of historical facts will be useful to an understanding of the present situation.

Early History of Mining.—The eventful history of mining within the small area in which anthracite is produced embraces not much over one hundred years. In the first half of the nineteenth century the new fuel gave impetus to the building of canals and railroads, but later these "anthracite" roads sought and gained control of the coal lands, forming a combination of mining and transportation that has been declared illegal by the courts within the past fifteen years, although investigation of the effect of combination began under a legislative committee appointed just one hundred years ago.

The record of the annual output of the mines and the record of anthracite prices not only reflect the result of this contest for unified control but suggests its incentive. The early history of the industry was one of pioneer enterprise in the face of risks and discouragement, a typical American story of initiative, energy and courage. It is a story of discouraging pioneering and slow development of a market, followed by feverish and ruthless competition of carriers for an increasing traffic, peace in the coal business coming only through pools and agreements expressing community of railroad interests.

A number of competing railroad companies built lines to tap the region, and in the natural desire to obtain traffic, entered the business of mining and bought up what was left of the coal-bearing lands. In their haste to prevent other railroads from entering their territory, certain of these carriers bought recklessly and at what were then high prices, a vast speculative reserve of coal lands, an amount of coal in the ground that they could not hope to transport to market in less than scores, if not hundreds, of years. The industry was overdeveloped much as the bituminous industry is now. Overproduction and slack time were the rule. Prices were low, competition was expensive, and profits were small.

When the Anthracite Coal Strike Commission made its report 20 years ago, the industry was only just recovering from a six-year period of overproduction due to mine inflation, when the mine workers especially had shared in the serious losses in that they could be given employment for only 160 to 175 days in the year. It is significant that the commission attributed the betterment in the conditions in the anthracite industry in 1901 in part to "the gradual concentration of anthracite mining properties in the hands of fewer corporations."

Methods of Control.—In order to stabilize the industry and to escape from the results of excessive competition, the railroads and their subsidiary mining companies resorted to pooling of traffic, limitation of output, and other devices. These devices to limit competition provoked much popular criticism and some of them have since been declared illegal by the Supreme Court of the United States. One of these devices existed fourteen years before it was finally overruled by the courts. It consisted in joint ownership by the several anthracite roads of the Temple Iron Co., upon whose board of directors were represented all the

railroad interests of the region. In 1912 the Supreme Court held that the Temple Iron Co. was a combination in restraint of trade and ordered it dissolved. "It has been," said the Court, "an efficient agency for the collective activities of the defendant carriers for the purpose of restraining competition in the transportation and sale of coal in other states."

Another device was a marketing arrangement, the so-called percentage contracts, under which the railroad companies purchased the full output of the individual operators, paying eventually as much as 65 per cent of the average tidewater price, a percentage somewhat related to the high offers of projected competing lines. Orders under these contracts being apportioned according to colliery capacity, one result of the plan was to stimulate mine development without exerting any competitive influence on the market. This non-competitive marketing, which existed for 20 years, was finally terminated by the Court decree of 1912.

The principal and underlying method of limiting competition was the ownership of coal-mining and coal-selling companies by the railroads. The Hepburn Act, passed by Congress in 1906, largely with the relations of the anthracite carriers and their subsidiary mining companies in mind, prohibited a railroad from entering directly or indirectly into the production and sale of coal in competition with any shipper on its lines. Suits brought by the government in 1908 and later resulted in decisions of the Supreme Court directing the divorce of the coal and the railroad properties of three of the principal anthracite interests.

The degree of combination and its effect in competition as found by the Court in these latest cases is pertinent to the present investigation. Eight producing companies, affiliated to some extent with the railroads, produce 74 per cent of the total output and control 90 per cent of the underground reserve. The remaining 26 per cent of the output is contributed by so-called independent companies, but the largest of these companies retains a community of interest with one of the railroads, and nine others control 13 per cent of the output.

Until the decree of the Supreme Court went into effect the Reading and affiliated company, the Central of New Jersey, produced 20 per cent of the output and controlled more than half of the unmined reserve. Through these affiliations of railroads and mining companies the same financial interest controlled both the production and the transportation of coal, and commonly also its wholesale distribution, either through the selling department of the mining company or through a separately incorporated but financially related selling company.

Recent decrees of the Court have not been in effect long enough to develop whether by them the grievances have been eliminated and the industry brought to a competitive basis. The clause in the Pennsylvania Constitution that prohibits common carriers from mining and manufacturing articles for transportation over their lines, in effect Jan. 1, 1874, and the commodity clause of the Hepburn Act of 1906 did not create new and merely technical legal offenses. The practices which they prohibit are opposed to public interest as soon as common carriers are granted the privileges of eminent domain and exclusive franchise.

The Sherman Anti-Trust act is only the embodiment of recognized principles of common law. It was obvious to the owners of anthracite railroads as to others, long before the Hepburn and Sherman acts were passed or the Pennsylvania Constitution was amended, that a company which operated a railroad and also mined coal on its lines had an advantage over other coal-mining companies that were compelled to use the same railroad and that if the several railroads that enter the coal regions were to combine this advantage would become economically irresistible.

The economic position of the larger companies even since dissolution is stronger than that of the so-called "independents." Many of the mines of the independent companies are operated at high cost. Their average royalty rates are higher than those of the railroad coal companies. They have alleged, and the charge was confirmed by the decision of the Interstate Commerce Commission in 1915, that the companies affiliated with some of the railroads had in effect been subsidized by those roads either through cash advances or through remission of interest charges on loans already made to them.

The independents have been losing ground in the proportion of the total output produced, through absorption by the larger companies and through gradual exhaustion of their lands. In 1895 the independents produced 45 per cent of the tonnage; in 1900, 38 per cent; in 1905, 25 per cent; in 1921, even after dissolution of the Temple Iron Co., 24 per cent, and, indeed, if the Susquehanna Collieries Co. be included with the railroad group, the proportion contributed by the independents in 1921 would be only 19 per cent.

Present Degree of Competition.—The question squarely before the public is, which better serves it in certainty of supply and in quality and price of product, the large or the small anthracite companies?

It remains to be seen what effect the Court dissolutions may have on the price of coal. There is no effective competition between "railroad" companies, even though there is a range of 35c. between the highest and lowest of the circular prices for the same sizes of coal. Changes in circular prices have been upward rather than downward since the Court decisions were made. The abrogation by the Supreme Court of pooling contracts has enabled the individual operators outside the pool to get their share of the business, but only when the market has been dull have these and other independent operators sold at prices near the circular prices.

With coal leaving the different mines at two or more distinct price levels, one dealer in a community may be receiving coal at two or even three dollars a ton less than is paid for coal of the same quality by his competitors. In time of good demand the dealer who gets the lower-cost coal may allow his competitor who gets the high-cost coal to fix the price to the consumer, though often the practice of the dealer

buying low-cost coal of adding the customary margin to his purchase price has been followed. This practice, however, results in widely different prices to different consumers for coal of similar quality, or in the equally vexatious advance in price to the same consumer later in the season if the dealer has to supplement his allotment of "company" coal with some "independent" coal. An extortionate retailer needs only to cite the premium price he has paid for a few carloads of independent coal as a screen behind which no local authority can well go, far less an individual customer.

Realizing this unfortunate effect of high-cost coal in the local market in raising the level of retail prices out of proportion to the relative tonnage of the premium coal received, the Commission is convinced that the public would benefit by increased production by the larger and lower-cost companies, and that if adequate publicity could be given to costs and prices at the mines, to freight rates, and to costs of local distribution, the buyer of household anthracite would thereby gain some measure of protection against the demands of unscrupulous dealers. If there be a monopoly in effect it is not in the sense of pooling cost and profit among the "railroad" companies but in the sense that practically uniform prices have been charged by the "railroad" group. From the consumer's point of view the retailer in his purchase of "company" coal might about as well be dealing with a single corporation charging a single price, since differentials are less than 5 per cent among circular prices of the "railroad" companies.

The present differentials in price made by the several "railroad" companies constitute some recognition of the right of the public to share in the advantage of the low-cost concern, but these differences in mine prices are far from reflecting the actual differences in mine costs. While because of great variation in natural conditions certain large companies have costs even \$2 below the costs of other companies less fortunately situated, yet little of this advantage accrues to the public. Even when the difference in mine price is passed on without change to the consumer, the result is not equitable; for example, only one consumer in six in New England last winter got the lowest-priced coal.

Real benefits have flowed to the public from strongly financed companies, although these benefits were largely offset in earlier years by the illegal practices which the courts condemned. The anthracite mines have conserved the country's coal resources by steadily increasing the percentage of coal in the ground recovered and sent to market; they have economized in the capital employed by a closer adjustment of mine capacity to production and in man power by largely eliminating the cost of idle days for men as well as for plants, resulting in a corresponding improvement in the economic condition of the mine workers.

The development of large and strong companies with centralized control may be a source of danger as well as of benefit. For example, the ability to stabilize prices that was used last winter by the larger companies to benefit the public contains also the inherent possibility of real danger. Ownership by the railroads of mines whose product they transported resulted in conditions fundamentally unsound. Financially weak roads have owned what are believed to be profitable mines, much stronger roads have been burdened with much poorer mines, and dividend-paying roads have been favored with dividend-paying mines, with the net result that the record of this mixture of transportation business with mining business is full of uncertainties as to what have been the real profits and on what investment these profits have been earned. It is a wise national policy that has forced the separation of the two types of business the actual relationship of which should be publicly known, not concealed in a maze of accounts.

Capital Costs.—While labor cost, which has been considered in many aspects in a preceding section of this report, is the outstanding item in the cost of mining anthracite, there are two others which though much smaller in amount also show large increases in the past ten years. The cost of supplies, as would be expected, somewhat more than doubled, being for 12 identical companies 35c. to the ton mined in 1913 and 72c. in 1923. The total of the items grouped under "general expense" has nearly tripled, from 33c. in 1913 to 93c. in the current year.

Three of the items under general expense—royalty, depletion, and depreciation—are directly related to capital, and affect the few thousand men and women who hold investments in coal lands or in stock of the operating companies. These three items, in returns for 1921 from 67 companies showing an average for general expense of 90c., together make up 45c. while state and local taxes amount to about 21c., and compensation insurance 7½c. For depletion the average charge reported was 15.8c. per gross ton; the average for depreciation charge for the same companies was 10.8c. Excluding, however, the two "railroad" companies that carry no depreciation account, the average charge is about 15c. Depletion charges range from 7 to 32c. for the "railroad" companies; from 8 to 50c. for the "independents."

Royalties.—About a third of the output of anthracite is mined under leases in which the operator pays the landowner a royalty. The royalties collected on fresh-mined coal range from as low as 12c. on old flat-rate leases to as high as \$1.50 per ton; on percentage leases and on certain stripping operations the rate is even higher. The royalty rate of the Girard estate leases for 1921 averaged \$1.27 per ton on all coal mined, 2,983,723 tons. As the Girard lands are in the Schuylkill region, where mining costs are relatively high and the percentage of domestic sizes relatively low, they are intrinsically less valuable than the lands in some other parts of the region. The high royalties of the Girard estate therefore suggest the profit that inures to the more fortunate operating companies simply in their capacity as land owners. For where the land is held in fee, the mining companies' costs are lower by the difference between the depletion charge and what they would pay as royalty if they were lessees, and there is the possibility of that much higher margin.

The land-holding companies and estates thus share in the monopoly power possessed by the anthracite operations. To protect the public against abuse of this monopoly power, they should be required to file periodic statements of their costs and profits in relation to investment under the program of publicity elsewhere proposed.

Among the independent operators the great bulk of the output—at least 70 per cent—is produced from leaseholds under royalty. Among the "railroad" companies the great bulk of the output is produced from lands in fee. Royalties are therefore not an important item in the cost of producing "company" coal. They are an important element in the cost of producing "independent" coal.

Before the war, over a year as a whole the prices of the independents were about the same as the circular prices of the "railroad" companies, and royalties had a fairly harmonious relation to circular prices. As prices rose, however, the normal relation of royalty to selling price was distributed. When the royalty was limited to a flat rate, the operator profited greatly by the rising price. When the royalty increased with the rise in price, as in the Girard Trust and certain other leases, the operator often found his costs increasing much faster than his margin and was forced to demand higher prices. The result in too many cases has been a vicious circle in which "premium" prices for coal caused an increase in royalty, which in turn was made the occasion for further demands upon the consumer, the only limit to the process being what the traffic would bear.

Royalties thus became a contributing cause of premium coal, and a charitable institution in Philadelphia became the unwitting beneficiary of the distress of the poor in other cities. Thus, although the royalties collected by the estate of Stephen Girard averaged only 31c. a ton from 1899 to 1913; in 1914, under new 15 year leases beginning that year, they averaged 52c. and in 1921 they had risen to \$1.27. Because of the public nature of the Girard Trust considerable attention has been attracted by these rates, when as a matter of fact they are not the only high royalties in the region. One operator reported to this Commission that in 1921 he paid to another estate an average royalty of \$1.50 a ton.

These royalties received by land owners not actively engaged in mining give some idea of the monopoly value of land underlain by workable beds of anthracite. That value is largest and a large royalty best warranted where physical conditions favor cheap mining, as in some stripping operations, which yield large profits even though a high royalty also is paid. A rate, however, that exacts the same royalty from properties whose direct operating costs, exclusive of royalty, may be higher than even the circular price is inequitable and demands some relief as was granted in 1920 by the Girard estate and at least one other land-owner. In theory the justifiable interest of the land owner should be a share of the net returns, and it is the method of determining royalty as a percentage of gross receipts, and those often at the highest prices, that has led to the recent marked rise in royalty charge.

The "sliding scale royalty" may work a hardship on the operator in that it disregards the fact whether he realizes a profit or not, and it may work injury to the consumer by its influence in still further raising the premium price. One suggestion is that all existing leases with this sliding scale royalty be amended to refer to the circular price instead of to the premium price taken from the distressed consumer. Land owners can well offer this equitable adjustment since the royalty would surely exceed their fondest expectations of ten years ago. The owners of anthracite lands should be as much concerned as others in the industry—operators and mine workers—in setting the house in order to avoid any future demand for drastic regulation for the protection of the consumer.

Ten-Year Record of Margins and Profits in the Anthracite Industry

Margins and Profits.—The Commission has not completed its study of investment and therefore cannot yet state what the profits have been in terms of return on investment. It has completed a study of mine costs and sales realizations which throws some light on profits. Since only the sizes above pea sell at prices generally higher than the average cost of mining and the smallest sizes considerably below that cost, market prices give little clue to margins except as the operator's proportion of large or domestic sizes and small or steam sizes is known. However, the average sales realizations on all sizes have been reported and can be compared with average costs for the same companies over the series of years.

For the 12 companies the average of these sales prices received ranged from \$2.63 in 1913 to \$6.78 in the first quarter of 1923. Distinguishing between the "railroad" companies and the larger independents, the 9 railroad companies received for all sizes an average price 28c. lower than that received by the 3 independents in 1913, and 89c. lower in 1923. Part of the difference is due to the fact that two of the "railroad" companies turn their coal over to affiliated sales organizations at transfer prices considerably below circular.

The margin per ton between cost of production and net sales realization includes all the earnings from the mining of coal available for payments on account of capital, whether paid out in federal taxes, as interest, as dividends, or reserved as surplus. The margin will not show return on investment until the amount of the investment is established, but it will indicate whether over a period of years profits are increasing. This margin is simply what capital, whatever its amount in the business, receives for services rendered in mining the average ton of coal, and thus the margin per ton as capital's wage is fairly comparable in nature with the wages paid per ton to the mine labor.

Measured by this margin per ton the anthracite operators are receiving much larger profits at present than they customarily did before the war. For the year 1913 nine "railroad" coal companies had an average margin of 36c. a ton. In the first quarter of 1923 the same operators received a margin over reported costs of 93c. a ton. But because of differences in accounting methods in respect to depletion and depreciation, these reported costs, although following the Treasury Department's requirements, are not strictly comparable with the costs as determined by the Federal Trade Commission for earlier years. To make them comparable it is necessary to deduct 14c. from the costs as now reported and add 14c. to the margin. This would make the 1923 margin \$1.07 per ton, or three times the pre-war margin. The trend of margins through the period is indicated by the following table:

TABLE XVI—CHANGES IN MARGIN PER TON RECEIVED BY NINE RAILROAD COAL COMPANIES, 1913-1923

Period	Margin Reported By Federal Trade Commission	Margin Over Costs Reported To Coal Commission	Margin Adjusted So As To Be Comparable Throughout Period
1913	\$0.36		\$0.36
1914	.37		.37
1915	.33		.33
1916	.39		.39
1917	.63		.63
1918	.38		.38
1919		\$0.43	.57
1920		.36	.50
1921		.67	.81
1922 1st quarter		.31	.45
1922 2d and 3d quarter		Suspension	Suspension
1922 4th quarter		.91	1.05
1923 1st quarter		.93	1.07

The difference in accounting methods between the cost investigations of the Federal Trade Commission and the costs submitted to the Coal Commission by the operators will be discussed in detail in a special report on costs and profits. The difference in method does not invalidate comparison between costs of several operators when calculated by the same method. To compare costs as ascertained by one method with costs as ascertained by the other, however, requires the adjustment above noted. Thus, the average margin in the four years before the United States entered the

war was 36c. In 1919 the average margin (adjusted) was 57c. In 1920 and 1921 it was 50 and 81c., the variations in these years representing in part movement of steam sizes into storage and out of storage to the market. During the suspension of 1922 the companies lost money heavily, but in the last three months of the year, their margin (adjusted) was \$1.05, or three times the pre-war figure.

Further evidence that the profits of the anthracite companies are increasing is found in the increase of their surplus accounts. There are five "railroad" coal companies engaged exclusively in the mining of coal that have been paying dividends in recent years. The total surplus of these five companies rose from \$7,000,000 in 1911 to \$52,000,000 in 1920. In other words it increased sevenfold in ten years. The following year (1921) it dropped to \$36,000,000, chiefly because of the payment out of surplus during 1920 and 1921 of very large dividends by four of the five companies. This statement does not include the Philadelphia & Reading Coal & Iron Co., which showed an increase in surplus account, but paid no dividends, and practically no interest on advances previously made to it by the Reading holding company. Neither does the statement include the Scranton Coal Co., which pays no dividends. The increasing surpluses of two other "railroad" companies are omitted because they report transportation income as well as coal income.

These figures of increasing surplus do not of themselves show what the profits have been; all that they show is that compared with pre-war conditions present profits show a large increase.

The net income accounts of the anthracite companies also show an increase. In 1913, the combined net income of eight railroad coal companies that produce 57 per cent of the output was \$13,600,000. This statement includes the net earnings from the coal departments of two companies engaged both in mining and transportation but excludes their earnings from transportation. In 1920 the net income of the same companies had risen to \$33,000,000. In 1921 it was \$27,000,000, or twice as great as in 1913. The production of the eight companies during this period showed practically no increase.

Until the total earnings can be compared with the total investment, the public should withhold judgment as to the profits received by the anthracite industry. It may be that judged by this standard, the margin obtained before the war was too small. If, on the other hand, the pre-war margin was adequate, the present margin may be unduly large, unless in the meantime there has been a marked increase in the investment. The task has proved so involved and far-reaching that the findings of the Commission on the subject of the profits of anthracite companies are reserved for a later report.

The work in hand involves examining the books of operating companies and their related sales agencies. From the reports of the Commission's examiners so far obtained it is not possible to generalize as to the average rate of profit on the aggregate investment in the anthracite industry. The Commission finds that some of the lower-cost companies have been extremely profitable and have paid very large dividends even though their sales prices have been relatively low. It has found other companies with higher costs whose rates of return have been small and which have paid small dividends or no dividends at all, but until the study of investment is completed, the evidence of dividend payments must be accepted as an indication rather than explicit proof of profits. In a number of important companies the outstanding capital stock represents but a small portion of the book value of the property.

Whether the peculiar corporate organization of the anthracite industry has been helpful or harmful to the public turns in the last analysis on whether its profits have been reasonable. The fact of an economic concert amounting to combination is established beyond reasonable doubt. Its capacity for public service is demonstrated. The point upon which the public demands explanation is whether or not it has used its monopoly power to extort exorbitant profits from the consumer.

Compulsory Rendering of Cost, Price and Profit Reports Recommended

Publicity of Accounts.—Regardless of the final verdict as to reasonableness of profits the Commission is convinced that publicity of costs, prices and profits must be provided to protect the interest of the public. At present the current reports published by the Federal Government deal only with statistics of labor, production and stocks of coal, and even these are returned voluntarily and there is no power to go behind the figures submitted. Most of the companies file these voluntary reports promptly and cheerfully, but certain ones do not.

During the crisis of 1922-23 the reports on coal storage issued by the Federal Fuel Distributor did not contain the all-important information on stocks of anthracite held by the producers because the Hudson Coal Co. was unwilling to furnish its share of the information. The Commission, therefore, recommends legislation providing for regular accounting reports to be rendered by all companies whose product moves in interstate commerce, and further recommends that the agency to which the reports are rendered shall have the power to prescribe the form of accounts. The opportunities for inflating figures of costs are so numerous and the questions as to how investment shall be reckoned are so unsettled that without such continuous publicity the Commission fears that the concentrated control of the anthracite industry may take indefensible profits.

It is found for example, that two of the largest companies carry no depreciation account, but charge certain outlays for replacement direct to operating costs. Without the most minute checking of each item it is impossible under this arrangement to be sure that items properly chargeable to capital account have not been included in current costs. The field accountants of this Commission report that some of the companies in earlier years charged off against current operations the entire costs of new plants, equipment and development work, which good accounting practice would recognize as legitimate capital charges. This subject will be discussed in detail in the Commission's final report since it concerns also the bituminous industry.

Measure of Investment.—The Commission has found itself confronted with conflicting claims as to the basis upon which the rate of income should be reckoned. One claim is that the market value is the proper measure of the investment. In the anthracite industry, however, the market value depends upon profits and prices of anthracite for the last 25 years, and has been influenced more or less by the operations of what the Supreme Court of the United States has declared to be a combination in restraint of trade and in violation of the commodities clause of the Hepburn Act.

Another claim is that income should be reckoned upon original cost. Another that the investment should be reckoned in accordance with the rules prescribed by the Treasury Department in the income tax returns. Still another suggestion has been that the rate of income should be reckoned upon the cost of reproduction. There is no such thing as reproducing an exhausted coal mine.

The Commission deems itself justified in finding as a fact that the mining, transportation in interstate commerce, and sale of anthracite coal impresses that commodity with a public use. It is not strictly analogous to but bears some resemblance, therefore, to the problem of valuing a public utility for the purposes of regulating rates. It will not be found that the courts have laid down a single formula for ascertaining values. Each case seems to rest upon its own merits. They have considered original cost, stock and bond issues, and cost of reproduction and have been governed in their decision sometimes by one element and sometimes by another.

Cost of reproduction might well be reported as a fact with reference to the plants and equipment, for that would give a fairly definite figure, but as the greater part of the investments claimed by the anthracite companies is in coal-bearing lands, reproduction of course cannot apply to these lands,

because the lands cannot be reproduced. Present market value may not afford a satisfactory basis of valuation because there are no lands of like character anywhere else, because they are not in the market for sale save as they may in rare instances from one operating company to another, and because such sales as do take place are of course at prices which reflect current profits.

As the Commission is not called upon to judicially determine the valuation of these plants and these lands, nor to state how a public official, state or federal, shall value the same for taxation or other purposes, it does not deem it prudent to lay down a rule for making such valuations. There will of necessity enter different elements in fixing the values of each company should the courts be entrusted with the discharge of this duty. If the rule shall be adopted in these valuations analogous to that of public utilities then of necessity the Court will consider its original cost or investment as part of the evidence in the case although not necessarily conclusive as the value thereof.

As furnishing the necessary facts for the making of this valuation the Commission will set forth in its report on the investment and profits for the use of the Congress and the public all the information on these subjects which it has been able to obtain, whether relating to original cost or investment, outside capital from time to time put into the business, earnings that have not been drawn out but left invested, as well as dividends paid, additions made to book value by reason of revaluation, whether based on actual appraisals or otherwise, statements of investment made for taxation purposes, and current market value.

The valuation of coal lands is not like the valuation of farm lands, where the value is determined by the free play of competitive force as millions of owners buy and sell, rent and mortgage. The anthracite industry is not governed by the free play of economic force. The crowding of the resources into an area of less than 500 square miles, concentration of that resource in the hands of a few large corporations that own 90 per cent of the reserves, the elimination of competition in price between them, the recurrence of shortage and consequent high price that may arise at any moment through the exercise by the trade union of its monopoly control over labor at the mines requires some measure of protection for the consuming public in the just and equitable valuation of these properties. The profits of the anthracite companies will look large or small according to the value that is ultimately determined to be fair for the coal-bearing lands.

Deficiency of Production.—A concise statement of the record of anthracite production is that for twenty years before 1913 production has followed closely the increase in population and since then it has not kept pace with the population either in the nation or in the States which rely upon anthracite as household fuel. From 1913 to 1922 the total production of anthracite remained practically constant except for the extremes of the record year of 1917, when it rose to 99,611,811 net tons, and the suspension year 1922, when it fell to 54,683,022 tons, while the population is estimated to have increased in the same period about 15 per cent. This steadiness of output is in marked contrast with the extreme fluctuations in the bituminous industry, which in a large way reflect nationwide business conditions; and the recent lag in increase of production as compared with population is equally in contrast with the rapid increase in bituminous production, which follows the growth of industry rather than that of population.

The inference should not be drawn, however, that there has been no large increase in output of anthracite. An interesting comparison can be made with the conditions 20 years ago. The Roosevelt Commission assumed that anthracite production would reach its maximum limit at 60 to 75 million long or gross tons, whereas the actual output in 1917 and the six months of 1923 indicate that whatever may be the potential market capacity, the present mine and washery capacity is at least 90 million gross tons a year. More significant is the progress made in 20 years in lessening the wide gap between mine capacity and actual output; with approximately the same number of mine workers, the production was 50 per cent greater in 1920 than in 1900. To

that extent the anthracite industry was once overdeveloped and overmanned much as is now the bituminous industry.

In the past two decades the geographic changes in the distribution of anthracite have been slight. The natural market for this superior household coal is in the nearby regions of longer and more severe winters, and the Northern States, with Canada, have increased their quota at the expense of the Southern and Western States. In the present distribution of the sizes suitable for household use 74 per cent goes to the states between Maine and the District of Columbia, and of these states only Maryland and Pennsylvania are coal producers. An additional 7 per cent goes to central Canada. Pennsylvania herself consumes only about the same quantity of domestic sizes as New England and less than half as much as is shipped to her nearest neighbors, New Jersey and New York. These facts illustrate interstate dependence.

A study of the present distribution of domestic anthracite

The Problem of an Insufficient Supply of Anthracite

Causes of Shortage.—Insufficiency of the available supply of anthracite is the acute problem of the moment and the serious problem of the future.

The failure of the anthracite industry to furnish an abundant supply of the domestic sizes is generally not due to a lack of transportation facilities, as in the soft coal industry. Among the anthracite operators complaint of car shortage is rare. The failure to visualize the magnitude of the traffic involved in taking the daily output of anthracite to market leads to misapprehension.

Travelers in the vicinity of the anthracite mines notice loaded coal cars on the sidings and infer that coal is being held back from market with a sinister purpose. The fact is that for several months past, from 6,000 to 7,000 cars have been loaded each working day at the anthracite breakers, so that 45 to 50 miles of cars start on their journeys each day. In the course of making up trains and despatching them, standing cars as well as moving cars must naturally be seen. In its recent decision on the distribution of coal cars the Interstate Commerce Commission specifically mentions the absence of any reason for continuing the investigation of carriers serving solely anthracite mines. Such community of interest as may exist between the mining of anthracite and its transportation has the beneficial effect of co-ordinating car supply and colliery output.

With one exception, the periods of shortage in the supply of anthracite have been associated with suspensions or strikes at the mines. The one exception was the period from the fall of 1916 to the spring of 1918, when increased demand resulting from the war, coinciding with a shortage in the supply of bituminous coal, made an unprecedented demand upon the anthracite industry. To that increased demand operators and mine workers responded to the best of their ability, and the difficulties experienced by consumers during that period must be laid to the strain of the war, to an exceptional severity of weather and, so far as Western communities were concerned, to the necessary restrictions of the Fuel Administration on westward transportation, rather than to any deficiencies in the anthracite industry itself. Though the number of mine workers was materially decreased, their response to the special demand established 1917 as the record year in anthracite production. Undoubtedly, the increase in output carried with it some decrease in quality.

The other periods of shortage have been directly connected with suspension of production at the mines. The country has not forgotten the effects of the great strike

has brought to light no evidence that economic combination takes the form of concerted partition of territory, either among the larger companies or between the "railroad" and the "independent" companies. A few localities are served by a single company simply by reason of the logical relation of railroad routes. Most of the time beginning with 1917 the increasing demand and stationary supply have made the dealers compete for shipments often regardless of prices. Competition by the operators for territory without, even then, any competition among "railroad" companies in price has largely given place to an allotment system under which it is recognized that the first obligation of a mining company is to its former customers, a principle first proposed and made mandatory by the Federal Fuel Administration in 1918 and again enforced in the past winter by the Committee on National Distribution. Should any surplus supply of anthracite seek a market, the former active competition in salesmanship and advertising might be resumed.

in the summer of 1902 upon the supply during the following winter. A shorter suspension at the expiration of the wage agreement in 1912 also was reflected in more or less distressing scarcity of household fuel in the following winter. In that year the mines were idle for 40 days and in the following winter, although this may not be generally remembered, high prices led to a federal investigation.

To produce the increased quantity demanded, without any corresponding increase in the capacity of the mines and even with an actual decrease, involved working the mines more and more steadily. A 20-day "vacation" in which three-fifths of the men in the anthracite region were idle in September, 1920, in protest at the award of the Anthracite Coal Commission, led to a distinct flurry in the market in the next winter, with local complaints of scarcity of coal, unreasonable prices and inferior quality.

Experience of 1922.—From the effects of the long suspension in 1922 we have not even yet recovered. For more than five months in that year not a wheel turned in the anthracite region. The suspension of mining reduced production for the year 40 per cent below the normal output. A 60-per cent supply had to serve. To protect the public from extortion and inequitable distribution of this partial supply the coal operators promptly joined public officials in making the best possible allotment. The close-knit organization of the anthracite industry made possible an effective control of distribution.

All but one of the larger companies, the Hudson Coal Co., pooled information regarding the distribution of their product in previous years, and after mining was resumed it was possible to keep an accurate check on the weekly distribution of 85 per cent of the available coal. A system of allotments was established by which each community received during the winter of 1922-23 a proportion based upon its purchases in previous years. This would have been impossible in the competitive bituminous-coal industry, which possesses neither the records, the machinery nor the discipline necessary for such an undertaking.

The control of prices at the mine in the winter of 1922-23 was almost as successful as control of distribution, although the acts of a small minority of operators and jobbers and dealers largely prevented the consumers from receiving the full benefit of this control. Realizing the hardships that a runaway market would inflict upon those least able to pay high prices, the Pennsylvania Fuel Commission, with the co-operation of all but a few operators, mostly irresponsible persons attracted to the business by the existing shortage, fixed a scale of "fair prices."

According to the Pennsylvania Fuel Commission the coal mined by the "railroad companies" and certain independents, over 77 per cent of the total, was sold at \$8.50 or less, these circular prices being adhered to at this time of acute shortage just as in a time of abundance. Unquestion-

ably these large producers might have obtained from the retailers of anthracite during the past winter much higher prices. *This Commission desires to pay public tribute to the restraint and good judgment displayed by the responsible shippers of anthracite during that trying period.* In a less centralized industry prices could have been held down only by arbitrary government action such as was authorized during the war by the Lever Law.

The amount of anthracite now being mined, shipped and distributed equals that of the war period. The total production in the first half of 1923—over 50 million short tons—equals the maximum recorded for a half year.

The strength of the market at the present time is good evidence not only of the apprehensions of buyers, which may be allayed by the renewal of the agreement between operators and miners, but also of the popular belief among one-third of the American people that "coal" means "anthracite," and that they must look to the anthracite mines of eastern Pennsylvania for their fuel. It is this ingrained preference for the clean and smokeless and slow-burning coal that enables at the present moment the smallest and weakest independent producers to obtain a price \$2 or \$3 above that at which two of the largest and strongest companies sell equally good if not better coal. Of course, these companies cannot immediately take on new customers.

The same preference for anything bearing the name "anthracite" permitted the sale of scattered carloads of "fireproof" coal at "bootleg" prices, while 77 per cent of the available supply was furnished by the "railroad" companies to their customers at little if any increase over former prices. These companies, however, did not in 1923 make the customary summer discounts. The excess of demand over supply has become the rule in recent years, and in the face of this excess of demand there plainly has been no definite economic relation between "company" prices and "independent" prices. In earlier years, after the termination of the pooling contracts, the price of independent coal fluctuated with the law of supply and demand, these smaller operators reaping an occasional rich harvest in time of panic or shortage, maintaining prices above the level of the "circular prices" in times of active demand, and cutting below that level and even at times selling coal at a loss when the demand was sluggish.

Need of Greater Capacity.—The usual undersupply of anthracite and the frequently recurring extreme shortages together make unnecessary any overt act to control the market; even with a potential monopoly of production it is not necessary that there should be a combination in restraint of trade in the legal sense to explain present price levels. If there is any well-founded suggestion of concerted action it is shown in the small range in circular prices, the extremes in prices of company coal of domestic sizes being only 35c. although all this coal could be sold at the higher circular price and probably much nearer the price level of the independent coal. Doubtless both business sense and regard for public opinion have led these strong companies to acquiesce in the noticeable differential between their own prices and the higher prices of the independents.

Only 6 per cent of the coal left the mines during the past winter, according to the Pennsylvania Fuel Commission, at prices of \$10 to \$12, as against 77 per cent at the circular prices of \$8.00 to \$8.50. The influence of this relatively small tonnage of extremely high-priced coal on retail prices, together with that of an insignificant quantity of coal of poor quality put on the market at even higher prices by irresponsible operators in defiance of the State Commission was, however, all out of proportion to its amount.

The conservative policy of the larger operators in stabilizing the market is based no doubt on sad experiences of the past, when unrestricted production caused disaster from which everyone connected with the industry suffered. This policy may be carried too far. If production is kept under demand, as it has been over many years, any temporary disturbance will of course give opportunity for swollen profits. Full credit should be given to operators, jobbers and retailers who for any reason do not take advantage of this chance to profiteer. The "companies" and some of the independents as well as many retailers and wholesalers deserve this credit. This does not, however, absolve the anthracite operators from responsibility for creating the permanent conditions which in a crisis make such profiteering possible; and even in a crisis the wholesalers and retailers cannot justify a sweeping advance in prices by any evidence which the Commission has obtained as to what they actually paid for premium coal and the amount of it which they actually bought.

It is very desirable to prevent the panicky market which results from the stoppage of production; but it is also desirable that the normal demand for anthracite shall be met and that this shall be done at a lower price level if

by any reasonable reduction of royalties, operating costs, freight rates or profits this is possible. The coal companies should not be allowed to hold large reserves indefinitely, instead of developing them. Such a policy would make the coal last longer, and this is sometimes defended as conservation. But a sound conservation policy does not require the present generation to pay extravagant prices or resort to inferior substitutes for the sake of a doubtful benefit to posterity. Genuine conservation will prevent waste and encourage the mining of even high-cost thin seams when the coal would otherwise be lost altogether, but will not countenance the holding reserves undeveloped for the purpose of stabilizing prices at a high level or insuring future tonnage to particular railroads.

Whether to increase the capacity of the anthracite mines or to make better use of present equipment is an economic as well as an engineering problem. It is estimated there remains a little less than fifteen billion tons in these Pennsylvania fields. The capacity to mine the anthracite is dependent on underground development, and the equipment of mines and breakers, and the available labor supply. Of these two factors the lack of labor is the more serious in that without an adequate labor supply mine-development can not be expanded. The number of employees in the production of anthracite reached its maximum of nearly 180,000 in 1914, but in the two years of maximum output, 1917 and 1918, the labor supply was near its minimum, only 154,174 and 147,121 respectively.

The explanation of this apparent anomaly lies in the exceptionally large number of days worked in those two years—285 days in 1917 and 293 days in 1918—and in the notable increase of efficiency of the miners in the war period. At the present time the rate of production of anthracite is fully that of the record year 1917, and again this high rate of approximately one hundred million net tons a year is maintained by the steadier operation of the mines and the more regular attendance of the mine workers rather than by any increase in mine development or labor supply.

Capacity is measured by the quantity of coal that would be produced if the mine were worked full time at the actual daily rate for the particular year. The conclusions of the engineering staff point to a decline in colliery capacity during the past ten or twelve years. Nor, with one exception, is there now in progress any new mine development of consequence to offset the normal reduction in capacity by wearing out of plant or mining out of reserves. The observations of the engineers, however, are in line with the labor studies to the effect that the present deficit in labor is a shortage of miners' laborers rather than of miners themselves, so that at present the limitation of capacity can not be charged to the Pennsylvania requirement of certification of miners.

More unskilled miners as well as laborers will, however, be needed to maintain production, to say nothing of increasing it, for there are factors at work tending to lower the production per man. There was an apparent increase thirty years or so ago, due to the increasing use of small sizes which before had gone to the waste pile. Whereas the output per man per day in the bituminous industry is increasing steadily, in the anthracite industry it is less to-day than it was twenty years ago. For the past ten years the daily production of fresh-mined coal per man employed underground has been practically stationary.

Chief among the factors tending to decrease the production per man is the constant decrease in thickness of beds worked and to the increase in depths of working, both items making for increased mining costs. Nor is the outlook encouraging when it is realized that the Northern field, in which the mines yield 70 per cent of domestic sizes, is being exhausted much more rapidly than the Southern field, where the mines yield only 53 per cent of domestic sizes. At the present time the average mineworker in the Northern field produces nearly 30 per cent more domestic coal than the mine worker in the Southern field. Yet it is from this Southern field with its greatest reserves that the future supply of domestic anthracite must come in increasing degree.

It is impracticable to attempt any quantitative statement

of the extent to which loss in labor efficiency has tended to reduce productivity. That there is some tendency to limit each man in the amount of coal to be mined and loaded in accordance with local feeling and tradition is not seriously denied. The introduction of labor-saving or product-increasing machinery although not opposed by the miner in principle gives occasion for vexatious and expensive delays in discussion over the conditions under which it is to be used, the rates of pay, the number of men on a machine, etc.

It would be to the interest of the industry as a whole as well as to the public interest if the miners' organization should become an active and aggressive instrument of greater efficiency in mining, co-operating heartily with the management in every effort to reduce mining costs by preventing waste, abandoning obsolete practices, diminishing labor turnover and in all other ways helping to establish good production standards.

Improved mining methods and mine machinery have of course slowed down the decrease in productivity, but even then the rate per man per day was only 2.09 tons in 1921 as contrasted with 2.50 tons in 1899. Better engineering should help to compensate the natural factors making for decreased output and thus give the consumer the anthracite he needs.

The engineering study of the breakers, where the mined coal is prepared for market, indicates a reserve daily capacity one third in excess of actual production in 1920. Indeed, this unused capacity is estimated as sufficient to handle the output of some 43,000 more men than were employed in 1921 and 13,000 more than the highest number ever employed. This unused breaker capacity might add something like

20,000,000 tons a year to even the present high rate of output, adding nearly 12,000,000 tons of domestic sizes.

The high-cost mines as a rule are more expensive in manpower and yield the lowest return in coal for a day's work, with the result that high prices which keep these mines running also tend to decrease the average productivity of mine labor. With these relatively high-cost and inefficient mines in operation the only practical method of increasing the supply of domestic anthracite is to recruit the labor supply of the lower-cost mines to full breaker capacity.

When the working capacity of present mine and breaker development has been reached, the question of double-shift operation should be considered as well as the opening of new mines or the building of new breakers. It is economy to make this more continuous use of the equipment which represents so large a part of the necessary investment in the anthracite industry. The difficulties in the way of establishing a new practice in this respect are recognized but they are not insurmountable.

The Commission concludes that at present the supply of unskilled laborers is the immediate limiting factor in anthracite production. This has been the condition since 1916. It may not be described, however, as a physical limitation over which the operators have no control. Other industries employing similar labor have increased the working forces during this period, notably the bituminous mining industry, to an excessive degree. It therefore appears that earnings and conditions of labor offered by the anthracite industry viewed in the aggregate have not attracted labor in the same degree as have the wages and conditions offered by other industries.

Better Combustion Practice and Use of Substitutes the Consumer's Responsibility

Improved Practices.—Better utilization of the anthracite that is mined is a problem in national economy in the solution of which anthracite consumer and anthracite operator must join. In terms of total annual output the supply is stationary; in tons per capita it is declining.

Improved practices in the use of anthracite as well as in its preparation that promise some relief relate to the sizing of anthracite and the disposition of the smaller sizes, better inspection of the coal as it leaves the breakers, use of substitutes and better fuel economy in household heating.

Simplified practice in sizing of anthracite is needed. Coal is now commonly sold in four domestic sizes—egg, stove, chestnut and pea—and three steam sizes—buckwheat, rice and barley. To prepare these seven sizes and keep them separate in their journey from mine to destination adds to the cost. It adds to the cost of preparation and it decreases in proportion the domestic sizes through breakage in repeated crushing of the lumps. It adds to the cost of switching and handling at railroad terminals and tide-water piers. It adds to the cost of the retailer, who must store and truck the several sizes separately.

Reducing the standard sizes from seven to four, as proposed from time to time and as already practised in part by one of the large producers, would reduce costs and increase the amount of domestic coal available. It would facilitate wider use of small sizes for heating.

The Commission therefore urges that the question of simplified sizing be considered at once by a joint conference of producers, railroads, retailers and chairmen of state and municipal fuel committees, and that the Bureau of Mines be consulted in determining the sizes to be produced and in reporting on the relative heating values of the present and proposed sizes. The simplification is recommended in the interest of the public.

To dispose of the steam sizes is perhaps the chief problem of the anthracite operator. It is also a matter of vital concern to the householder, for the present loss on the scale of the steam sizes has to be charged against the price of the domestic sizes. As the mines become deeper and as the center of production moves toward the pitching measures of the Southern field, the percentage of steam sizes is expected to increase.

Hope for wider demand for these small sizes, that will absorb the increasing output, is found in the trend of combustion engineering. The engineers of the Commission ex-

pect improvements in the manufacture of briquets and in burning powdered anthracite for power generation. If the superpower plan, outlined by the Geological Survey, is carried out, large central stations will be built near the anthracite region and will absorb millions of tons of the fine sizes. The problem calls for educational salesmanship on the part of the anthracite operators and receptive co-operation on the part of the consumer.

Complaints of poor quality of coal are a common feature on the recurring shortages of anthracite. The complaint is not confined to isolated carloads of "fireproof" coal shipped by "snowbird" operators. There is a widespread feeling that quality deteriorates during periods of scarcity and that much dirt, slate and bone is passed on to the consumer. It is this feeling that has inspired bills providing for government inspection introduced both in Congress and in the legislatures of several States.

It is not possible to ascertain what per cent of coal shipped during the crisis of 1922-23 carried an unreasonable amount of ash. It is known that many of the responsible shippers have not relaxed their standards of preparation. Those shippers have every reason to join with the public in support of some plan to protect the good name of their industry by guaranteeing the quality of the product.

The Commission therefore suggests to the anthracite producers that they join in an intercompany inspection service, which shall be empowered to prescribe standards, inspect and sample shipments, reject inferior coal and certify—if not guarantee—the quality of coal passed. Membership in the inspection service should be optional, but few producers could afford to stay aloof from such an association, when once established.

To this plan the objections commonly raised to grading do not apply. The sizes of anthracite are already largely standardized and the number of grades is small compared with bituminous coal. It is not proposed to abolish trade names which represent an investment in good will, but merely to certify that the coal in question reaches a minimum standard of quality.

As a pledge of good faith to the public the Commission suggests that the operators invite the U. S. Bureau of Mines to participate in the proposed inspection service both by technical advice in laying down standards of preparation and by detail of a fuel engineer to observe and check the work of inspection and grading.

Co-operative inspection is preferable to compulsory government inspection because it can be inaugurated at small expense by consolidating the inspection forces already maintained by many of the companies and because it is in line with the idea that the responsibility for management should be thrown back upon the industry itself. If, however, this proposal is not accepted by the anthracite trade or should it not in practice effect the desired purpose, the Commission recommends that a federal law should be enacted for permissive grading and inspection.

To eke out the inadequate production of anthracite each year the waning supply must be supplemented by increased use of other fuel. In the anthracite-consuming territory proper, convenient substitutes are not generally carried by the retail trade. The nearest bituminous mines are a hundred miles farther away and therefore pay higher freight charges. Very few mines in the bituminous districts adjacent prepare their coal in the sizes convenient for household use. So ingrained is the habit of using anthracite that there is little effective competition with other fuels. They have not displaced anthracite; they have supplemented it. Competitive relations have tended to advance the price of substitutes quite as much as to depress the price of anthracite.

The most promising supplementary fuels are small sizes of anthracite, used either in specially designed furnaces or in present furnaces either in the form of briquets or mixed with the larger sizes; carefully prepared bituminous coal of the kind commonly sold in the West and South; coke specially prepared for domestic use either in byproduct ovens or by some process of low-temperature carbonization. Manufactured gas or fuel oil may appeal to some householders, but the prospect for producing either of them at prices that will be attractive is not reassuring. House heating by electricity is not within the realm of practical affairs, as is quite evident if the thermal efficiency of good house furnaces is compared with that of the generating station. It would take five times as much coal at the station to generate the current required as to generate the heat at home. Whatever may be possible in the Far West, where there is surplus water power, the conditions in the anthracite-burning region are such that the current from any hydro-electric plant would cost perhaps three times as much as the coal used in the house furnace.

The engineers of the commission are convinced that with suffi-

ciently active demand the manufacture of briquets and of coke can be so improved as to yield increasingly large amounts of supplementary fuel. The problem is one of salesmanship, public education and intelligent choice by the consumer.

A responsibility for extension education in fuel economy rests upon our research organizations and universities. They have devoted much attention to combustion economy in the operation of power plants. It is now in order to turn attention to economy in household heating. The chief need is to make available to the home owner the simple facts about what to burn and how to burn it. Responsibility also rests upon the retail coal dealer to spread the knowledge and use of supplementary fuels. The commission commends to retail coal associations the subject of showing people how to cut fuel bills. This is salesmanship of a high order and will return a dividend in increased business and in a larger measure of public confidence not always now accorded to the retailer. State and local fuel committees and local chambers of commerce may play an important rôle in extending the use of supplementary fuels and in furnishing practical advice to any householder who is considering a substitute.

The chief responsibility, however, rests upon the householder himself. The inertia of habit has played into the hands of the producer and the dealer and helped to create a perpetual "seller's market." *The householders of New England and the Northeast while rightly asking for relief against the menace of an interruption of the coal supply, should realize their collective power to influence prices.* The most paternal of governments cannot relieve the individual from the consequence of his own negligence. There rests upon the householder the responsibility of buying coal when coal is to be had and also the responsibility of casting about for supplementary fuel.

One of the immediate causes of the distress in the Northeast last winter was the hesitation of householders to accept substitutes until cold weather was upon them and anthracite was literally not to be had. The consumer can create a demand for supplementary fuels that will both increase the supply and lower the price. Under present levels of price the Commission is convinced that many householders by a little attention to the subject can materially reduce their coal bills. Those who cannot burn coke or bituminous coal outright can frequently use a mixture of coke and pea coal or a mixture of the steam and the larger sizes of anthracite.

Building up the demand for substitute fuels is one form of insurance against combinations of labor or of capital and the consequent rising prices.

Review of Industrial Relations

Civil Rights.—The subject of the breach of civil rights, resulting in a general cessation of labor in all those fields where contracts have been made with the United Mine Workers of America, must be left for analytical presentation to the final report, since it involves the bituminous as well as the anthracite fields. But as these strikes or lockouts, whatever they may be, have affected the anthracite industry as well as the bituminous industry, a general reference to the situation is not inopportune.

The principles that a man has a legal right to work free and unimpeded by threats, duress, coercion or restraint, when, where and for whomsoever he chooses; that a man has a legal right to employ and discharge as he pleases, and that men have a right to bind themselves together for collective bargaining touching wages and working conditions are freely admitted by everyone. These principles honestly lived up to would keep the open shop and at the same time permit the existence of the union. But as a matter of fact, the open shop in a unionized mine is open to the union miner and closed to the non-union miner, while the open shop in the non-union mine is open to everybody save a United Mine Worker. No opinion will now be expressed as to whether this condition has arisen from an attempt to unionize the mine and not the miner.

Without attempting to trace to its origin the first violation of the law to fix the primary responsibility for breaches of the law and starting the trouble, it will be sufficient to say that no side, whether union or non-union, can show absolutely clean hands in keeping and helping to enforce the civil rights of American citizens. These breaches of the law have doubtless arisen upon the theory that vast aggregations of capital and vast aggregations of labor have just the same rights as the individual, but the Commission believes that the innocent bystander has some rights which both of these contending forces are bound to respect. Corporations, whether *de facto* or *de jure*, are not individuals, and

they may not exercise unrestrained the natural rights of man. If, as the Commission believes, the mining of coal is clothed with a public interest, then both sides must—peaceably and voluntarily if they will and under compulsion if they will not—deal with each other in the light of the general welfare of the American people; and while the Commission believes there is ample authority to punish a conspiracy of either operators or miners, or both, directed against the general welfare of the people, if there be not such legal authority, it will be recommended for enactment in the Commission's final report.

We shall not attempt to give a list of button strikes or other strikes called for the real or alleged purpose of rectifying grievances under the existing contract. The anthracite mines are theoretically open mines. It is not the public's concern but the union's business whether a man pays his dues to the union or not, yet if he does not pay his dues and wear his button in proof thereof, a strike takes place and is not usually settled until he has paid his dues. By the existing contract a settlement of disputed questions of fact arising under its terms is provided for the very purpose of obviating strikes, yet strikes have occurred over these facts. They have not taken place at the instance of the general or district officials of the United Mine Workers; nevertheless they have occurred.

It is not possible to determine the motive in the mind of each man who votes for a strike, whether it is economic or political, but it is fair to assume that the vast majority of the violations of agreement not to strike have been by those who were interested in the purely economic situation. Men in America have economic rights for which they are justified in contending and they have political views which they are authorized to advocate. But they have no right to pretend they are contending for economic rights if their aims are purely political. Political questions should be settled by American citizens, and economic questions by individuals, corporations and labor organizations. An alien has as much right as an American citizen to strike for wages and working conditions and as such has a right to join with American citizens; but it is to the interest of the Republic that aliens should seek citizenship.

Persons, firms and corporations doing business under the protection of the laws of this land owe it to be diligent in their efforts to educate and naturalize the aliens whom they employ and for whose presence here they have been in too many cases responsible. It appears that less than one-half of the 78,000 foreign-born miners have sought citizenship, notwithstanding 68,000 of them have been in this country

over ten years. A rebirth of the American idea is needed in the anthracite region, and great care should be exercised to differentiate on questions which may lead to a strike as to whether they are economic or political in their nature. The alien should be permitted to exercise every economic right of an American citizen, but no political right until through naturalization he assumes allegiance to this country.

Strikes have occurred in violation of the agreements entered into not to strike, but fairness compels the statement that there has been justification for some of them in human nature arising over delays in investigating complaints and insufficient personnel to accomplish speedy results.

Neither individuals nor aggregations have the right to make a contract and ignore its obligations, and collective bargaining implies collective keeping of the bargain. In the anthracite region the union has won its fight for collective bargaining and now exercises a practical monopoly. The union must justify itself. If it cannot furnish wise leadership and assist in the efficient conduct of this industry, punish the wrongdoings of its own members as freely as it demands the punishment of wrong at the hands of the operators, it will not justify its existence.

Similarly, by making use of the experience in other industries and the best in their own industry, the operators have an opportunity to concentrate on the human problem of men at work. The best standards of general industrial practice imply continuous cultivation of good relations between the employer and his employees, by organized efforts to build up industrial good-will and by the selection and training of foremen and other employees. Organized efforts to promote such contact would tend to correct the sad effects of contacts based chiefly on grievances, and, needless to say, this would weaken the forces making for strife by strengthening the normal co-operative motives. Industrial practice has demonstrated that the best results are to be obtained where executive responsibility for personnel and labor matters is concentrated in one responsible executive whose attention is devoted chiefly to them.

Pending Negotiations.—Just now, when in accordance with the agreement made between the anthracite operators and the United Mine Workers of America, a new contract is to be entered into in the light of the recommendations of this Commission, it calls attention to certain facts, not to stir up a controversy about them but in the hope that a general amnesty may be declared in the industry, the slate wiped clean, and negotiations had looking toward justice to both miner and operator and a continuous and uninterrupted supply to the users of anthracite.

There is no adequate provision for the consideration of specific disputes at the mine nor for insuring that all employers handle the question the same way. The union participates by its district representatives, but the employers have no corresponding agent to represent them in the early stages of the disputes. In this particular this industry is not abreast of other well-organized industries. The Conciliation Board has done valuable work since it was created, in 1903, but as the years have gone by it has lost some of its effectiveness; and partly through its own fault.

Recommendations.—(1) *The Commission recommends that in the next agreement there should be a provision for a continuing umpire and that he or an assistant named by him should sit with the Conciliation Board at all its meetings, but without a vote.*

(2) *In view of the delays that have been caused by the absence of members of the Conciliation Board, alternates of like standing in the industry should be selected with authority to act in the absence of the original member.*

(3) *The operators' group should appoint a full-time representative and all necessary assistants to consider jointly at the mine with the district officers of the union each case before it is appealed to the Conciliation Board in the hope of securing a local agreement, arriving at a better understanding by each side of the difficulties and problems of the other, and thus producing a mutual feeling of respect for the other's opinions and each obtaining the outlook of the other upon the problems.*

(4) *So many changes have taken place since 1903 that the agreement should provide for a joint committee to work out a restatement of the whole agreement in the terms of today, and this agreement should be specific enough to be the code by which all persons having anything to do with the settlement of grievances shall be bound.*

(5) *If the Board of Conciliation does not clearly understand the facts involved in any case, it should appoint an examiner from each side immediately to investigate and furnish it with all the facts.*

(6) *The agreement should provide for penalties for the breach thereof by either party, and the method by which such penalties are to be enforced.*

(7) *The renewed agreements have too rigidly retained the practices and conditions of 1902 and have not had adequate flexibility. An industry which is necessarily constantly changing cannot tie itself inflexibly to conditions of twenty years ago without hampering the management and working injustice to miners. A second joint committee should be provided for in the next agreement and directed to make an engineering study of the elements of the job of mining anthracite coal, for the purpose of building up a scientific and more equitable basis for rate making. Until, however, such committee shall disclose fundamental facts which shall form a decidedly better basis, the old 1903 base should, of course, be retained, for however inequitable the basis of 1903 with its subsequent modifications is, it is better than no basis at all.*

(8) *The expiration of the contract in the anthracite region should not coincide with the expiration of that in the bituminous region. The contract should run for a definite period of time with the proviso that it shall be deemed to be renewed for a like period of time except as to such provisions thereof in which notice of a desired change shall have been given by either party to the other at least ninety days before the renewal date. Upon these proposed changes the parties shall immediately confer and if, sixty days before the date fixed for the renewal of the contract, they have been unable to agree, they shall report such fact to the President of the United States, specifying clearly the controverted points. The President shall thereupon appoint a person or persons to inquire into and make public a report upon all the relevant facts in controversy before the date of such renewal shall have arrived.*

The Commission recommends at this time no punitive legislation. It awaits with interest whether the next agreement entered into shall show a co-operative spirit, a clear idea of partnership on the part of all concerned in it, and a proper conception of the rights of the American people. These rights in the anthracite region are no different from those in the bituminous, and the judgment of the Commission will be very largely affected by what takes place in the present negotiations. It calls attention to the fact, however, that some of the material from both the operators and the United Mine Workers presented to it is calculated even if not intended to inflame the public mind for or against one of the parties. This is more applicable to the bituminous controversy.

These charges and counter-charges are most unfortunate at this period of negotiations. Instead of preparing the public mind as to what will be real justice to the operator and the miner and what will stabilize the industry, there has been too much of epithet, too little of argument. The Commission recommends that each side forget past differences and grievances and attack the problem in the spirit of justice and fair dealing, not only between themselves but with due regard for the rights and sensibilities of the American people. The Commission hopes that a constructive view will be taken, not controversial in its character, so as to assure a continuous output from the anthracite mines and the scrupulous keeping of the agreement. If it must fix responsibility because the old order has not changed, it cannot do so without taking into consideration the bituminous industry.

In conclusion the Commission invites attention to the specific recommendations contained in this report on the following subjects:

- (1) Government regulation.
- (2) Publicity of accounts.
- (3) Authorization of President to declare national emergency.
- (4) Uniform standard ton.
- (5) Re-examination of anthracite freight rates by Interstate Commerce Commission.
- (6) Reduction in number of sizes.
- (7) Inspection of quality.
- (8) Larger use of substitute and supplementary fuel.
- (9) Excessive hours.
- (10) Readjustment of wages of miners' laborers and of the conditions of their employment.
- (11) Readjustment of royalties.
- (12) Power to punish conspiracy against general welfare.
- (13) Personnel manager.
- (14) Assimilation of aliens.
- (15) Alternates for members of Conciliation Board.
- (16) Continuing umpire.
- (17) Examiners for Conciliation Board.
- (18) Full-time representative of operators.
- (19) Joint committee to prepare industrial code.
- (20) Joint committee to secure scientific analysis of jobs.
- (21) Penalties for breach of agreement.

Respectfully submitted,

JOHN HAYS HAMMOND, Chairman.
THOMAS R. MARSHALL,
CLARK HOWELL,
GEORGE OTIS SMITH,
EDWARD T. DEVINE,
CHARLES P. NEILL.

Attest:
EDWARD EYRE HUNT,
Secretary.



Where to Build Our Mining Towns and What Type of House We Should Erect in Them*

Build in the Creek Bottoms and Straighten Out and Deepen Creek for Safety, Space Economy and Sanitation—Keep Houses Near Mine—If Necessary to Restrict Town Area, Erect Apartments

BY THOMAS F. DOWNING, JR.

General manager, Logan County Coal Corporation, Lundale, W. Va.

IN A LARGE area of West Virginia and Kentucky many of the mines are small because the companies lack space on which to build large towns and make the necessary improvements. They often have nothing but a little bottom land cut up by the streams and ravaged at times of high water.

The question arises whether they are using to the best advantage all the bottom or level land they have. Where the mountains are steep and the valleys narrow the streams are subject to sudden increases in volume. In most cases the bed of the creek is shallow and when the stream rises suddenly it spreads out over a large part of the bottom land.

When the floods are unusually high the stream often does many thousands of dollars' worth of damage to property, and so completely deprives many of the inhabitants of their peace of mind that they move away to places where such hazards do not exist. At such times of high water the creek usually changes its course and, in doing so, often carries away some of the land that was considered high and safe. It is obvious, therefore, that if the investments of mining companies in such places are to be protected, if communities are to be permanently established and if a maximum tonnage is to be produced, the bed of the stream must be so

modified that the water will be controlled at its flood stages.

What is the best, most economical and lasting method of doing this? In my opinion the most practical and economical way is to dredge the creek with steam shovels. An original expenditure of about \$3 per lineal foot is about all that is necessary under the conditions to carry approximately three million gallons per minute at a velocity of from 15 to 17 ft. per second. This cost includes the leveling of the spoil.

In 1917 our companies† and those working adjacent properties lost several buildings and decided to try to protect the properties by dredging. Several of the neighboring companies entered into the project with us and we dredged approximately nine miles, at the same time making about seven miles of roadbed above the water level and four miles of railroad grade. Sufficient material was procured from the creek to level and grade part of the house sites. Bids were called for, but the contractors were afraid of floods, and consequently the bids were too high to receive consideration. Three 60-ton shovels were rented with specially constructed booms for excavation, and three smaller shovels were leased to take care of the spoil. The project was attacked at three different points, the work being continued through the winter of 1917 and being completed in 1918.

The winter work added greatly to the cost, and I would not advise anyone to do this work in the winter if that can be avoided. I also would not advise dredg-

*Article entitled "Where to Build Our Mining Towns and How to Build Them," read before the summer meeting of the West Virginia Coal Mining Institute at Clarksburg, W. Va.

NOTE—Headpiece shows channel excavated at Lundale, W. Va., and the double line of houses which the dredging of the creek made feasible. This picture was taken four years after the work was completed. The stream formerly meandered all over the bottom, leaving no room for houses. Observe the fine public road which parallels the stream.

†Lundale Coal Co. and Three Forks Coal Co.—EDITOR.



RECLAIMING THE CREEK BOTTOM NEAR LUNDALE BY DEEPENING THE CHANNEL WITH

In this section of the work the channel was carried up the center of the bottom, as houses already had been constructed, thus preventing the choice of the foot of the hill as a location. The two shovels are side by side so that the spoil is put into position

as fast as it is cast up into the heap. Thus if a flood comes no risk of having the material washed back into the channel need be faced. It is clear that the houses that line the creek are occupying the flood channel of the stream. Until the creek was

dredged, times of high water were discommoding even when not actually perilous. Furthermore, the lowering of the stream bed improved sanitary conditions by providing good drainage either through the soil or through pipes. Stream rectification,

ing unless the small shovel goes along with the big shovel, the first disposing of the spoil as fast as the latter excavates it. In one of the sections a small shovel could not be procured and in order to get the section completed before the high water came the bed of the stream was dredged a distance of about 3,000 ft., the material being placed on the side of the creek.

The flood came and washed all this spoil back into the creek, and it had to be dredged out all over again. The shovel was covered half way up the boiler, and it had to be dug out by hand. In another instance the flood turned over the large shovel and cut the bank from under the small shovel, letting it drop into the stream with the big shovel. All the expense connected with these unfortunate occurrences or with our lack of foresight—call it what you may—is included in the cost given later.

Suitable labor could not be obtained for this work, and the contractor from whom the equipment was rented was allowed a few cents per cubic yard excavated, in return for which he was required to keep a full crew on the job at all times. The rental was \$500 per month each of the 60-ton shovels and \$350 per month for the smaller shovels, the lessee to keep up the shovels while using them and paying the freight to and from the job.

Table I shows the cost per cubic yard under different classifications.

This dredging was completed during the early part of 1918. During the excavation period more water passed through the completed channel sections than in the making of the estimates had been anticipated as a maximum. No damage has been sustained from flood or high water since the work was completed, and hundreds of houses have been built in places which would not have been safe for such buildings prior to the dredging.

This particular job has shown us that the cross-section of the creek can be three-fourths of what it was before dredging and still allow a safety factor of from 15 to 20 per cent. The velocity of the stream was increased at one point from 10 ft. per second before dredging to 17 ft. per second after dredging.

In laying out a dredging project it is advisable to keep the creek as near the mountainside as possible, as this allows the recovery of a maximum area of ground. The channel should be kept as straight as can be arranged and where curves are necessary a slightly greater cross-section area should be afforded. It will be found that there will be little cutting of the bank except on curves. Where these occur they should be protected in some manner.

If the bottom of the channel is near solid rock the best protection, of course, is a wall. It is not safe, however, to build such a structure unless it rests on solid rock, for the greater part of the water will run along the wall and in time will undermine it. Where solid rock is to be found only at a considerable distance under

TABLE I—COST OF EXCAVATION OF CHANNEL PER CUBIC YARD AND PER LINEAL FOOT

Freight.....	\$0.0071
Erecting and dismantling shovels.....	0.0061
Moving to and from location.....	0.0133
Rental on shovels.....	0.0579
Drainage.....	0.0022
Shovel repairs.....	0.0286
Flood excavation.....	0.0058
Shovel excavation (labor).....	0.1108
Grading and spoiling (labor).....	0.0651
Supplies.....	0.0188
Contractor's estimate.....	0.0390
Total cost per cubic yard.....	0.3547
Number of cubic yards excavated.....	403,615
Number of lineal feet excavated.....	48,225
Number of days the shovel worked.....	718
Number of cubic yards per working day.....	562.1
Number of cubic yards per foot dredged.....	8.37
Cost per lineal foot.....	\$2.969

The number of days worked represents the sum of the actual working days of the three big shovels.



A 60-TON SHOVEL AND SPREADING THE SPOIL WITH A SMALLER MACHINE

and deepening is a problem which most operators in mountainous regions have to face. The difficulty is as perplexing in Utah as in West Virginia and Kentucky with the exception that in the first-mentioned state conditions seem perfectly safe

and improvement a flagrant waste of money until a cloudburst comes and what was a mere trickle of water is converted in a few minutes into a raging torrent the full width of the valley and capable of carrying everything before it. In many cases where

streams pass over coal mines the formation of a better stream bed by dredging will save the workings from much water and make possible the excavation of the coal over a larger area. It should not be delayed till flooding makes it necessary.

the floor of the channel the curve should be protected by large loose rock. This rock presents just as much friction as any other part of the bed and when undermined merely sinks deeper, affording still better protection.

WITH A LITTLE WORK CHANNEL WILL DEEPEN

After the job is completed the channel, given proper care, will continue to deepen. Every wet season washes dirt from the channel and exposes new boulders. If these are not renewed the channel probably will fill up in the next wet season, but if a few men are put to work in the channel in the summer throwing out these boulders, the stream under most conditions will continue to cut deeper. The rock thus removed should be thrown to the foot of the bank, thus forming a better protection from cutting. While the actual dredging is going on the shovel should put all convenient large rock at or near the foot of the slope.

In some places the channels have cut 3 to 4 ft. but at other places only about one foot. The least cutting usually is found just after leaving a bad curve, where the velocity of the stream is reduced.

Aside from its advantages from the viewpoints of safety and reclamation, dredging has been of inestimable value to us from a sanitary standpoint. The bed of the creek is now enough below all of our houses to make it easy to run our sewers into it. It is so much lower than the surrounding land that the water seeps through to the creek, and contagious diseases have been practically unknown in our camps since dredging was completed.

The material removed by the dredging consists principally of sand and gravel. This material is excellent for road-making purposes as it drains well. Where we formerly crossed through the main creek fifteen

times in going from one mine to another, a distance of five miles, we now have a good county dirt road above water level at all seasons and we have had to build only two short bridges.

After the ground is made safe and prepared for the town comes the question as to the kind of construction to be employed. What it should be depends largely on two conditions: How much can justifiably be spent on the town and how long will the plant last? The plan is influenced also in some measure by the proximity of the mine village to a larger and well-developed town and by many other features which are peculiar to the particular territory under consideration.

Before any construction is commenced it is important that the location be cleared and properly graded. This will add much to the appearance of the town and will be much less expensive than if an attempt is made to do it after the houses are built. After people move into the houses it will not be necessary to annoy them by the blasting of stumps and rock and, furthermore, water cannot collect in stagnant pools to breed disease.

Much has been written on the detail of construction and architecture, and I will not dwell on that subject but merely state that no matter what you are going to build it would be well to keep in mind the fact that American standards of living are continually becoming higher and your construction should reflect that fact.

We must watch lest we build too far away from the mine if we are to receive the maximum efficiency from our dwellings. I have found that a house which is built a mile away from the mine mouth is only about half as efficient as a house which is built nearby. I have found that in the winter it is difficult to keep tenants in the more distant houses, and that all of them want to live near the drift mouth so that the men will be close to their work in bad weather and their families



VALLEY AT THREE FORKS, FIVE MILES ABOVE LUNDAL

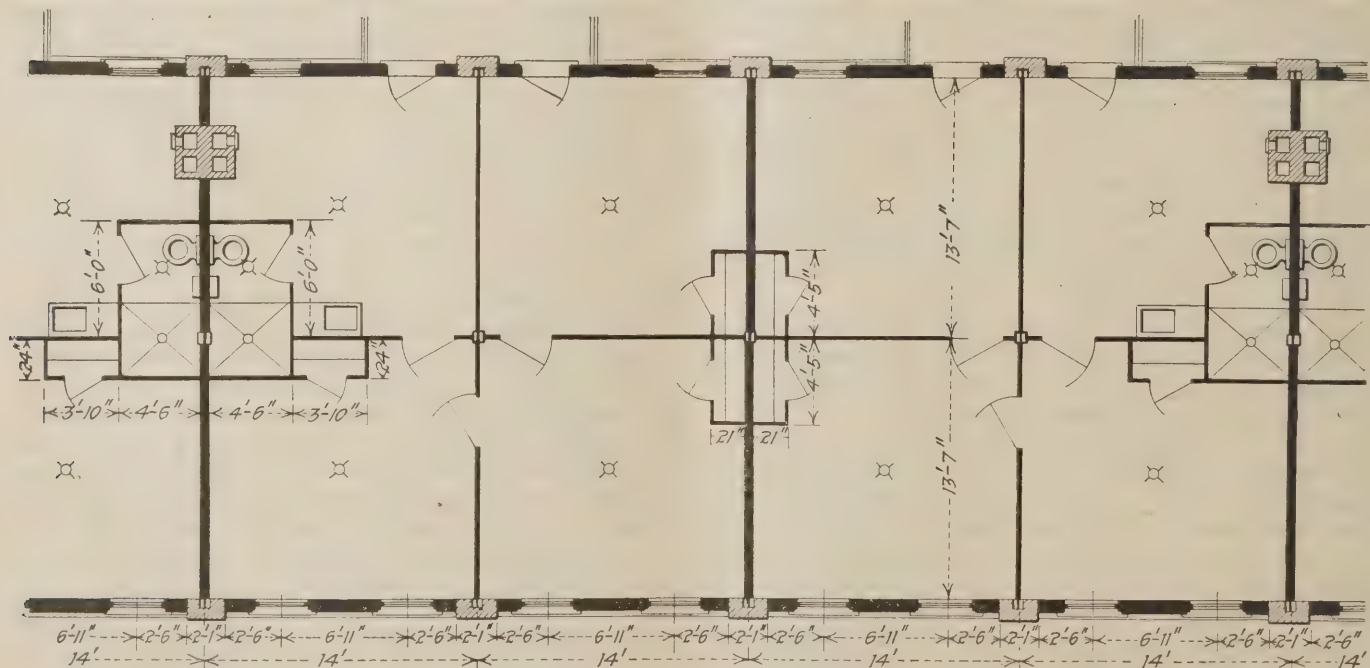
As the watershed at this place is much smaller than at Lundale the excavation has been made shallower. The spoil from this channel has been used to make a railroad fill which parallels the creek as does the public road in the headpiece of this article. That road, however, cannot be seen in the illustration.

will be near to the store and welfare buildings, which usually are centralized.

The question which has perplexed me is what shall we do to get a higher efficiency from our houses where the valley is narrow and where any necessary expansion would seem to make it obligatory to go a great distance up or down the valley if space is to be found for dwellings. I first thought of building tenements, but our people are so mixed that the housing of a number of families with a common entrance and with common

stairways and hallways would be of extremely doubtful success. A short time ago I thought of building such a tenement right at the foot of the mountain with no stairways or hallways. A road or path would be graded at each floor level and a fireproof bridge or walkway constructed from the hill contour to each apartment, thus making for each a private entrance.

We have prepared plans also for a four-story twenty-apartment house to be constructed of steel, tile and concrete and fireproof throughout. We would install



SECTION OF APARTMENT HOUSE DESIGNED FOR A MINING TOWN

Where the level ground is limited and people, not having trolley facilities for reaching the mine, the store, the church, the movie show or the dance hall, must travel long distances afoot, the proposal has been that mine villages be provided

with fireproof apartment houses having modern conveniences. Where the company supplies coal for a small given charge per month (usually at a wholly inadequate figure) the apartment house will save fuel and reduce this loss. The apartment sug-

gested is to be four stories high. It is believed that the cost of this large building will be about the same as that of a number of smaller dwellings that will house an equal number of families, but it will take less space and provide greater comfort.

steam heat, cold water and connections for hot water with hot-water tanks, lavatories and shower baths. I show herewith a plan giving the details of the arrangement and the size of rooms together with location of chimneys, bath, etc. You will note that one chimney from the ground up will serve eight kitchen stoves. The plumbing is so arranged that one coil of pipe will serve eight families.

We have not gone far enough to obtain an exact cost on such a building but from what information I can gather it should cost between \$45,000 and \$48,000. I think it is practically necessary to make such a building four stories high, for only by that means can it be built at a cost comparatively little greater than would be incurred in building separate structures to house the same number of families.

A large saving on insurance and coal would be effected. In mining towns employees usually are charged

\$1 per month for all the coal they wish to burn. When houses are equipped with grates the company loses much money on the coal furnished. Under this arrangement much of the cost would be saved, for a centralized heating plant would be provided. The building proposed would give the people all the conveniences possible and for twenty families it would occupy about the area that two single houses would require.

In discussing this proposition among the members of our organization it was pointed out that the people living in such a building would have no gardens. We therefore made a canvass of our largest town and found that only 46 per cent of the people who could have gardens really had them. It is, of course, not the idea to build the entire town along these construction lines, but only to take care of the tenements necessary after the town has been built up in the usual manner within an economical distance from the plant.

Southwestern Operators Launch Campaign in Newspapers to Educate Public

United as "The Associated Coal Bureau of Kansas City," operators, jobbers, wholesalers and retailers of Kansas City have instituted an intensive advertising campaign in an endeavor to bolster the midsummer domestic market. The bureau carries advertisements of from one-fourth to one-third page in one of the Kansas City newspapers, explaining something of the hazards of the coal business and the factors which determine the retail price.

As a sample of the type of matter employed, soon after the submission of the report of the Southwestern Interstate Coal Operators' Association to the U. S. Coal Commission, the bureau had reprinted in its "ad" a facsimile of Washington press dispatch to the *Kansas City Star* summarizing the association's statement.

By the side of the facsimile appeared the bureau's comment: "This clipping, which is a résumé of the report of the Southwestern Interstate Coal Operators' Association, shows the coal problem as it now presents itself to the producer in this territory. It explains the 'why' of increased coal production costs and demonstrates the reason why you cannot expect lower coal prices in the near future. Many of the troubles cited are peculiar to this Southwestern territory—some are nation-wide in their scope—yet all are facts with which coal users should be acquainted. . . ."

The campaign has not yet lasted long enough to determine what effect it will have upon the local market, but it has the support of most of the coal men of Kansas City.

Coal Prospectors Busy in Wyoming; Leasing Active in Utah

Up to June 1 a total of 419 coal-prospecting permits had been issued by the Department of the Interior on public lands of the United States. Coal prospecting is most active in Wyoming, where 103 permits had been granted. Colorado, with 90 prospecting permits, was second in this respect; Montana, with 51 permits, was third; Utah, with 39, fourth; and Nevada, with 34, fifth. Thirty permits had been issued in New Mexico, 25 in Oregon, and 21 in Washington. Of the 78 leases of coal-mining operations, the largest number, 26, is in Utah. Sixteen leases have been granted in Colorado, 12 in Wyoming, 10 in North Dakota, and 9 in Montana.

A total of 980,000 acres of coal lands in 15 Western states have been leased for mining operations, and this acreage is increasing rapidly. These figures do not include the Territory of Alaska, where operations are conducted under a different system.

Coal is now being mined from government land in Washington, Montana, North Dakota, South Dakota, Wyoming, Utah, Colorado, and New Mexico. During 1922 a total of 101 mines produced coal on leased public lands.

Technical supervision of these coal-mining operations, with special regard to maintaining maximum standards of safety and efficiency, is directed through a mining supervisor of the engineering staff of the Department of the Interior.

In the past, because of the prior development of mines and industries in the Eastern states, coal mining on the Western public domain has been overshadowed by private industry; in the years ahead the leased mines may well become the more important. Every effort is accordingly being made by the Interior Department to establish the new system on a sound basis, to protect the public interest in safe and efficient mining, and not unduly to hamper initiative in operation.

French Coal Output and Consumption

The fuel consumption of France in April (and the first four months of this year) was as follows, in metric tons:

COAL		
	In April, 1923	First 4 Months of 1923
Output.....	2,999,617	11,637,998
Imports.....	1,926,563	7,598,514
	4,926,180	19,236,512
Exports.....	96,675	807,439
Consumption.....	4,829,505	18,429,073
COKE		
Production of collieries' coke ovens.....	156,035	558,996
Imports.....	243,989	939,155
	400,024	1,498,151
Exports.....	21,298	109,521
Consumption.....	378,726	1,388,630
PATENT FUEL		
Production of briquets works attached		
To collieries.....	214,342	994,502
Imports.....	44,648	248,052
	258,990	1,242,554
Exports.....	27,412	103,632
Consumption.....	231,578	1,138,922

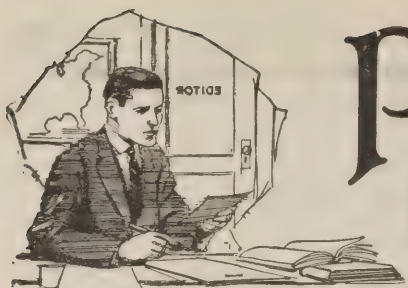
In order to arrive at the exact figure for total French consumption, the quantities transformed into coke and briquets should, of course, be deducted from the coal output.

The Office des Houillères Sinistrées (French distributing agency for indemnity coals) has received from German occupied territories the following fuel, in metric tons:

	Coal	Coke	Lignite	Briquet
In April.....	62,900	131,000	3,400	
From May 1 to May 28, inclusive.....	110,400	159,900	4,400	

According to another source there was forwarded from Germany to France and Luxemburg (the above figures apply only to France) during the whole month of May 137,700 metric tons of coal, 193,000 metric tons of coke and 10,000 metric tons of lignite briquets.

During the first week of June 37,275 metric tons of American coke arrived at Dunkirk, as against 25,600 metric tons during the preceding week.



Problems of Operating Men

Edited by
James T. Beard



Working a Double Seam of Coal

Experience in Working Coal Seams with
Forty Inch Slate Parting Shows Advantage
in Use of Jeffrey Arcwall Mining Machines

WHILE employed as superintendent of mines for the Consolidation Coal Co., at Jenkins, Ky., I had several sections, in Mine 204, where the conditions were similar to those described in the inquiry that appeared in *Coal Age*, May 10, p. 762.

The inquiry comes from a superintendent at Staub, Ky., and asks for the cheapest and safest manner to work a double seam of coal with a view to obtaining a maximum extraction of coal, at a minimum expense for deadwork.

The inquirer states that his bottom seam, a bench 52 in. in thickness, is separated from the top seam by 30 in. of slate parting, which is of such a nature that it cannot be held up for any length of time. The upper seam is coal of good quality and 30 in. thick. In the Jenkins mine I have mentioned, the parting slate ran up to 40 in. in thickness and the method of extraction I am about to describe proved very successful.

Under the conditions mentioned in the inquiry, I would suggest driving all entries 12 ft. wide and turning rooms on 50-ft. centers and widening to 20 ft., leaving 30-ft. pillars between the rooms. My experience has taught me that advantage is gained by the use of the Jeffrey arcwall mining machine.

MINING IN THE SLATE SAVES COAL

If the slate parting is sufficiently soft, as I believe is the case in this instance, the cutting should be made in the slate just on top of the lower bench of coal, as this will save 5 in. of coal being reduced to bug dust.

At Jenkins, we succeeded in cutting from 75 to 80 per cent of the places in the slate parting. The only places cut in the coal were those where the parting was so hard that the bits on the machine would not stand up to the work. Also, the hard cutting caused an excessive heating of the armature of the machine, particularly if the parting was of a flinty nature.

In my opinion, loading out all of the slate when driving the entries proved a hundredfold saving, by keeping good clean haulage roads, which always means increased production and reduced cost. Gobbing the slate at the side of the track generally resulted in more or less of it slipping down on the track and reducing the efficiency of the haulage, which is the most important factor in coal-mining operation.

From the statement regarding the soft condition of the parting in this case, I would not consider it to be safe for men to work any distance under the slate. If it did not fall readily, I would blast it down and

work out the full height to the sandrock roof, with each cut made in the face.

However, all the coal of the lower bench should be loaded out before the slate is allowed to fall. For that purpose, it should be well timbered till the lower coal has been loaded out. The posts are then drawn and the slate allowed to fall or blasted down. In the rooms, the slate should be gobbed on the side of the track opposite to the pillar that is to be extracted.

To my mind, this is the most practical way to work a seam of this kind where the slate parting is too soft for a permanent roof, and the upper bench of coal is of such quality and thickness as will justify the handling of the rock separating the two seams.

J. W. POWELL,

Charleston, W. Va.

General Rock Contractor.

ANOTHER LETTER

IN LOOKING through the issue of *Coal Age* for May 10, I became interested in a letter of an inquirer (p. 762) regarding the working of a double seam of coal containing a slate parting 30 in. in thickness. The inquirer wanted to know the cheapest method of mining these two seams, in respect to the handling of the large amount of waste.

In my opinion, the only practical method to adopt, in this case, would be to drive the rooms with the road close to the straight rib. The rooms should be turned 8 ft. wide and driven a distance of 10 yd. before widening out to a width of 24 ft. In doing this work, the stone should be loaded out; but, after widening the room, there will be plenty of room to gob the stone.

DISPOSAL OF WASTE IMPORTANT FACTOR

Thirty inches of stone is a large amount of material to handle with due regard to economy of operation. It is not practical to consider loading this waste into cars and hauling it out of the mine, as that would largely increase the cost of production and eventually close the mine by putting it on a non-paying basis.

It is of the utmost importance, therefore, to stow the slate at the nearest available point and avoid the expense of hauling it out of the mine. The inquirer has stated that the nature of the slate is such that it cannot be supported for any length of time, which makes it necessary to consider how it can be handled to the best advantage. For that reason I would work these two seams as one.

By following this plan, all the coal, both top and bottom, will be taken out as the room is driven up. I would cut the face with a shortwall machine, loading out the bottom coal, then dropping the stone and stowing it in the waste, before taking down the top coal. This plan eliminates the danger of working under the stone, as stated in the reply to this inquiry.

—, Pa.

ALEXANDER DENHOLM.

Extracting Coal in a 30-Ft. Seam

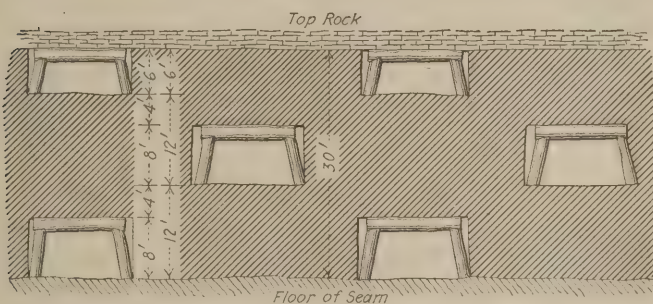
Seam divided into three measures—Headings not driven vertically over those in seam below—Extraction in each lower seam kept in advance of that above.

SOME time ago I noticed, in the Inquiry Department of *Coal Age*, a request for the most suitable method of working a 30-ft. coal seam. If I remember rightly, the inquiry came from a mine in Utah or Colorado. At that time, I was unable to offer the suggestion I had in mind; but, though late, the following brief outline may be of interest.

Without referring to the question of the depth of the seam below the surface (I do not recall that mention was made of that matter in the inquiry), my plan would be to divide this thick seam into three measures, with respect to the extraction of the coal. For example, making the two lower measures 12 ft. in thickness will leave the upper measure 6 ft. thick, which will afford a good opportunity for timbering the overburden.

HOW THE WORK IS STARTED AND CONDUCTED

Work should be started by driving the main headings on the slope of the seam, if any, keeping these well in advance of the headings above. In the accompanying



SHOWING GENERAL ARRANGEMENT OF HEADINGS

figure, I have shown a general cross-section of the main headings in the several measures. It will be observed that these headings do not lie vertically, one over the other, but alternate in the different measures.

The arrangement offers a good support to the floor of each heading and has the effect of overarchng the weight. The same general plan is followed in driving the butt headings to the right and left of the main slopes or entries. These butt headings are driven in pairs on, say 300-ft. centers. The rooms or chambers are driven 15 ft. wide, on 24-ft. centers and follow the same alternating plan with respect to the chambers in the next overlying measure.

When all the headings have been driven to the limit and the chambers likewise, in the several measures, the work of robbing the pillars is first begun in the lowermost measure, the robbing advancing about 10 yd. ahead of similar work in the measure above. If properly conducted, this method will not require the use of much timber, except in the uppermost section or measure. I should have stated that all entries or chambers are driven 8 ft. in height, leaving 4 ft. of coal between the measures, as indicated in the figure.

Parnassus, Pa.

C. W. ATKINS.

[The correspondent has not made clear, in the method he has outlined, regarding the work of robbing, which he states is started first in the lowermost section and kept some 10 yd. in advance of similar work in over-

lying sections. The question of support for the upper measures, as the robbing progresses below would appear to be a difficult matter and should have been explained.—EDITOR.]

Measurement of Men

Display of assumed capabilities no guide to ascertaining the true worth of men—True merit in men needs no advertisement.

SOME recent occurrences have recalled to my mind a statement made by a former writer, in *Coal Age*, to the effect that a certain mine manager once expressed himself as preferring to choose the man who made a display of his capabilities, rather than one who made no such display but was willing to be judged by his work. It is hard for me to believe that many successful managers hire men on their display of supposed capabilities.

Now, it may be to an applicant's credit to be able to acceptably present his experience and refer to his record in previous undertakings, very much after the manner of those characteristics that make for good salesmanship. However, a good manager will look a little deeper; and, by questioning, ascertain for himself the probable fitness of the man for the position he has in view. There must be something more than the mere claim to capability if a wise choice of men is to be made.

MANY CERTIFIED MEN HAVE FAILED

The fact that a man holds a certificate of competency does not always mean that he is capable of filling the position for which he applies. There are certified foremen, assistant foremen, firebosses and others, an investigation of whose record would show that they had practically failed; and yet each, in his own estimation, is capable of filling the position he desires. So confident is the applicant of his own ability that he is prone to make a display of what he can do, instead of modestly pointing to what he has done.

In the selection of men for responsible official positions in mines, I would be more favorably inclined toward the man whose record shows that he has had a practical experience and who has every appearance of being cool headed and observant of things about him, than toward the man who flaunts his certificate and boasts of what he can do in various situations. I would not expect a man's ideas always to conform to my own; but when overruled he should show a disposition to work with the same zeal as when following his own plan.

ABILITY TO PROMOTE HARMONY A CHIEF FACTOR

The real merit of a man needs no verbal exploitation. One of the chief elements of a successful foreman is his ability to promote harmony among the men in his charge. The practical man knows that harmony and goodwill win the day where nothing else can avail. I have observed many mine superintendents and foremen who were worth all the company paid them, solely by reason of their ability to maintain harmony in the camp.

It used to be said that, "men do not always get what they deserve." But, that day is now past and the saying is suggestive of "passing the buck." As a matter of fact, we get nothing that is not coming to us. On the other hand, we always get what comes to us as the result of our own acts and thoughts. A man

is taught many a lesson by his own failures, though he may not see it that way at the time.

Speaking of meriting promotion, the first lesson a man has to learn is to measure himself correctly, and be able to shoulder the blame for his doing, instead of trying to pass it on to the other fellow. A grumbler is never in line for promotion, as he will spend too much time criticising the man above him to really do any constructive thinking himself.

Many years ago I was in a crowd of men who were discussing the promotion of a mutual friend, when a newspaper man made a remark that I have never forgotten. He said, "You seldom see a man hold a position long that he is not capable of filling."

Speaking for myself, I am not satisfied with my own progress. However, I am learning things, each day, that have been handicaps to a more rapid progress in my past. Candidly, I realize that I am where my own actions have brought me. That to which I have attained is the result of my thinking. I like to regard our thoughts as being fully recorded in our minds, making each one the product of his majority thoughts.

Neither money nor position is the full measure of a man's success in life. True success is attained by doing each day's recurring tasks better and more thoughtfully than before. Then, promotion will come when we are prepared for its greater responsibilities. ELKO.

Seattle, Wash.

Examination Questions Answered

Miscellaneous Questions

(Answered By Request)

QUESTION—*The length of a main-and-tail-rope haulage is 7,000 ft. (no grade); the weight of the main rope is 0.8 lb. per ft., and the weight of the tail rope 0.6 lb. per foot.; the full cars weighed 6,000 lb. and the empty cars 1,800 lb., each; the train consists of 15 cars. What are the tensions on the main and tail ropes? If the average speed is 10 miles per hour, what is the horsepower due to the maximum tension of the rope?*

ANSWER—In the general arrangement of a main-and-tail-rope haulage, the main rope hauls the loaded trip from the inby parting to the shaft or slope bottom, or the tippie, as the case may be, at the same time dragging the tail rope which is attached to the rear end of the trip. The weight of this loaded trip is $15(6,000 \div 2,000) = 45$ tons; and that of the empty trip $15(1,800 \div 2,000) = 13.5$ tons. The average weight of the two ropes being 7 lb. per ft., the entire weight of rope, extending in and out of the mine (14,000 ft.), is $7(14,000 \div 2,000) = 49$ tons. Then, when hauling the loaded trip out of the mine, the entire moving load is $45 + 49 = 94$ tons. Assuming an average track resistance of, say, 20 lb. per ton, the average tension on the main rope is $20 \times 94 = 1,880$ lb.

On the other hand, when hauling the empty trip into the mine, the average weight of the entire moving load is $13.5 + 49 = 62.5$ tons and, for the same track resistance, the average tension on the tail rope is $20 \times 62.5 = 1,250$ lb.

At a speed of 10 miles per hour ($5,280 \times 10 \div 60 = 880$ ft. per min.), the horsepower due to the maximum tension on the rope is $(1,880 \times 880) \div 33,000 =$ say 50 hp., which is the power due to the maximum tension on the rope and takes no account of the efficiency of the engine.

QUESTION—*In a single haulage plane where 17 loaded cars weigh 4,200 lb. each and the hauling rope is 4,500 ft. long and weighs 0.9 lb. per ft., what is the tension at the moment of moving the full load, the grade being 3.2 per cent? If the train is hauled at a velocity of 10 miles per hr., what is the required horsepower of the engine?*

ANSWER—In this case the weight of the loaded trip is $(17 \times 4,200) \div 2,000 = 35.7$ tons. The weight of

the rope lying on the incline is $(0.9 \times 4,500) \div 2,000 = 2.025$ tons. This makes the weight of the entire moving load, at the moment of starting the trip from the bottom, 37.725 tons. Then, assuming a track resistance of, say, 15 lb. per ton, for both cars and rope, and adding a grade resistance of 20 lb. per ton, for each per cent of grade, or $20 \times 3.2 = 64$ lb. per ton, the sum of the track and grade resistances is $15 + 64 = 79$ lb. per ton of moving load. This makes the tension on the rope, at the head of the plane, when starting the trip from the bottom, $37.725 \times 79 = 2,980.275$, or say 3,000 lb.

A speed of 10 mi. per hr. is $(5,280 \times 10) \div 60 = 880$ ft. per min. Finally, assuming an efficiency of 80 per cent in the haulage engine, the horsepower of the engine required to haul this load at this given speed is

$$H = \frac{3,000 \times 880}{0.80 \times 33,000} = 100 \text{ hp.}$$

QUESTION—(a) *How is the horsepower of an engine determined?* (b) *The area of the piston of an engine is 500 sq.in., the mean effective pressure 30 lb. per sq.in. and the length of stroke 8 ft. If the engine is making 20 strokes per minute, what is the horsepower developed?*

ANSWER—(a) The mean effective pressure in the cylinder must be first ascertained from the engine card. Multiplying this mean effective pressure by the sectional area of the cylinder gives the total pressure on the piston. Finally, multiplying this total pressure by the piston speed in feet per minute and dividing that product by 33,000 gives the indicated horsepower of the engine.

(b) In this case, the total pressure on the piston is $30 \times 500 = 15,000$ lb. For an 8-ft. stroke and a speed of 20 strokes per minute, the piston speed is $8 \times 20 = 160$ ft. per min. Finally, the indicated horsepower of the engine is $(15,000 \times 160) \div 33,000 = 72.72$ hp.

QUESTION—*The horsepower of an engine is 175; how many gallons of water per hour will be consumed?*

ANSWER—The water consumption of an engine, as in boiler practice, depends on a number of items not stated in the question. These items are: the mean effective pressure in the cylinder, the dimensions of the cylinder and percentage of clearance. However, with an ordinary slide-valve engine such as is in common use at many coal mines, a consumption of 5 gal., per horsepower per hour, would be a fair estimate. On this basis, a 175 hp. engine of the type mentioned would require $5 \times 175 = 875$ gal. of water per hour.

QUESTION—*A motor is taking 45 amp. of current at a pressure of 500 volts; what is the horsepower?*

ANSWER—The output of this motor is $(45 \times 500) \div 746 =$, say 30 hp.

General Adoption of Automatic Substations at the Mines

Application of Automatic Features to Mine Substations—
Economic Advantages — Saving in Power, Attendance
and Maintenance — Description of Automatic Operation

BY J. E. BORLAND

General Engineer, Westinghouse Electric & Manufacturing Co.

FOR several years before the application of the automatic substation to mining service its position in the electric railway field had been firmly established by the success shown in reducing operating charges and improving service. Conditions in the railway industry had been such that an improvement leading to these results was of vital importance. While the mining industry was not confronted with this necessity to the same degree, the success of the automatic railway substation was logically followed by application of the same principle of operation to mining, as like results were to be expected because of a similarity in power requirements and distribution.

Both industries require the transmission of direct-current power over a considerable extent of territory, which often necessitates a large investment in feeder copper and distributed substations to maintain satisfactory trolley voltage. Although the haulage distance of the average mine is in general much less than that of an electric railway, the lower trolley voltage used in most mines because of safety considerations makes the two fields comparable in many respects. In both cases the load varies over a wide range, and the service is subject to more or less frequent interruption caused by excessive overloads or short-circuits, this being particularly true in mining service. That the advantages of automatic substation equipment under such conditions are being generally recognized is demonstrated by the rapid expansion in its use in mining substations within the last two years.

The first substation equipped with automatic control to be installed in an American mine was put into service in January, 1921, by the Lincoln Coal Co., at Nanty-Glo, Pa. The mine using this equipment is a drift opening having a main-haulage distance of more than two miles with grades against the loading trips throughout the entire length. The substation consists of a 200-kw. 250-volt synchronous motor generator set installed in a concreted room along the main haulageway about two miles from the drift mouth. Power is supplied through a three-conductor 2,200-volt cable entering the mine through a borehole.

The Lincoln Coal Co. substation is normally started and stopped by means of a small control switch operated by the first man entering the mine in the morning and by the last man out at night. By throwing a small double-throw knife switch on the switchboard, operation of the equipment is made entirely automatic, the substation starting when the trolley voltage is reduced below a predetermined value for more than 5 seconds, and shutting down when the load is reduced for a certain time interval. This installation followed very closely the practice of automatic control and protection for railway substations, including protection from hot bearings, overspeed, overheating, reverse current, reverse phase, low a.c. voltage and excessive overloads by the

use of current-limiting resistors. The substation has given entirely satisfactory operation since it was first installed, and through the improved voltage conditions obtained the haulage time has been considerably reduced and the mine capacity correspondingly increased.

Without doubt the principal stimulus to the use of automatic substations has been the direct reduction of operating expenses obtained by automatic operation. In general this saving is made up of several items which vary to some extent with local conditions, such as the size of the mine, cost of attendance, characteristics of power demand and equipment in operation.

The elimination of a regular attendant, of course, is the principal factor in the economy of the automatic substation. Where the substation location is such that a manually controlled equipment would require the presence of an operator at all times, automatic equipment will release him for other work, and the automatic operation and protection of the substation will be much more efficient than is possible with manual control. As the automatic equipment requires only short inspections at weekly intervals, the direct saving resulting from elimination of the operator amounts to almost the entire amount of his wages. In comparing the two types of substations the entire cost of periodical inspection cannot be charged properly against the automatic equipment, as a similar item is necessary with manual equipments for frequent inspections and attention by the maintenance crew. This reduction of labor charges will often show a saving sufficient to entirely wipe out the original cost of the automatic equipment in two or three years.

At many mines the substation is located so that it can be started and given intermittent attention throughout the day by a man employed regularly on other work,

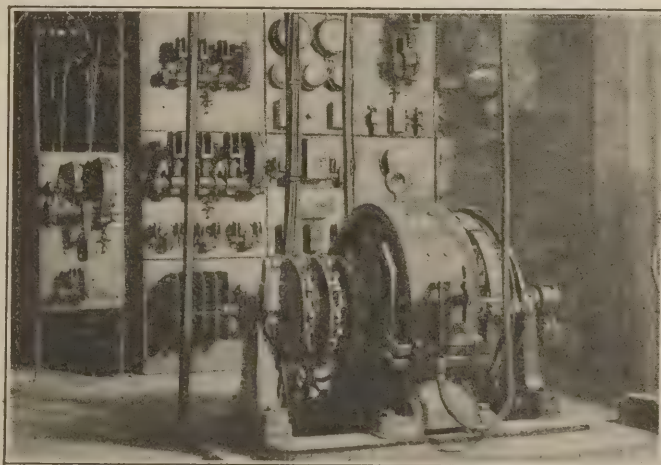


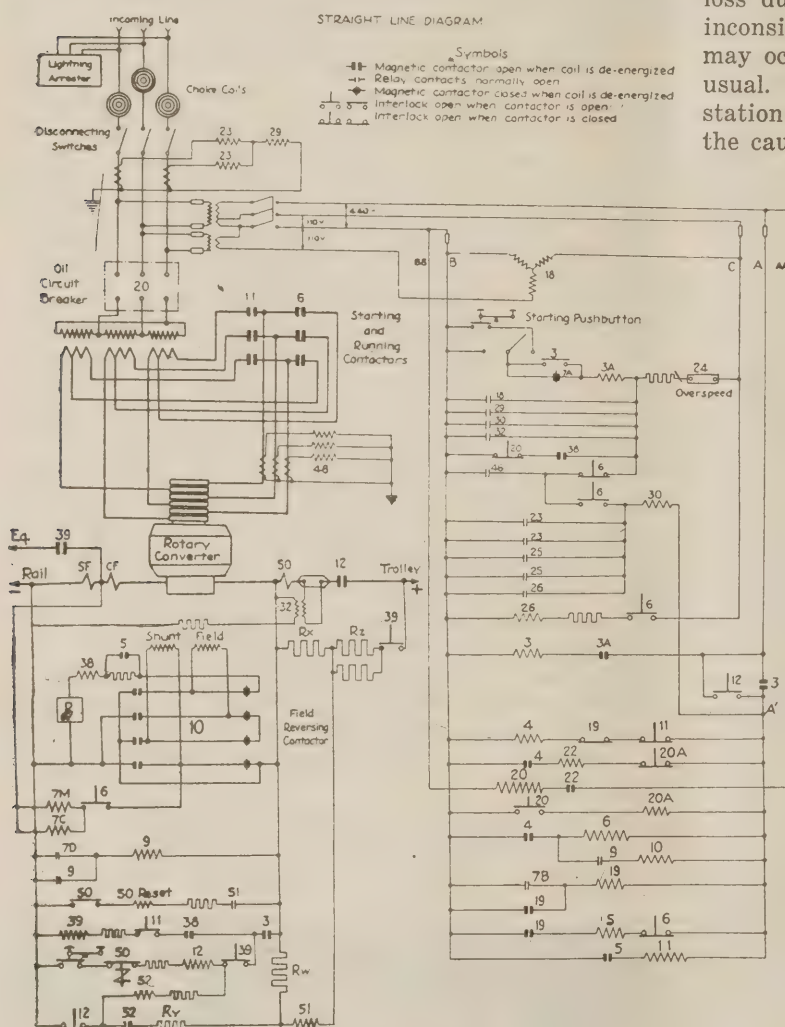
FIG. 1—LAYOUT OF UNDERGROUND AUTOMATIC SUBSTATION

This station is equipped with a synchronous converter, behind which is shown the complete switchboard for automatic control and protection.

such as a mine clerk or a hoist operator. This usually requires that the substation be placed farther from the load than would be necessary otherwise, with the result that the cost of installation is increased somewhat by the added length of positive and return feeders, and the trolley voltage and efficiency is reduced by the drop in the added feeders. Fairly satisfactory operation can be obtained with such attendance, in case the man whose duty it is to look after the substation is available at any time throughout the day. It often happens that his regular work requires him to leave the vicinity of the substation at various times, or conditions may be such that interruptions of service are not immediately observed.

The majority of interruptions of service from a min-

ing substation are caused by heavy overloads from locomotives or by short-circuits on the trolley system, which opens the d.c. circuit breaker. If the attendant loses no time in getting to the substation, service is restored with small delay by reclosing the circuit breaker, provided the trouble is cleared. The usual result of depending upon an irregular operator, however, is a considerable amount of time lost every day through delays in restoring power after interruptions. The losses chargeable to this source are in the form of reduced tonnage and consequent increased capital charges, idleness of motormen, trip riders and other day men, and the general dissatisfaction and confusion which follows an interruption in service for any length of time. While it is a difficult matter to estimate the loss due to such causes it is obvious that this is not inconsiderable when delays of ten minutes or more may occur several times daily, which is not at all unusual. This is entirely avoided by the automatic substation which restores service almost immediately after the cause of interruption is removed. In addition, the



SEQUENCE TABLE

Device Number	3A	3	4	6	22	20A	26	7M	10	7B	19	5	11	38	39	52
Operation Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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* These operations are omitted if converter starts with correct polarity.

LIST OF APPARATUS

- 3 - Master Control Relay - S.P.
- 3A - Auxiliary Master Control Relay - S.P.
- 4 - Starting Control Relay - 2P.
- 5 - Running Control Relay - 2P.
- 6 - A.C. Starting Contactor - 3P.
- 7 - D.C. Polarized Motor Relay
- 9 - Field Reversal Control Relay - 2P.
- 10 - Field Reversing Contactor - 4P.
- 11 - A.C. Running Contactor - 3P.
- 12 - D.C. Line Contactor - S.P.
- 17 - Knife Switch - S.P. D.T.
- 18 - Phase Failure and Low Voltage Relay - S.P.
- 19 - Starting Transfer Relay - 2P.
- 20 - High Tension Oil Circuit Breaker Closing Coil
- 20A - High Tension Oil Circuit Breaker Latch Coil
- 22 - High Tension Oil Circuit Breaker Control Relay - S.P.
- 23 - A.C. Overload Relays - S.P.
- 24 - Overspeed Device
- 25 - Bearing Thermostats - S.P.
- 26 - Starting Time Limit Relay - S.P.
- 29 - A.C. Thermal Overload Relay - S.P.
- 30 - Lockout Relay - S.P.
- 32 - D.C. Reverse Current Relay - S.P.
- 38 - Field Current Relay - 2P.
- 39 - Equalizer Contactor - S.P.
- 46 - Phase Balance Current Relay - S.P.
- 50 - D.C. Series Overload Relay - S.P.
- 50T - D.C. Series Overload Relay Trip Coil
- 50R - Latch Release on Overload Relay
- 51 - D.C. Line Contactor Reset Relay
- 52 - Reset Delay Relay S.P.

FIG. 2

Wiring Diagram Showing Control and Protective Equipment

Automatic equipment used with mine converting machines makes possible the location of the substation at the most economical point for distribution regardless of the accessibility from the standpoint of attendance.

automatic equipment provides protection which is left to the observation of an operator in a manual station, so that a manually operated station without constant attendance is only partly protected.

Another pronounced advantage of the substitution of automatic control and protection for manual operation is that the substation is better adapted to be located at the most efficient point with respect to the load. This is of particular importance in the case of mines developed to a considerable distance from the opening.

In starting the development of a mine it is the usual practice to install near the mine opening a substation of sufficient capacity to meet the initial requirements. As the development progresses and tonnage is increased, the addition of locomotives, mining machines and pump motors frequently requires an increase to be made in the substation capacity. Furthermore, with increased distance of transmission, the voltage drop in the trolley circuit may be so large at times that it will become necessary to install heavy feeders to maintain satisfactory voltage to gathering locomotives and mining machines at the working face. Under conditions similar to these the addition of feeders can be obviated, and high voltage maintained at all motors by installing a substation as near as possible to the load center. This may be done by locating the equipment in an underground room and running to it a three-conductor alternating-current cable through a borehole, or the substation may be located on the surface, and the direct-current feeders lowered in the borehole. Fig. 1 shows a substation installed in an underground room. When the location is convenient to an alternating-current line, the cost of such an automatic substation will often be less than that of a similar increase of the existing substation and feeder capacity. In addition voltage conditions will be improved to a greater extent than would be practicable by adding to the outside substation.

VARIOUS WAYS OF STARTING AND STOPPING

Numerous automatic mining substations have been applied in this manner. These equipments are started and stopped in a variety of ways: by remote control from a circuit breaker in the alternating current feeder, by pushbuttons and a pilot circuit energizing a master relay at the substation, by a time switch adjustment to start and stop the station at desired times, and by combinations of these forms of control. In mining substations it is not considered desirable to follow the railway practice of starting automatically upon reduction of trolley voltage to a predetermined value and shutting down when the load has reduced, as there is no appreciable advantage in this refinement in mining work, and the equipment is simplified somewhat by its elimination.

In general a considerable demand for power is being made constantly by gathering locomotives, mining machines and pumps, to which is added the requirements of the main haulage locomotives so that it is generally desirable to have the substation running continuously to maintain high voltage at these various motors, in addition to being able to supply without delay any sudden overloads. In substations consisting of two units it is the usual practice to provide for automatic starting of the second machine by a thermal relay in case the load is such that overheating of the first machine would result unless it were relieved. When the load is decreased for a predetermined time the second machine is automatically disconnected and stopped. By

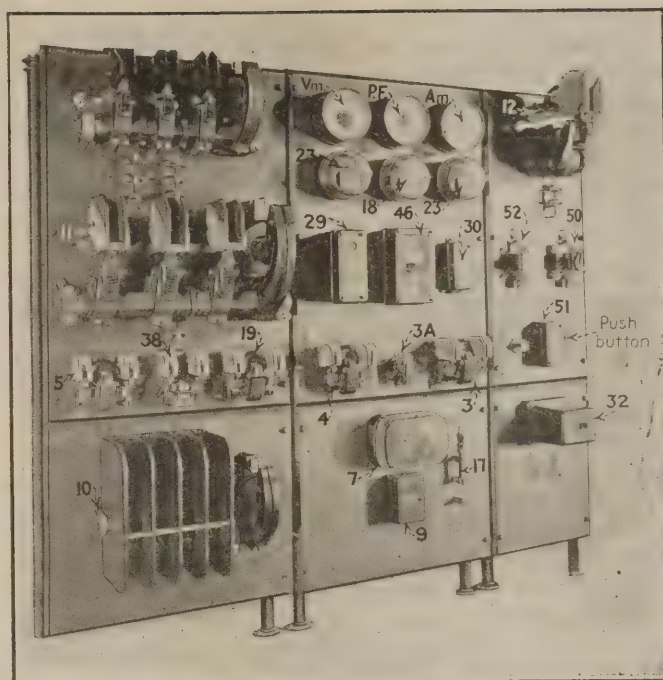


FIG. 3—COMPLETE SWITCHBOARD FOR AUTOMATIC SUBSTATION

The equipment for automatic operation rarely occupies much more space than the manually operated equipment. The proper functioning of the station depends on a certain sequence of relay operations.

this means the light load losses of the second machine are eliminated at times when the demand can be satisfactorily met by the first unit alone.

A further economy resulting from the substitution of automatic for manual operation is a reduced maintenance charge due to better handling and protection of the equipment. With automatic control each switching operation is a direct function of the electrical condition existing at that particular moment, and as each succeeding operation is dependent upon the proper functioning of those preceding, the equipment is started and put into service in the smoothest possible manner, and all possibility of damage through incorrect or careless switching is avoided.

Automatic protective devices prevent damage to the equipment from any abnormal condition or source of trouble with the least interruption to service, the substation being locked out of service only in case the presence of an inspector is required. As these devices perform immediately the functions ordinarily left to the observation and judgment of an operator, serious damage often is averted which might otherwise result from failure to act promptly. In addition to reduced maintenance and added life of the equipment, extended periods of time lost in repairing damaged equipment are avoided.

As these advantages of automatic operation became generally recognized the demand in the mining industry soon increased to such an extent as to warrant the standardization of automatic control equipment for motor generator sets and rotary converters of the capacities generally used in mining service. These include machines up to 300 kw., 25 or 60 cycles, 2,300 volts d.c., 275 or 600 volts d.c., this being the largest rating usually desired in a single unit. The design of these standard equipments is based on the extensive experience obtained in the railway field and in the early mining installations.

Thorough consideration has been given to the re-

quirements peculiar to the mining industry, with the result that features not necessary or desirable in a mining substation have been eliminated, and the cost and complication considerably reduced thereby. Simplicity and reliability have been considered of prime importance. The control and protection of these substations is obtained largely through the use of magnetic contactors and relays that have been proved by years of service in industrial and power-control work.

With those who are unfamiliar with automatic substation equipment there is apt to be a feeling that the control is highly complicated and difficult to maintain. This is not the case, however, as the entire operation and the functions of the various devices can be readily understood after a little study and experience. To demonstrate this it is thought advisable to describe in some detail the performance of an automatic synchronous converter substation which was recently put into operation in a Western coal mine. This type of equipment is not quite so simple as that for a motor-generator set, as provision must be made to correct polarity if the converter starts up with reversed d.c. voltage, and in the 300-kw. size the d.c. brushes must be raised at starting.

The complete wiring diagram of this substation is given in Fig. 2, showing all power and control circuits, omitting only the meters, which have no part in the automatic operation. The diagram is arranged to show the various circuits as short and direct as possible, to facilitate tracing out. Operation of the equipment in starting up is outlined by the sequence table. A detailed description of a mine installation is given below.

The automatic switchboard is shown in Fig. 3, the principal control and protective devices being mounted on slate bases assembled on pipe framework. The various devices are numbered to correspond to the diagram and list of apparatus. The high-tension oil circuit breaker with its operating mechanism is mounted on a separate panel—Fig. 4—so that it may be set up in the most convenient location. This equipment controls a 150-kw. 275-volt d.c. synchronous converter supplied from a 2,200-volt 3-phase 60-cycle line, representing practically the latest practice in the automatic operation of a mining substation of this type and rating.

DETAILS OF AUTOMATIC OPERATION

In normal operation of the substation the disconnecting switches and control knife switch shown in the diagram are closed at all times, and the S. P. D. T. knife (17) switch shown at the bottom of the switchboard is closed on the bottom contact corresponding to the right-hand contact in the diagram, which provides for starting and stopping from a remote pushbutton. The station also can be started and stopped independently of the remote pushbutton by the use of the top contact of the S. P. D. T. knife switch (17), when the substation is being inspected. The converter then starts automatically with the proper sequence of operations, according to the following explanation, which can be more readily understood by referring to the diagram:

Operation 1—The coil of the auxiliary master relay (3A) is energized by the starting device, being connected across the 110-volt bus B-C through the over-speed device (24) and the contact 7A of the polarized motor relay (7). Contact 7A is closed only in the neutral or de-energized position of relay (7) so that the relay must be in this position before starting up.

Operation 2—The master control relay (3) is ener-

gized through the contacts of relay (3A). Closing of relay (3) energizes the 440-volt control bus A.

Operation 3—When bus A is energized, the coil of the starting control relay (4) is energized through interlocks on relay (19) and running contactor (11). This prevents closing of the starting control relay (4) unless the running contactor (11) is open.

Operation 4—Through one contact of relay (4) the coil of the starting contactor (6) is energized. The other contact of relay (4) energizes the high-tension oil circuit breaker control relay (22).

Operation 5—Closing of the starting contactor (6) connects the collector rings of the converter to low-voltage starting taps of the power transformers. Closing of relay (22) energizes the closing coil of the high-tension oil circuit breaker (20) across the 440-volt control bus AA-BB. Closing of the oil circuit breaker (20) connects the high-tension side of the transformers to the line, and starts the converter on reduced voltage through starting contactor (6). The starting time-delay relay (26) is energized by an interlock closing with contactor (6). The contacts of relay (26) close after a definite time delay, provided the starting sequence is not completed.

Operation 6—The oil circuit breaker latch (20A) is energized by an interlock which closes with the oil circuit breaker (20). The polarized motor relay armature and clutch (7M and 7C) are energized from the direct-current side of the converter through an interlock on starting contactor (6).

Operation 7—The oil circuit breaker control relay (22) is de-energized by an interlock which opens when the oil circuit breaker latch (20A) closes.

Operation 8—The oil circuit breaker closing coil (20) is de-energized by opening of the control relay (22). The oil circuit breaker is now held closed by latch (20A), which requires only a small amount of power.

Operation 9—With a rotary converter starting in this manner provision must be made to reverse the direction of field excitation momentarily to correct the d.c. polarity if the machine starts up reversed. This is the function of the polarized motor relay (7). The relay consists of a small direct-current armature (7M) placed in the field between poles of a permanent magnet. When the armature (7M) is energized it drives through a gear train and a magnetic clutch (7C) a small drum carrying the moving parts of two sets of control contacts (7B and 7D). The direction of rotation of the relay determines which of these two sets of contacts will close.

Under operation 6 it is noted that the polarized motor relay, armature (7M) and clutch (7C) are energized from the d.c. brushes of the rotary converter. As the machine comes up to synchronous speed the relay armature receives direct current and begins rotating in a definite direction which is dependent on the direction of current flow and accordingly on the polarity of the converter. If the polarity is incorrect when the machine reaches synchronous speed, the direction of rotation of the relay will be such that contacts (7D) are closed.

Operation 10—Closing of polarized motor relay contact (7D) energizes the field reversal control relay (9), which is excited from the direct-current side of the rotary converter.

Operation 11—Closing of relay (9) energizes the coil of the 4-pole double-throw field-reversing contactor (10) through the starting control relay (4). This closes the upper row of contacts, which are normally open, and

reverses the excitation of the converter. With the excitation reversed the rotary converter "slips a pole," and the voltage drops to zero, the shunt field being split in two and the two halves connected in parallel to insure rapid operation on reversing.

Operation 12—When the converter voltage drops to zero the polarized motor relay (7M and 7C) and relay (9), which are excited from the d.c. side, are de-energized and the rotating drum of the polarized motor relay is returned to the neutral position by a spring. Opening of relay (9) de-energizes the field-reversing contactor (10), which is closed and held in its normal position by gravity. The rotary converter having dropped back a pole, its polarity is now correct with normal excitation.

Operation 13—As the d.c. voltage builds up with correct polarity, the polarized motor relay (7M and 7C) is energized in the opposite direction.

Operation 14—Rotation of the polarized motor relay in the opposite direction closes contact 7B after an inherent time interval.

Operation 15—Closing of contact 7B energizes the starting transfer relay (19) from the 440-volt control buses B-A'.

Operation 16—The starting control relay (4) is de-energized by an interlock which opens when starting transfer relay (19) closes.

Operation 17—Opening of the starting control relay (4) de-energizes starting contactor (6).

Operation 18—Polarizing motor relay (7M and 7C) and starting time delay relay (26) are de-energized by interlocks which open with starting contactor (6).

The running control relay (5) is energized through relay (19) and an interlock which closes when starting contactor (6) opens. This prevents closing of the running contactor until the starting contactor has opened.

Operation 19—Closing of running control relay (5) short-circuits a series resistor in the converter field circuit, and also energizes the running contactor (11). This connects the rotary converter collector rings to the full voltage taps of the power transformers. The converter is now running light with full voltage.

Operation 20—Increasing of the converter field excitation to normal value by closing of relay (5) closes the field current relay (38). This relay prevents loading of the rotary converter until its field is excited.

Operation 21—Closing of the field current relay (38) energizes the equalizer contactor (39) through master relay (3), and an interlock closing with running contactor (11). This equalizer contactor is mounted separately and is required only in case the converter is to operate in parallel with another machine.

PUTTING CONVERTER ON THE D. C. LINE

Operation 22—The d.c. line contactor (12) is energized through a normally closed pushbutton, the overload relay contacts (50) and an interlock closing with the equalizer contactor (39). This requires the equalizer contactor (39) to be closed before the d.c. line contactor (12).

An interlock closing with the d.c. line contactor (12) shunts the contact on master control relay (3) which connects buses A and A'. This prevents disconnecting the converter from the a.c. line until the d.c. side is opened.

It will be seen by the preceding explanation that the entire operation of starting is carried through in the correct sequence, and with no more than the proper

amount of delay to allow the machine to come up to speed. All danger of damage to the equipment from faulty or careless switching is removed. The equipment is started and in operation in 10 to 20 seconds after closing of the starting contact, depending on the setting of delay relay (52).

The protective equipment is designed to provide adequate protection from damage by any abnormal operating condition, and at the same time to assure the least possible interruption of service. Reference to the diagram will show the relation of the protective devices to the rest of the apparatus.

In case of trouble which will not be cleared automatically it is necessary to lock the station out of service. For this purpose lockout relay (30) is used. When the lockout relay is energized its contacts short-circuit the coil of the auxiliary master relay (3A), and the station is shut down by the opening of relay (3A). The contacts of the lockout relay (30) on closing are held in this position by a latch, so that the station is prevented from restarting until the latch is reset manually by a maintenance man. The coil of lockout relay (30) is energized by protective devices which operate in case of trouble requiring an inspector's attention.

Alternating-Current Overload—Two induction type overload relays (23) energize from current transformers provide protection from excessive alternating-current overloads. These relays are set to operate only on very abnormal overloads such as would be caused by a short-circuit on the alternating-current side, the d.c. relays protecting against ordinary overloads. Operation of the a.c. overload relays locks out the station by closing relay (30), which opens master control relays (3A) and (3).

Bearing Protection—The rotary converter is equipped with two bearing thermostats (25) which operate relay (30) and lock out the station if the bearing temperature rises to a dangerous point.

Starting Protection—If the starting operation is interrupted and the converter remains connected to the starting taps for a longer period than necessary the station is locked out by the starting time delay relay (26).

Unbalanced Phases—If for any reason the phase currents to the converter become unbalanced the station will be shut down by the phase balance current relay (46), the contact of which short-circuits the coil of the auxiliary master relay (3A). If the condition still exists when an attempt is made to restart, operation of relay (46) will close relay (30), and lock the station out of service until the trouble is located and cleared.

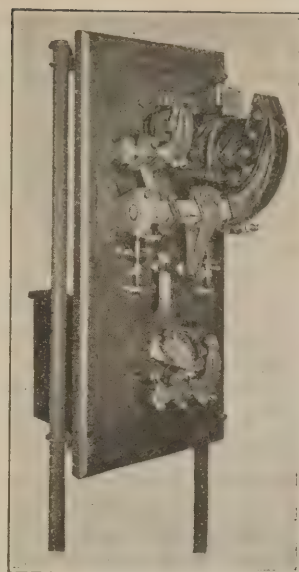


FIG. 4—MAIN LINE OIL SWITCH ON ALTERNATING-CURRENT SUPPLY

At one time the human element seemed necessary and highly desirable for the proper care and operation of converting equipment. Today automatic equipment gives far better results than manually operated equipment. The switch in the photograph functions more positively than any manually operated switch, in that the contacts are completely and positively made whenever the switch is closed.

Reverse Current—Reverse current or inverted operation of the converter is prevented by relay (32), which shuts down the station by short-circuiting the coil of relay (3A).

Overheating—Overheating of the converter from sustained overloads is prevented by the a.c. thermal overload relays (29). This relay is essentially a thermostat having a temperature characteristic similar to that of the converter so that the relay contact closes just before a dangerous temperature is reached. Operation of relay (29) shuts down the station by short-circuiting the coil of relay (3A), and the contact of relay (29) is maintained for a time to allow the converter to cool before starting up again.

Phase Failure—Starting of the station under single phase or reverse phase is prevented by relay (18). The contacts of this relay are closed also by low a.c. voltage.

Overspeed—The converter is prevented from overspeeding by a centrifugal device (24) which disconnects auxiliary master relay (3A).

No Field—Opening of the converter shunt field circuit de-energizes relay (38) and prevents closing of the d.c. line contactor (12).

D.C. AUTOMATIC CIRCUIT BREAKER PROTECTION

Direct-Current Overload—The converter is protected from excessive overloads and short-circuits on the d.c. side by overload relay (50), which causes the line contactor (12) to open. The overload relay is provided with a dash pot so that service is not interrupted by momentary overloads within the capacity of the converter, while rapid operation is obtained on short-circuits. When opened, the contacts of relay (50) are held in that position by a latch.

When the d.c. line contactor (12) opens, the coil of the reset delay relay (52) is energized through an interlock. Closing of the reset delay relay is retarded by an oil dash pot which may be adjusted to the desired value. When relay (52) closes, the resistance of the load between trolley and rail, in series with resistor *RY*, forms one leg of a Wheatstone bridge arrangement, the remainder of which is composed of *RW*, *RX* and *RZ*. The coil of the d.c. line contactor reset relay (51) is used with this grouping in such a manner that its contacts are closed when the resistance between trolley and rail has increased to such a value that the converter will not be overloaded upon closing of the line contactor. Operation of relay (51) energizes the latch release coil (50R) which trips the latch holding open the contacts of overload relay (50). The d.c. line contactor (12) then recloses and the shunt reset relays are de-energized.

By this method the equipment is fully protected from excessive d.c. overloads, and the service is restored almost immediately after the cause of interruption is removed, except when intentionally delayed by relay (52).

The installation described provides all the operating and protective devices necessary for a station of medium size. The standard equipment is sufficiently flexible, however, to permit the addition of other features that may be desired.

As shown by this discussion, the operation and protection of the automatic equipment is much more reliable than that to be expected of manually controlled equipment. As a result of this and its economic advantages, the automatic substation is rapidly gaining favor in the mining industry, and warrants serious consider-

ation for new installations. Existing manually controlled stations can be arranged to obtain the benefits of automatic operations with minor changes in the equipment.

Electrical Engineers in Annual Convention And Technical Sessions

THE American Institute of Electrical Engineers held its thirty-ninth annual convention at Swampscott, Mass., June 25 to 29. Headquarters were at the New Ocean House. Dr. A. E. Kennelly, chairman of the convention committee, made the welcome address on Monday. At the same meeting President Frank B. Jewett delivered an address on "The National Engineering Societies, Their Problems of the Past, Present and Future."

The first technical session was held on Tuesday morning, when papers were read by Messrs. Steinmetz, Hayden, Eddy and Simons, pertaining to cable charge, dielectric strength and capacities of conductors. In the evening demonstrations were given of a 30,000-watt incandescent lamp and of the public address system with telephone lines.

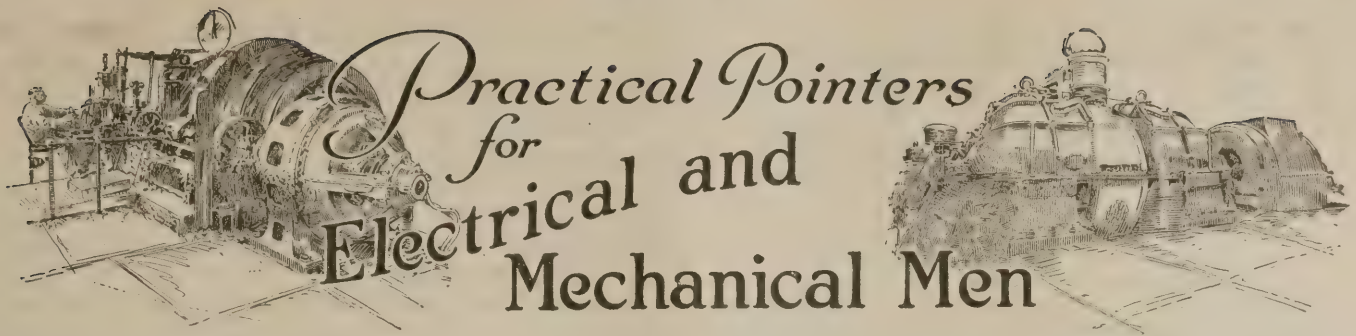
The technical sessions held on Wednesday were descriptive of the Weymouth Power Station, the ultimate capacity of which is to be approximately 300,000 kw. and where considerable research and experimental work is being done with a boiler and turbine designed for operation at a steam pressure of 1,200 lb.

An interesting paper on "Cooling of Electric Machines" also was read. This paper dealt with the ability of copper, iron and insulation to dissipate heat by conduction and showed the results of tests to determine the rate of heat dissipation by natural ventilation, radiation and convection currents. Several interesting papers also were read on plants and equipment used in transoceanic telephony and national broadcasting and receiving. Other papers covered a large variety of subjects relating to transmission of electricity, protection and utilization problems and developments.

Inspection trips to many points of technical and historical interest were arranged. The General Electric Co.'s Lynn works, Simplex Wire & Cable Co. plant, New England Telephone & Telegraph Co. exchange and Watertown Arsenal were most popular.

About 1,200 members and guests were presented, which shows the growing appreciation of the importance of the work of the society in promoting electrical science and its pioneering in electrical application.

SALES OF EXPLOSIVES in the United States in April, 1923, according to the U. S. Bureau of Mines, amounted to 598,622 kegs of black blasting powder, 5,443,735 lb. of permissible explosives, and 23,466,571 lb. of high explosives other than permissible. Each of these figures represents a large increase over April sales during the past four years with the single exception of black powder sales for April, 1920, which amounted to 611,979 kegs. The figures presented are based upon reports from manufacturers whose sales amount to about 90 per cent of the total sales of explosives in the United States. The quantity of black powder sold in April was 1.3 per cent less than the amount sold in March, 1923, but it exceeded by 222 per cent the sales for April, 1922, when coal mining, the principal consuming industry for black powder, was so greatly affected by the miners' suspension of work. April sales of permissibles were 20 per cent more than in March, 1923; 228 per cent more than in April last year, 125 per cent more than in April two years ago, and 48 per cent more than in April 1920.



Electrolysis from Current Leaks

WE ARE experiencing considerable difficulty in one of our mines due to electrolytic action on some of our important cable systems and also on pipe systems. I would like to have some suggestions as to how some of this leakage may be eliminated and the damage resulting at present reduced.

MINE ELECTRICIAN,
Pennsylvania.

The greatest cause of electrolysis in coal mines is insufficient bonding of track joints. Usually this would mean that a larger number of bonds is needed but it also means proper installation of bonds and the correct type of work.

Poorly bonded joints may cause the current to leave the track and flow toward the power house or substation through a gas or water pipe or the metal sheath of an electric cable. This leakage current may cause electrolysis at the joints of the pipe and in time destroy the joints.

Because of its location or surroundings this pipe or sheath may become electro-positive to some other pipe or the track, and in leaving the pipe or sheath the current sets up an electrolytic action which is destructive to the spot where it leaves. The result of electrolysis is readily recognized but it is difficult and sometimes impossible to locate it is its incipient stage.

Whenever a pipe or the ground in the vicinity of a negative return rail is electro-positive to that rail (measured with a low reading voltmeter) it is fair to assume that all the current is not returning on the rail and that an electrolytic action is in progress. The destructive action is a direct function of time but is not always proportional to the magnitude of the leakage current and a small current density may cause very serious corrosion.

There are three remedies for electrolysis. First, by permitting the leakage to continue but by bonding the pipe joints and connecting the pipe electrically to the return lead of the generator, the current remains on the pipe and cannot start destructive electrolytic action. Second, by installing insulated joints in the pipe the current can not flow over it but must flow through the ground. Third, by electrically bonding the pipe joints in certain zones and then bleeding the current from the pipe by return cables the current is returned without destructive action. This is called a mitigating system.

The three schemes are difficult to carry out successfully and being corrective in principle rather than preventive, none of them protects the rail which may be eaten away at the base, due to the current leakage. The best scheme is to prevent current leakage by having efficient bonding and a return track circuit which is the path of least resistance to the generating station.

To obtain this it may be necessary to supplement the rail return with negative cables or negative boosters, but in any case the current should be kept where it belongs.

Block Signal for Mine Track

WE HAVE been able to save considerable time and eliminate many wrecks by using a simple block signal in handling trips on partings. An arrangement such as shown in Fig. 1 was used. One wire was fastened to an insulated section of the parting track and the other fastened to the opposite rail. These wires were connected to the regular binding posts of a 20-volt a.c. bell, from which the gong was removed. A pair of wires from the regular 220-volt lighting circuit with a lamp in the circuit were connected by placing one wire on an insulated piece of iron where the clapper would rest with no current flowing through the electromagnets; the other wire was grounded to the bell frame.

When there are no cars on track A, shown in Fig. 1, the clapper of the bell is pulled away from the electromagnets by the clapper spring, which causes the clapper to come in contact with the insulated piece of iron. Completing the 220-volt circuit through the frame of the bell and causing the light to burn. When cars are on track A the 20-volt circuit is closed by the current passing through the wheels and axles of the cars, causing the electromagnet to become magnetized and thus pulling the clapper away from the piece of insulated iron, breaking the circuit and putting the lamp out. Thus, with the above-described connections the rope runner dropping empties into the parting can tell at a glance if the track is clear which is indicated by the lamp when lighted. If the light was out it would indicate that there were cars on the track and he would have to wait until the light came on.

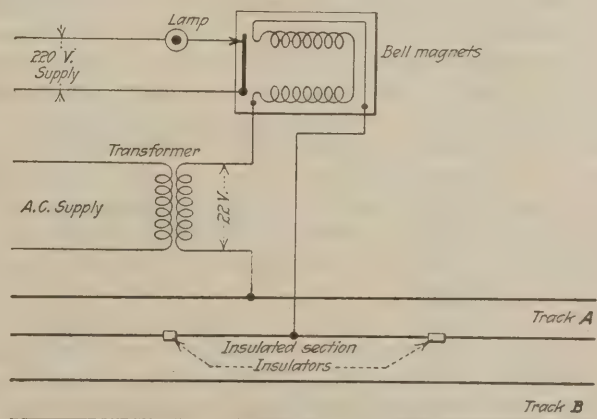


FIG. 1—BLOCK SIGNAL CIRCUIT

Cars standing on the section of track which is insulated completes the 22-volt circuit, which, operating through the bell magnets, opens the local 220-volt circuit, thus putting the lamp out. When there are no cars on the track the control circuit is not operative and consequently the spring on the clapper of the magnet frame closes the local circuit and keeps the lamp lighted.

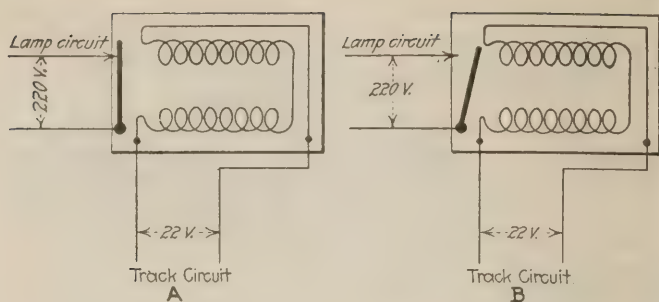


FIG. 2—OPERATION OF IMPROVED RELAY

A shows the track circuit open and the signal circuit closed, thus lighting the lamp. B shows the track circuit closed and the signal circuit opened, the lamp being out.

A different arrangement can readily be made by changing the insulated piece of iron so that when the cars are on the track the clapper will come in contact with it. With this arrangement the light would burn with the cars on the track and would not burn when the track was empty. The first arrangement has been used because at many places there are times when the power goes off, so that with this arrangement no damage can be done because the absence of a burning light indicates that there are cars on the track. An enlarged sketch of the action of the bell under both conditions is shown in Fig. 2. These are self-explanatory.

In some places the block signal is placed on track B, indicating when the loaded cars are on the track and preventing dropping more cars into the parting until it is clear. There are several possible arrangements for this system which any electrician can readily make to accommodate local conditions. The cost of this installation is very low. The only materials needed are a 20-volt bell (without gong), a stepdown transformer, a lamp socket and lamp with sufficient wire to make connections. The insulated sections in the track are made of wood.

CECIL ROWE,
Mining Engineer.

Tokay, N. M.

Worn Locomotive Tires Removed Through Aid of Engine Lathe

REMOVAL of worn locomotive tires from the wheels by driving in a drift punch, thereby cracking the tire, as an alternative method to that of the acetylene flame is suggested by the New Field By-Product Coal Co., of North Bessemer, Pa. Either method can be recommended as a vast improvement over the altogether too dangerous method of lifting off a tire by dynamite.

The job is done at the mine of the above-named company by lifting a wheel set by a carriage crane and transporting it to an engine lathe, where it is placed on blocks that rest on the lathe bed. A $\frac{3}{4}$ -in. drill is inserted in the headstock and is made to pierce the tire, running at high speed and clearing the wheel, by feeding the work toward the drill through the turning in of the footstock screw. A few blows of a sledge upon a drift punch inserted in the drillhole will crack the tire.

Two men can remove four 18-in tires and shrink on new ones in two hours. While the worn tires are being removed the new ones are being heated so that no time is lost in making the change.

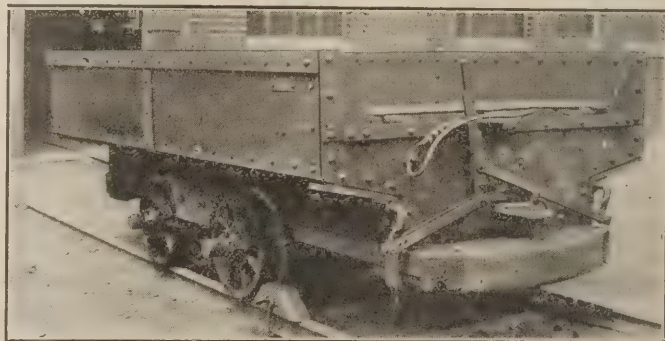
EUROPEAN NATIONS MAY BURY the hatchet, but they seem to retain plenty of axes to grind.—*Brooklyn Eagle*.

Track Block Prevents Runaway Mine Cars

IN AN endeavor to provide safe working conditions in its Springdale mine the Allegheny-Pittsburgh Coal Co., Pittsburgh, Pa., has placed a safety block in every working place whether it be a room or a heading. As the illustration and the sketch show, it is nothing more than a trapezoidal block of oak which is pinned to a clevis inserted under the rail so as to embrace the rail.

Primarily it is used to prevent a mine car from leaving the track near the face of a room or heading. Though it is termed a safety block, it might better be called a track block in that its sole function is to block the track. Consequently, it might be considered an idea borrowed from the railroad where concrete or wooden piers are used for this purpose.

Mine cars pushed in a room are seldom spotted near the face by a mule driver or motorman. For this



SAFETY BLOCK HOLDING CAR

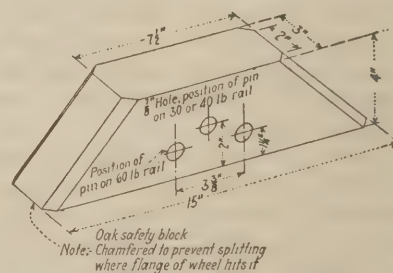
Blocking the car in this manner makes mining work safer. Runaway cars always are a source of danger and frequently hold up the whole transportation system.

reason the miner is required to push the mine car within shoveling distance of the face. The result is that he must move the mine car and look to the braking simultaneously. Sometimes the mine car gets away from him, passing over the end of the track onto the bottom. If the working place is on the dip, this danger is most likely to occur. Frequently considerable time is lost in putting the mine car back on the track. A spotted mine car with brakes improperly set might run toward the face when on the dip, or away from the face when on the rise, endangering the life of the miner at the face in the first instance and the lives of those behind this miner in the latter case.

These dangers are removed by fastening the safety block onto the ball of the rail on the grade end of the spotted car. Similarly,

a block is placed to hold the truck of a shortwall mining machine. Where rooms are on the dip, a block located about 60 ft. from the face will derail a runaway mine car which might be placed carelessly behind a cutting crew at the face.

A. F. BROSKY,
Pittsburgh, Pa.



DESIGN OF WOODEN STOP

The shape of the block is such that it performs its function with the car on either side. There are no lefts and rights in this design.

ACCORDING TO THE RAILROADS, what is needed for their going ahead is more backing up.—*Norfolk Virginian-Pilot*.

41,000,000 Tons of Bituminous Coal Stocked June 1, Largest Reserve Since March, 1922

Commercial consumers had in storage on June 1, 1923, approximately 41,000,000 tons of soft coal. This was an increase over stocks on March 1, 1923, of 5,000,000 tons, and is the highest level recorded since March, 1922, according to a report just issued by the Bureau of the Census, the Geological Survey, and the Federal Fuel Distributor. Strictly comparable records for corresponding dates are not available except for June 1, 1920, when stocks were at the lowest point on record. The supply on June 1, 1923, was more than twice as large as that three years before. The available data indicate that the tonnage on hand on June 1 probably was about the same as on June 1, 1921.

Measured in tons, stocks increased 13.9 per cent between March 1 and June 1. Measured in terms of days' supply, the increase was 36.4 per cent. The larger increase in days' supply is explained by the fact that the rate of consumption decreased perceptibly between March 1 and May 31. At the rate of consumption during that period stocks on June 1 were sufficient to last 30 days on the average. Such an average is based on the assumption that stocks were evenly divided. This is never the case, however, and it must be borne in mind that figures far above and far below the average are used in this report. In every locality there are consumers who store practically no coal, and others who usually have on hand a great deal more than the average tonnage.

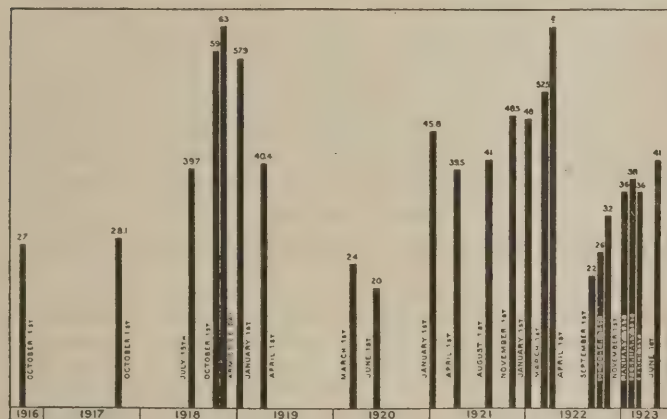


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO JUNE 1, 1923

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities and retail dealers. Coal for steamship fuel, on lake docks, in transit and that in bins of householders is not included. The figures for 1923 are subject to revision.

Stocks on the Lake docks at Duluth-Superior and Ashland-Washburn on June 1, 1923, were 1,591,000 net tons. Complete records for the Lake Michigan docks are not available. A group of producers who store coal at the mines or at some intermediate point had 960,000 tons in storage on June 1.

Retail dealers in anthracite received more of that coal than they delivered in the three months preceding June 1, and their stocks on that date were 130 per cent larger than on March 1. The stocks on anthracite on the Lake docks at Duluth-Superior and Ashland-Washburn totaled 86,263 net tons. No data are available on stocks on Lake Michigan docks.

The total quantity of soft coal in the hands of commercial consumers on June 1, 1923, was between 39,000,000 and 43,000,000 net tons—probably 41,000,000 tons. This estimate does not take into consideration coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which items are classed as coal in transit.

The accumulation of reserve stocks which had been in

progress since the fall of 1922, and which had been temporarily halted in February, was resumed sometime after March 1. This increase was made possible partly through a perceptible decrease in consumption. The rate of consumption from March 1 to May 31 is estimated at approximately 1,500,000 tons per day. When compared with the rate in February, this was a decrease of 200,000 tons per day.

The average stocks for all consumers on June 1 were sufficient to last 30 days at the rate of consumption in March, April and May. At the rate of consumption in February, the stocks on March 1 would have lasted 22 days. The low record stocks on June 1, 1920, were sufficient for but 15 days at the current rate of consumption at that time.

Taking the country as a whole, the stocks held by general industrials were sufficient to last 39 days. This was an increase of 5 days over the supply on March 1. In comparison with dates on which stocks were large, the supply on June 1, 1923, was sufficient for 17 days less time than that on March 1, 1922, and 26 days' less than on Jan. 1, 1919. Information is not available for the corresponding date in 1921 but it seems evident that the tonnage on hand is larger than on that date even though the days' supply is smaller. This is explained by the greater rate of consumption at present.

Electric-utility plants' stocks on June 1 were sufficient for 45 days, against 34 days' supply on March 1. On June 1, 1920, such plants had enough coal to last but 22 days. Stocks at coal gas plants increased from a 58-days' supply on March 1 to 75 days' on June 1. This was nearly three and a half times the supply on June 1, 1920.

Practically complete returns from byproduct coke and steel plants indicated the following reserves on June 1 and March 1, 1923, which show no great change during the period from March 1 to June 1, 1923:

	BYPRODUCT PLANTS			STEEL WORKS	
	(Days' Supply— June 1, 1923	March 1, 1923		(Days' Supply— June 1, 1923	March 1, 1923
Low volatile...	21	17	Steam coal....	27	23
High volatile..	24	19	Gas coal	31	30
Average	23	19	Average	29	26

The total quantity held by the railroads in stockpiles, cars and chutes on June 1 was 8,500,000 tons, a supply sufficient for 21 days. In comparison with March 1 this was an increase in days' supply of approximately 31 per cent.

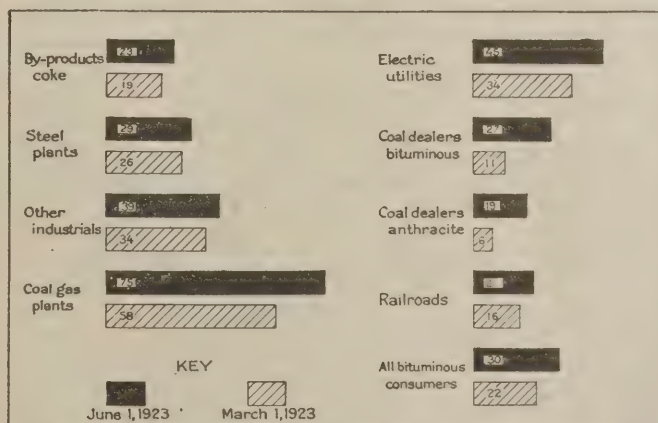


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON JUNE 1, 1923, AND MARCH 1, 1923

At the rate soft coal was burned from March 1 to May 31, 1923, the stocks on June 1 were sufficient to last 30 days. The stocks on March 1 were sufficient to last 22 days at the rate of consumption in February. Two factors in the increase in the reserve on June 1 were a normal seasonal decline in some industries and curtailment of operations in others. The supply on June 1, 1923, was sufficient for 15 days more time than that on June 1, 1920, when stocks were at the lowest point on record.

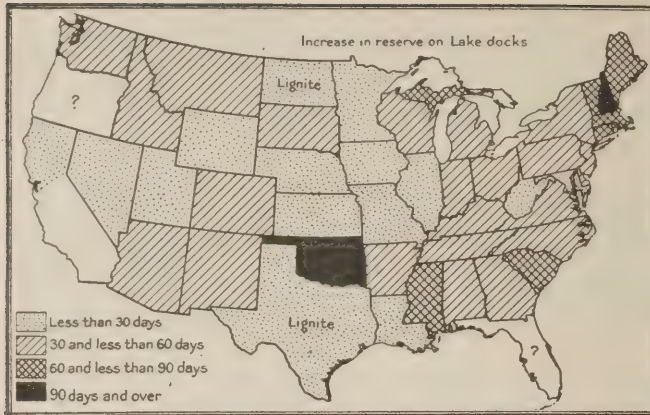


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON JUNE 1, 1923

At the average rate of consumption that prevailed from March 1 to May 31, 1923, reserve stocks at industrial plants other than steel and byproduct coke would last on the average 39 days. The map shows how the supply varied from state to state. Changes in business activity which affect coal consumption are quickly reflected in the days' supply. Decreased consumption after March 1 increased the days' supply on that date, based on February consumption, from 34 to 37 days. Based on reports from 2,194 plants.

Deliveries of bituminous coal by retail dealers decreased sharply after March 1, the average daily rate during March, April and May being but little more than half that in February. On June 1, 1923, retailers had a supply sufficient to last 27 days at the rate of delivery during the three months preceding, against 11 days' supply on March 1. The days' supply on June 1, 1923, was practically the same as on April 1, 1921. The unusual demand for bituminous coal for household use in the territory which ordinarily burns anthracite continued during most of March, but ceased with arrival of warm weather.

The quantity of unbilled coal in cars standing at the mines increased from 183,000 tons on March 1 to 421,000 tons on June 1. The tonnage at junction points and terminals awaiting reconsignment decreased from 43,000 to 36,000 tons.

Stocks of byproduct coke increased 132 per cent during the period March 1-May 31, and the quantity on hand June 1 was 202,000 tons. In spite of this large increase the supply on June 1 was less than one-fourth that on March 1, 1922, when the reserve was heaviest.

Unseasonably cold weather during March and April maintained the demand for anthracite at a high level, and retailers were given but little opportunity to accumulate reserve supplies during that time. On June 1, 1923, stocks in the hands of 413 retail dealers totaled 668,491 net tons, against 290,852 tons on March 1, 1923. This was an increase of 130 per cent. Retailers' stocks on June 1, 1923,

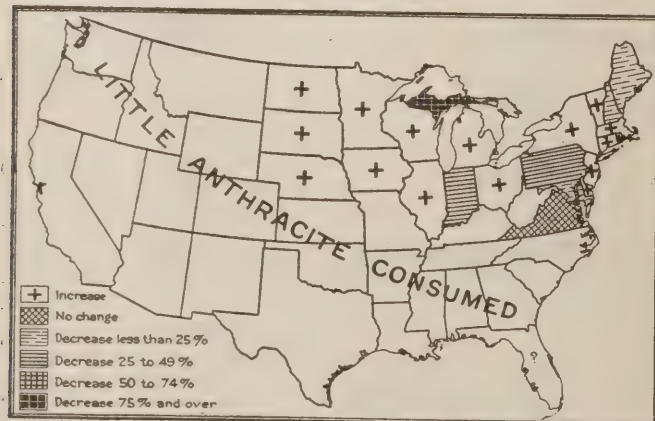


FIG. 4—HOW RETAILERS' STOCKS OF ANTHRACITE ON JUNE 1, 1923, COMPARED WITH THOSE ON JUNE 1, 1920

Stocks of anthracite in retail yards were 133 per cent larger on June 1 than on March 1, 1923. The supply was sufficient to last on the average 19 days at the rate of delivery from March 1 to May 31. The map shows how stocks on June 1 compared with those on June 1, 1920. In all but 7 of the anthracite consuming states the supply on June 1, 1923, was considerably larger than it was 3 years ago.

were 40 per cent less than on March 1, 1922, 44 per cent less than on April 1, 1921, and 22 per cent more than on June 1, 1920. Measured in terms of days' supply, retailers' stocks of anthracite on June 1, 1923, were sufficient to last 19 days at the average rate of delivery from March 1, 1923, against a 10 days' supply on March 1, 1923, at the rate of delivery in February.

Available information indicates the probability that producers have little, if any, domestic sizes of anthracite on hand.

Rail Brotherhood Agrees to Unionize Mine

The miners' union appears to have browbeaten the Brotherhood of Locomotive Engineers. In a conference at Chicago last week it was decided to permit the unionization of the Lick Creek mine in Boone County, West Virginia, which has been operated on an open-shop basis by the Brotherhood. Warren S. Stone, for the Brotherhood, general manager of the Coal River Collieries, as well as the United Mine Workers conferees and J. C. Lewis, president of the Iowa Federation of Labor, who acted as arbitrator, declined, after the meeting, to make public the exact nature of the agreement. Mr. Stone did say, however, that "no objection would be advanced" to the miners in the Brotherhood property unionizing. The mine several weeks ago was declared by the miners' organization to be in a state of strike though most of the men working in it did not belong to the union.

Miners Buy Herrin Massacre Strip Mine

The strip mine near Herrin, Ill., around which centered the Herrin massacre of June 21, 1922, has been bought by the United Mine Workers. The sale was made by way of satisfying damage claims against the union filed by the original owners or their representatives following destruction of the equipment at the property following the mine siege. It is reported the price was \$250,000, but this and other details have not been made public. No announcements have been made about the future operation of the mine.

Indiana Tries for Loading-Machine Scale

The joint conference of Indiana operators and union officials to discuss fixing a scale of pay for operators of underground loading machines in that state has begun its sessions but has not yet accomplished anything. The conferences started in Terre Haute, Ind., without much hope for a definite agreement soon but with a prospect of clearing the ground and of approaching a working basis for negotiation. The three operator conferees are Phil Penna, J. B. Pauley and Paul Zimmerman. For several months loading machines have been working in three mines. Machine operators have received \$12 a day, but the theory is that development work is their main activity. Mine owners consider it hopeful that the union is now ready even to discuss the question of fixing a scale for room loading.

Illinois Operators' Associations May Unify in Relations with Labor

The three operators' associations of Illinois scheduled a joint meeting in Chicago for Wednesday, July 11, to consider several matters, including the proposal to unify in their relations with labor. It is possible a single board to represent the entire state will be set up to supplant the three boards which now meet the miners in joint conference over disputes arising under the labor contract. Also there is much conversation over a proposal to employ a single labor commissioner for the state, though nobody has yet been able to suggest a man who could be had for the job who would be acceptable to the various operator groups. Also at the meeting the men who attended part of the National Coal Association convention in Atlantic City will report their observations. A strong effort is being made to induce the Illinois operators to rejoin the National.

I. C. C. Declares Ohio Coal Rates Too High; Readjustment Ordered Sept. 27

On July 3 the Interstate Commerce Commission handed down its findings on the Ohio-West Virginia rate case, virtually giving the decision to Ohio. The carriers are directed to readjust differentials to Michigan points between Ohio mines and those in the so-called crescent group of West Virginia, increasing the spread from 40c. to 50c. per ton in the inner crescent and from 60c. to 75c. in the outer crescent. The decrease does not apply to Lake cargo coal.

The rates from Ohio mines to affected territory are to be reduced 10c. and from the outer crescent to be increased 5c., the inner crescent rates to remain unchanged.

The commission made its decision effective Sept. 27 in an order for the readjustment of both sets of rates, reducing those from Ohio and increasing those from the Southern districts.

Commissioners McChord, Potter, Cox and Campbell handed down separate opinions, concurring in the general conclusions of the majority report submitted by Commissioner Esch, but challenging it on the ground that the majority does not go far enough in the one matter of differentials in the rates from the inner and outer crescents over those from southern Ohio.

Southern Ohio, in the opinion of Commissioner McChord, is as fully entitled to the advantage of her geographic position now as when the 40c. differential was fixed with relation to the rate of \$1 from southern Ohio.

"That territory's rate advantage," said Mr. McChord, "expressed in terms of the percentage relationships, is less favorable now than when the differential relationship was fixed. I am convinced that at this time the rates from the crescents should be 60 to 90c. respectively, higher than from southern Ohio. So adjusted, taking the key rate to Toledo with the appropriate reduction from southern Ohio for the purpose, the relationships would then be for southern Ohio 100 per cent, inner crescent approximately 133 per cent, and outer crescent approximately 150 per cent."

The dissenting opinion of Commissioner Potter is particularly striking. His conclusions approximately concur with those of Commissioner McChord but Mr. Potter insists that the rate-making theory should be so modified as not to encourage unnatural long-haul development and operation but to promote the short hauling of coal.

"There is an opportunity," said Commissioner Potter, "through the medium of the rate structure to reduce the average haul, increase efficiency in the use of carrier equipment, reduce carrier costs, bring about available surplus of transportation facilities without increase of carrier investment, concentrate mining labor so as to permit continuous operation, provide steady employment of labor on a basis better for labor, producer and consumer, accomplish an available market surplus of coal and reduce mining costs and coal prices.

"It is quite possible that by this means there could be a direct saving of from \$500,000,000 to \$750,000,000 a year in the price of coal to the consumer, with much additional indirect saving through lower rates and reduced manufacturing costs.

"It is gratifying to know that certain prominent carriers are appreciating that endeavor should be made to eliminate long hauls in the coal traffic. These considerations tend to justify increasing the differential in this case to an extent that, at least, will restore the original normal relation."

Commissioner Potter contends that the Interstate Commerce Commission made a mistake when, some time ago, it allowed an increase out of line with the increase from the crescents to the extent of 30c. a ton on coal.

"The increase in the spread between rates from Ohio mines and those remote," declared Commissioner Potter, "incident to correcting the differential relation, will encourage resort to short hauls in supplying consumers' demands and make for cross-haul elimination and more efficient use of transportation.

"Long hauls make for congestion, high costs and inefficient service and are giving too serious import to the transportation problem. Correct adjustment should enable com-

munities to be less interdependent and more nearly self-sustaining. Artificial adjustments should be modified where consistent with regard for interests entitled to preservation. Change of the differential, as proposed, would be helpful to these ends."

In the opinion of Commissioner Potter the general bituminous coal situation has an aspect which should have influenced the Interstate Commerce Commission in this case.

Lewis Orders Nova Scotia Strikers Back; Livingstone "Scorns" Command

Charging that the strike of 9,000 coal miners in Nova Scotia is "unquestionably a violation of the existing agreement between District 26 and the coal companies" and a violation of the principles and policies of the United Mine Workers, John L. Lewis on July 7 instructed Daniel Livingstone, president of District 26, to take immediate steps to put the men back to work. Miners are on strike as a protest against the calling of Nova Scotia militia in a dispute between neighboring steel workers and their employers.

Dan Livingstone is reported to have "scorned" the telegraphed command of Lewis that the strikers be ordered back to work. "District 26 is absolutely autonomous," was his reported comment on the order, "and it isn't accepting dictation from John L. Lewis or anybody else."

MacLachlan's opinion of the telegram was that "It constitutes thunder, but there is no lightning back of it."

The crown intimated in court July 9 that new criminal laws adopted after the general strike in Winnipeg in 1919 might be brought to bear against Dan Livingstone and James D. MacLachlan, district leaders of the United Mine Workers, charged with circulating false tales. It is alleged that in asserting the police and soldiery had been guilty of brutality, the defendants published "a seditious libel concerning His Majesty's Government of and for the Province of Nova Scotia, and the provincial police."

Miners in the Westville, Thordun and Stellarton sections of district 26 voted Monday night for a 100 per cent strike in support of their demand for liberation of Livingstone and MacLachlan.

ATLANTIC CITY, N. J., July 9—According to a press dispatch John L. Lewis today received a telegram from Daniel Livingstone stating that he had called a meeting of the executive board of the union tomorrow to act upon Lewis' instructions to end the coal strike there. Lewis today wired Alexander McIntyre, vice-president of the district, to carry out the instructions contained in the telegram to Livingstone, who is in jail.

48,824,127 Tons of Anthracite Produced In 1922, Valued at \$273,700,125

Production of Pennsylvania anthracite in 1922, according to statistics released by the Geological Survey on July 7, was 48,824,127 gross tons, with a total value of \$273,700,125. The value given, it is stated, is the value at which the coal left possession of the producing companies f.o.b. the mines, and does not include the margin of separately incorporated selling companies.

The total quantity of fresh-mined coal was 45,073,602 gross tons, valued at \$262,798,641; of washery product, 2,943,286 gross tons, valued at \$9,911,775; and of dredge product 807,239 gross tons, valued at \$989,709.

Commercial shipments were 41,073,838 tons, local sales 2,123,393 tons and the quantity used for power and heat at the mines was 5,626,896 tons.

The Wyoming region contributed 25,802,944 gross tons, valued at \$155,261,102; the Schuylkill region followed with 16,056,992 tons, valued at \$79,910,415; of the total the Lehigh region supplied 6,716,137 tons, valued at \$37,327,244, and Sullivan County produced 248,054 tons, valued at \$1,201,364.

Editorial Comment in Eastern Press Approves Anthracite Report

Commentators Impressed with Public Interest in Coal
Mining and Declared Necessity for Publicity
for Costs, Prices and Profits

Two things in the Coal Commission report on anthracite appear above all others to have caught the eye of editorial writers on the New York and Philadelphia dailies, whose comment is on hand as this issue of *Coal Age* goes to press. The first has to do with the public interest in coal mining and the second with the necessity of publicity for costs, prices and profits. The New York *Evening Post* finds that, superficially at least, the most dramatic feature of the report is that providing "power for the President to declare a state of emergency in the event of a cessation of anthracite mining and to take over the operation of the industry." The *Post* thinks that actually this recommendation would "only give formal sanction to a power accepted as inherent in the President." In this connection the New York *Times* notes that "this power has been claimed for the President as inherent in his office, but legislation by Congress is to be preferred to an interpretation of the Constitution that may be opposed and challenged."

PRIVATE MONOPOLY OF KEY INDUSTRY INTOLERABLE

Citing the strike of 1902 and again that of 1922, the *Tribune* concludes that "arbitrary and private control of a monopolized key industry is intolerable. Mr. Lewis and the operators proved this last year. They ought not to have an opportunity to prove it again. The recommendation of presidential intervention goes to the heart of the hard-coal problem so far as the interruption of supply is concerned." The *Evening Star* of Washington thinks that recommendations of the Commission "will appeal to the ultimate consumer as a drop of cool water to a wanderer in the desert." The Philadelphia *Record* finds that "a business that is so thoroughly monopolized as this, and where consumers are threatened with freezing when the railway monopoly and the labor monopoly are dickering for terms, is evidently one that cannot be left to itself." The Philadelphia *Inquirer* hopes "that such an emergency will never arise," as it will cause the President to declare "that a national emergency exists and to take over and operate the mines and determine the proper wages and prices."

ADDS COAL TO CATEGORY OF PUBLIC UTILITIES

Under the caption "Coal a Public Utility" *The Sun* and *the Globe*, of New York, notes that the Commission's "entire work is colored by one idea, expressed clearly, that as with railroads and banks so with coal. The Commission, in other words, adds coal to the list of public utilities." This, that paper thinks, to most Americans will now seem a simple and natural act. The *Inquirer* says that the "Commissioners are here treading on safe ground, for they distinctly repudiate government ownership." The Philadelphia *Public Ledger* is glad that the industry is to lose its shadow of mystery and sees the "outlines of an Interstate Coal Commission" looming large in the report, while the *Evening Post* notes that for the moment we are "not to go as far as the actual fixing of prices." That paper believes that if publicity of the kind recommended by the Commission should not prove an effective remedy against price boosting, it is then "inherent in the Commission's report that the second step should be taken," which step, involving price fixing, "is something which neither the operators nor employees will hasten to bring upon themselves."

The New York *World* believes that "the case for publicity is even more complete than that for regulation. With publicity, the public can take care of itself. When consumers know what profits are realized and what combinations of railroads and mining companies are reaping excess rewards, they will soon insist on regulatory measures where they are most needed."

"The Coal Commission is speaking under great restraint

when it describes the anthracite business 'as a limited natural monopoly,'" notes the Philadelphia *Record*, which adds that there is, furthermore, "a monopoly in the supply of labor." The anthracite business, according to the Brooklyn *Daily Eagle*, "has been run on the principle of a Coney Island concession," with the landowners, operators, miners, railroads, wholesalers and retailers "scrambling for all the profits the traffic will bear." Continuing, the *Eagle* says, "most of these facts were known before, but the Coal Commission has gone a little deeper than any other previous inquiry."

It seems to be quite generally the opinion of the press that, as stated by the Boston *Daily Globe*, "public opinion will give full approval" to the main recommendations of the Commission, and the Washington *Star* believes that "the temper of Congress would scarcely be uncertain when it comes to dealing with the coal situation." If Congress balks, the Brooklyn *Eagle* would find this "a confession of its utter incapacity to deal with an urgent problem." New England, according to the Boston *Post*, is going to be "especially concerned with the recommendations that the President may seize and operate the mines in the event of a tie up."

There is quite general approval of the Commission's stand against nationalization and government ownership or operation. The New York *Evening Mail* notes that the report "wisely does not go so far as those who recommend government ownership of the mines." The New York *Journal of Commerce* believes that "it would not be well to attempt final judgment" upon this report of the Coal Commission until the full text of the document has been scrutinized or until the bituminous coal report is available. But there are nevertheless "a few facts which should be brought most forcibly to the attention of the public." Among others this paper cites the fact that "on the side of labor absolutely no competition remains" and that "nothing is to be gained and much lost by nationalization of the mines."

Not so much interest as might have been expected was displayed in the matter of prices. The New York *Tribune* picks up the fact that "profits have increased nearly 300 per cent" in ten years and that "coal prices are far out of line with the average of increases in commodity prices since 1913," which is a fallacy shared by a number of editorial writers and one on which the Commission report itself is by no means as clear as it should be. The *Evening Post* quite fairly states: "Let it be said at the beginning that the Commission's figures do not bear out the wild charges of profiteering so regularly flung out in heat of controversy." This paper notes that the increases in retail coal prices in New York "range very close to the general index of cost increases since the war," which prices, continues the *Post*, "might, however, be lower by a perceptible degree—and the perceptible degrees count for the average consumer."

WANTS FAT AND LEAN MINES GROUPED FOR AVERAGE

The New York *Herald* strikes the only discordant note in the editorials reviewed on this page. "The report of the U. S. Coal Commission on the anthracite situation is weak because of its failure to deal directly with the underlying problem of the coal industry. As far as the Commission was willing to go, its work is useful, but it was too cautious." The *Herald* points out that the purchaser of coal is interested chiefly in price and in quality and its criticism of the Commission's report is that merging of the operating companies was not recommended as a means to further stabilize price and quality. The *Herald* is opposed to government ownership but it does want the "fat and lean mines" grouped so that the cost of production should be averaged. Although the Commission has been "too timid in dealing with the fundamentals of the industry" the *Herald* conceives that its "methods of careful, scientific inquiry have been admirable and in the final report ought to lead to conclusions of general advantage to the country." The New York *Times* believes that "in the light of this strong report the operators and miners will have no excuse for bickering over wage terms and conditions of labor nor will Congress be sustained by the people if it fails to enact regulatory laws."

Anthracite Wage Conference Shatters Precedents; Two of Eleven Demands Granted

Precedents in a number of important aspects have been shattered at the Atlantic City conference between the United Mine Workers and the anthracite operators. The public and the press have been admitted to the general sessions. A miner instead of an operator is chairman, for on motion of Mr. Warriner, John L. Lewis was selected for that position. And then on July 9, four days after the conference began, the operators granted off-hand, without any attempt at trading, two of the eleven demands of the miners.

Never before has a wage conference in the coal industry begun its work better fortified with the facts of its industry. On Saturday night, July 7, both sides were in possession of mimeograph copies of the anthracite report of the President's Coal Commission and in addition volumes of detailed statistics of earnings of practically all the men in the industry.

At the first meeting on July 6 at the Hotel Ambassador in Atlantic City, John L. Lewis and, in turn, Golden, Kennedy and Brennan, three district presidents of the anthracite mine workers, presented in full the eleven demands framed by the Tri-District convention of the union in Scranton the previous week. Their presentation, together with their arguments, occupied the entire first day and was so voluminous that the official reporters were not able to transcribe the speeches until late on Saturday. For this reason there was no session on Saturday or Sunday in order to give the operators opportunity to study the arguments of the union men and prepare their reply.

WARRINER WAIVES TWELVE-HOUR DAY

On Monday S. D. Warriner, president of Lehigh Coal & Navigation Co., chairman of the Policies Committee of the anthracite operators and spokesman for the committee of twenty-five operators, made his reply to the demands of the mine workers. He conceded two of the demands, that for abolition of the twelve-hour day and the requirement that the umpire of the Anthracite Board of Conciliation render decision within thirty days. With reference to the abolition of the twelve-hour day he said:

"We are entirely conscious that the idea that a man should be required to work a twelve-hour day is not deemed compatible with what we call our 'American standards.' We feel elimination of this practice is dear to your hearts and that public feeling considers it out of date. In the coming sessions of the sub-committee we are ready to work out with you a plan of reorganization satisfactory to both sides by which this practice may be eliminated."

Increases in wages, however, Mr. Warriner deemed unjustified. He said he had looked in vain in the coal commission's report to find any refutation of his belief that present wages in the anthracite mines were adequate to meet present conditions.

"While wages in our fields are wages of which we can mutually be proud," Mr. Warriner said, "we don't mean at all that our ideas are fixed. We are open to conviction and argument, but we can't refrain from giving you the benefit of our business training in the handling of this industry."

Mr. Warriner asked the conference to adopt a resolution pledging that, "To allay public apprehension, we announce that if the completion of negotiations should be delayed beyond Sept. 1, the mines shall nevertheless be continuously operated." He cited "a recent letter from the President of the United States to the U. S. Coal Commission, and another letter from the commission to the operators admonishing us in no uncertain terms that the public must be protected from another stoppage."

The resolution was defeated following a rejoinder by John L. Lewis, the miners' leader and chairman of the conference, in which he said that delaying completion of the negotiations until after Sept. 1, when the present contract expires, could only serve to increase public apprehension and cause a

"runaway market," with higher prices for anthracite. The miners, Mr. Lewis said, joined with the operators "in the desire for a prompt adjudication of the issues before us."

"We are here to relieve the public mind and to get a contract," said Mr. Golden. "We have ample time, if we apply ourselves to the work of negotiating a contract, to reach an agreement that will assure the public not only of a supply of coal but of the price it will have to pay."

Mr. Warriner served notice that he would bring the matter up again in sub-committee.

Continuing, Mr. Warriner said: "I would emphasize our desire to co-operate with you in a full study of those labor conditions that may have developed into controversy and running sores, to the end that we may have harmony and cordiality as well as peace in our industry. We pledge ourselves to do that."

The anthracite industry was not a "limited monopoly" as the coal commission had defined it, he said, because of the competition of producers of hard-coal substitutes, such as bituminous coal, gas and fuel oil.

Nevertheless, Mr. Warriner indicated, this was not necessarily the last word in scale negotiation.

Mr. Kennedy presented a resolution asking that the conference demand an investigation of printed statements made by George Cushing, declaring that Attorney General Daugherty caused the rewriting of part of the coal commission's report dealing with labor-policy recommendations for the anthracite fields.

"In view of the publicity given these astounding charges," read the resolution, "the true facts must be ascertained if the distinguished members of the U. S. Coal Commission are to retain the confidence and respect of the American people. Mr. Cushing should be required by competent authority either to substantiate his most serious charges or make public disavowal and retraction thereof."

On presentation of the resolution the operators could not concur in it, "as we believe it an impugnment of the commission and its individual members."

Mr. Lewis denied there was any such motive in the resolution, but insisted that "steps be taken to have the veracity of the statements set forth, so we may fully understand their nature."

When the question was put all the miners voted "aye" and the operators "no," and as is customary in such cases the motion was declared lost.

John Hays Hammond, chairman of the coal commission, according to the *New York Herald*, bitterly attacked the allegations of George Cushing, saying: "The subject has never been discussed with Attorney General Daugherty, nor has he seen the draft of the report. Furthermore, neither the President nor the Attorney General has made a single suggestion as to the recommendations to be made by the commission. Every recommendation in the report received the unanimous approval of the commission."

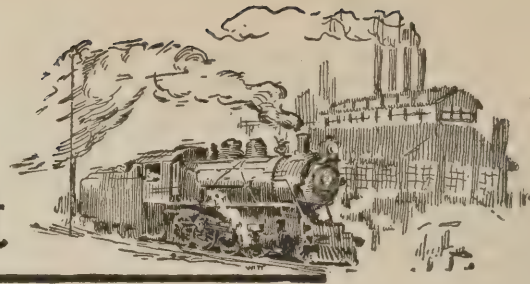
Dr. Charles P. Neill declared that the statements made by Cushing were "absolutely false," and Thomas R. Marshall said the Cushing allegations were without foundation and "too ridiculous" to be dignified with formal denial, according to the *New York Times*.

Negotiations will be carried on this week by a sub-committee of eight, four—John L. Lewis and the three district presidents—representing the miners, and four operators.

Extra copies of the full text of the U. S. Coal Commission's report on the anthracite industry, contained in this issue of Coal Age, may be had at cost upon addressing the New York office of Coal Age.



Production and the Market



Weekly Review

With stocks of bituminous coal in the hands of commercial consumers now in excess of 42,000,000 tons, as is indicated by the government's stock report showing 41,000,000 tons on June 1, and with production holding up to 10,500,000 tons per week, there is no occasion for surprise that prices of soft coal are continuing their downward movement. The government figures indicate that the rate of consumption of soft coal is now approximately 9,500,000 tons per week, that 500,000 tons is being exported each week, mainly to Canada, and that approximately 500,000 tons is going into storage out of the current production of 10,500,000 tons.

Prices of bituminous coal continue their decline, *Coal Age* Index of mine prices recording a drop of 6 points to 197 on July 9. The average spot price is now \$2.38, a drop of 8c. in one week and of 35c. in the past nine weeks.

The Federal Fuel Distributor in Washington has just issued a lengthy statement reviewing conditions in all soft-coal producing fields, pointing out the transportation and labor supply are ample and current prices at or below production cost. He also issued a statement to the press urging consumers to buy and store more coal this summer if they would avoid transportation tie-up and higher prices next fall and winter.

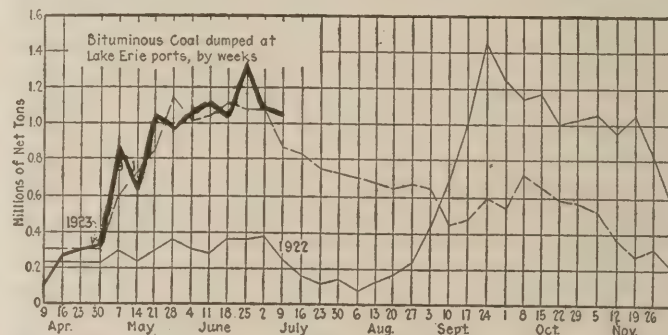
With the present rate of production maintained during July and August the country is certain to go into the fall and winter season with a plentiful supply of coal where it is most needed when the railroads are called upon to divert their motive power and facilities to the transportation of grain and other fall products. With between 45,000,000 and 50,000,000 tons of bituminous coal in the hands of commercial consumers and with the docks in the Northwest stocked with coal by the end of summer nothing short of calamity can bring about a sellers' market this winter.

The strike of the Nova Scotia miners brought in several Canadian inquiries and a few sales of high-volatile coal. Inquiries also were received from Euro-

pean and South American houses. During June total dumpings for export at Baltimore were 326,745 tons.

The Coal Commission's report on anthracite reached the operators and miners in conference at Atlantic City last Saturday evening. Both sides found in the first reading points to which they take marked exception, the operators because the Commission recommends that the President be given power to take over the mines in national emergencies and the miners because the Commission would compel them to arbitrate their disputes and would prevent their striking. The public is yet to be heard from.

Although every day that the negotiations are on at Atlantic City the prospects of a suspension of hard

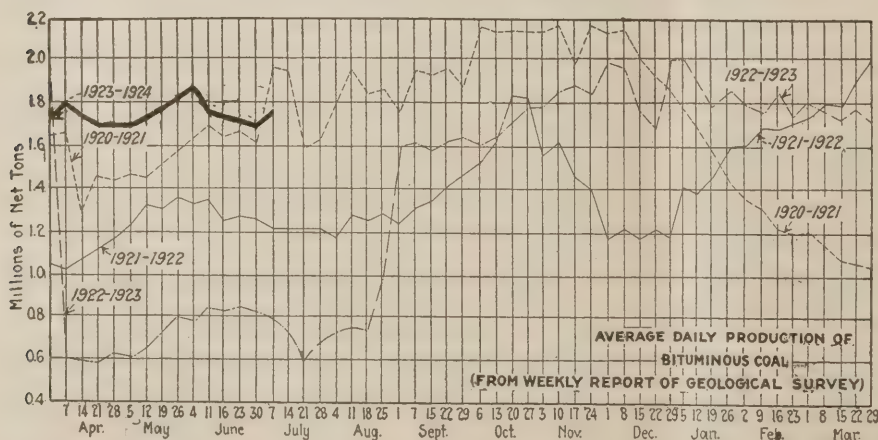


coal mining on Sept. 1 recede farther into the distance, the price of independent coal has taken another upward turn.

Dumpings at Hampton Roads for all accounts during the week ended June 30 were 355,961 net tons, as compared with 333,870 tons the previous week.

Chicago Market Still Lifeless

Had it not been for a little interest in smokeless created by an effort to sink the price of mine run there would have been nothing to enliven the Chicago coal market during the week. One important shipper dropped the price from a low of \$3.75 to a new low of \$3.25 and claimed to draw business



Estimates of Production (Net Tons)

BITUMINOUS		
	1922	1923
June 16 (b).....	5,013,000	10,573,000
June 23 (b).....	5,363,000	10,422,000
June 30 (a).....	5,226,000	10,609,000
Daily average.....	871,000	1,768,000
Calendar year.....	187,850,000	273,423,000
Daily av. cal. year.....	1,216,000	1,775,000
ANTHRACITE		
June 16.....	22,000	2,053,000
June 23.....	24,000	2,042,000
June 30.....	25,000	2,087,000
Calendar year.....	21,926,000	51,374,000
COKE		
June 23 (b).....	110,000	413,000
June 30 (a).....	114,000	399,000
Calendar year.....	3,217,000	10,069,000

(a) Subject to revision. (b) Revised from last report.

in spite of the fact that nobody wants smokeless. The others tried to stall off this move by declining to do business at \$3.25.

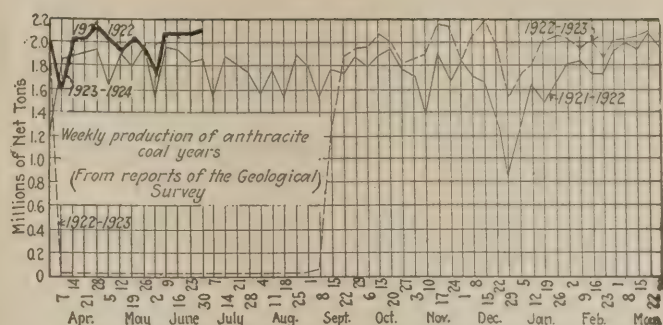
A large proportion of Illinois screenings that have been clogging mine tracks throughout the state have been unloaded at low prices. Domestic sizes are selling at all sorts of prices from \$3 up, while producers look forward for a strengthening of demand within two or three weeks.

Slow production gets continually slower in the Illinois fields. Railroad storage coal is easing off in the south fields making all sizes harder to move. In the Mt. Olive region the tonnage of steam sizes is sold up on contract and domestic is hard to move.

Warm weather seems to have killed St. Louis business, where a little apartment-house and school coal has been going in steadily. Steam business is not picking up even though very little lump is being made in the fields shipping to that city. Household display no interest in anthracite in spite of a price jump of 25c. retail and a warning of shortage in case of a strike.

Kentucky Salesmen Work Harder

Kentucky producers realize now more than ever that they must have effective selling organizations. They are drawing



back good men released during easier times and a general high-pressure effort is noticeable. Demand has fallen flat for almost every kind of Kentucky coal and there continues a general closing down among plants not equipped to prepare their output properly. The embargo against lake shipments to Toledo compresses the market painfully and has resulted in cheap coal enough to produce demoralizing conditions.

The bituminous coal market at Duluth remains weak. Old screenings are offered as low as \$3.75. New screen-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 10 1922	June 25 1923	July 2 1923	July 9 1923†
Smokeless lump.....	Columbus		\$3.65	\$6.10	\$5.85	\$5.75@ 6.00
Smokeless mine run.....	Columbus		3.45	3.60	3.60	3.00@ 3.50
Smokeless screenings.....	Columbus....		3.25	3.60	3.35	3.00@ 3.25
Smokeless lump.....	Chicago		3.65	6.10	6.10	6.00@ 6.25
Smokeless mine run.....	Chicago.....		3.45	3.85	3.75	3.25@ 4.00
Smokeless lump.....	Cincinnati		3.75	6.00	6.25	6.00
Smokeless mine run.....	Cincinnati		3.50	3.50	3.35	3.25@ 4.00
Smokeless screenings.....	Cincinnati		3.25	3.25	3.00	2.75@ 4.00
*Smokeless mine run.....	Boston.....		6.35	5.60	5.60	5.25@ 5.50
Clearfield mine run.....	Boston.....		3.50	2.35	2.35	2.00@ 2.50
Cambria mine run.....	Boston.....		4.00	2.85	2.85	2.50@ 3.25
Somerset mine run.....	Boston.....		3.65	2.60	2.60	2.25@ 2.75
Pool 1 (Navy Standard).....	New York.....			3.75	3.60	3.25@ 3.75
Pool 1 (Navy Standard).....	Philadelphia.....			3.65	3.60	3.25@ 3.90
Pool 1 (Navy Standard).....	Baltimore.....					
Pool 9 (Super. Low Vol.).....	New York.....		4.40	2.75	2.80	2.50@ 3.00
Pool 9 (Super. Low Vol.).....	Philadelphia.....		4.70	2.85	2.80	2.45@ 3.00
Pool 9 (Super. Low Vol.).....	Baltimore.....		4.40	2.75	2.60	2.50@ 2.75
Pool 10 (H.Gr. Low Vol.).....	New York.....		4.25	2.50	2.45	2.25@ 2.50
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....		4.45	2.25	2.20	2.15@ 2.40
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....		4.40	2.45	2.25	2.15@ 2.35
Pool 11 (Low Vol.).....	New York.....		4.05	1.95	2.05	1.60@ 2.00
Pool 11 (Low Vol.).....	Philadelphia.....		4.25	1.90	1.85	1.70@ 2.00
Pool 11 (Low Vol.).....	Baltimore.....		3.90	2.25	2.05	2.00@ 2.10
High-Volatile, Eastern		Market Quoted	July 10 1922	June 25 1923	July 2 1923	July 9 1923†
Pool 54-64 (Gas and St.).....	New York.....		3.90	1.80	1.80	1.60@ 1.75
Pool 54-64 (Gas and St.).....	Philadelphia.....		3.65	1.70	1.60	1.40@ 1.75
Pool 54-64 (Gas and St.).....	Baltimore.....		3.90	1.75	1.75	1.75
Pittsburgh ac'd gas.....	Pittsburgh.....			2.80	2.80	2.25@ 2.60
Pittsburgh mine run (St.).....	Pittsburgh.....			2.05	2.05	1.90@ 2.00
Pittsburgh slack (Gas).....	Pittsburgh.....			1.50	1.50	1.50
Kanawha lump.....	Columbus.....		3.65	3.00	3.00	2.75@ 3.25
Kanawha mine run.....	Columbus.....		3.40	1.85	1.85	1.75@ 2.00
Kanawha screenings.....	Columbus.....		3.15	1.35	1.25	1.00@ 1.20
W. Va. lump.....	Cincinnati.....		3.90	3.25	3.50	3.00@ 3.50
W. Va. Gas mine run.....	Cincinnati.....		3.90	1.75	1.85	1.50@ 2.00
W. Va. Stearns mine run.....	Cincinnati.....		3.75	1.75	1.85	1.50@ 2.00
W. Va. screenings.....	Cincinnati.....		3.35	1.10	1.25	1.00@ 1.10
Hoeking lump.....	Columbus.....		3.65	2.75	2.75	2.50@ 3.00
Hoeking mine run.....	Columbus.....		3.40	1.85	1.85	1.75@ 2.00
Hoeking screenings.....	Columbus.....		3.20	1.20	1.25	1.20@ 1.30
Pitts. No. 8 lump.....	Cleveland.....		4.25	2.70	2.55	2.15@ 3.00
Midwest		Market Quoted	July 10 1922	June 25 1923	July 2 1923	July 9 1923†
Pitts. No. 8 mine run.....	Cleveland....		\$4.00	\$1.90	\$1.95	\$1.80@ \$2.00
Pitts. No. 8 screenings.....	Cleveland....		4.00	1.25	1.25	1.20@ 1.35
Franklin, Ill. lump.....	Chicago.....			4.05	3.90	3.50@ 4.35
Franklin, Ill. mine run.....	Chicago.....			3.10	3.00	2.75@ 3.25
Franklin, Ill. screenings.....	Chicago.....			1.80	1.65	1.50@ 1.85
Central, Ill. lump.....	Chicago.....			2.60	2.60	2.50@ 2.75
Central, Ill. mine run.....	Chicago.....			2.10	2.10	2.00@ 2.25
Central, Ill. screenings.....	Chicago.....			1.60	1.35	1.25@ 1.50
Ind. 4th Vein lump.....	Chicago.....			3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run.....	Chicago.....			2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings.....	Chicago.....			1.80	1.60	1.50@ 1.75
Ind. 5th Vein lump.....	Chicago.....			2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run.....	Chicago.....			2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago.....			1.55	1.45	1.40@ 1.50
Standard lump.....	St. Louis.....			2.25	2.25	2.25@ 2.50
Standard mine run.....	St. Louis.....			1.75	1.75	1.85
Standard screenings.....	St. Louis.....			1.35	1.20	1.10@ 1.20
West Ky. lump.....	Louisville.....		4.75	2.25	2.25	2.15@ 2.35
West Ky. mine run.....	Louisville.....		4.90	1.75	1.75	1.60@ 1.85
West Ky. screenings.....	Louisville.....		4.90	1.15	1.15	1.10@ 1.25
West Ky. lump.....	Chicago.....		5.05	2.35	2.40	2.25@ 2.55
West Ky. mine run.....	Chicago.....		5.00	1.45	1.15	1.10@ 1.25
South and Southwest		Market Quoted	July 10 1922	June 25 1923	July 2 1923	July 9 1923†
Big Seam lump.....	Birmingham..		2.35	3.05	3.05	3.15@ 3.40
Big Seam mine run.....	Birmingham..		2.15	2.05	2.05	1.85@ 2.25
Big Seam (washed).....	Birmingham..		2.40	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago.....		3.75	3.25	3.25	3.00@ 3.50
S. E. Ky. mine run.....	Chicago.....		3.65	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Louisville.....		3.90	3.35	3.25	2.60@ 3.00
S. E. Ky. mine run.....	Louisville.....		3.70	2.10	2.00	1.60@ 2.25
S. E. Ky. screenings.....	Louisville.....		3.50	1.35	1.25	.90@ 1.25
S. E. Ky. lump.....	Cincinnati.....		3.90	3.25	3.10	3.00@ 3.50
S. E. Ky. mine run.....	Cincinnati.....		3.75	1.60	1.75	1.40@ 1.85
S. E. Ky. screenings.....	Cincinnati.....		3.25	1.10	1.00	.85@ 1.25
Kansas lump.....	Kansas City..		5.00	4.00	4.00	3.00@ 4.50
Kansas mine run.....	Kansas City..		4.25	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City..		2.80	2.60	2.60	2.50@ 2.75

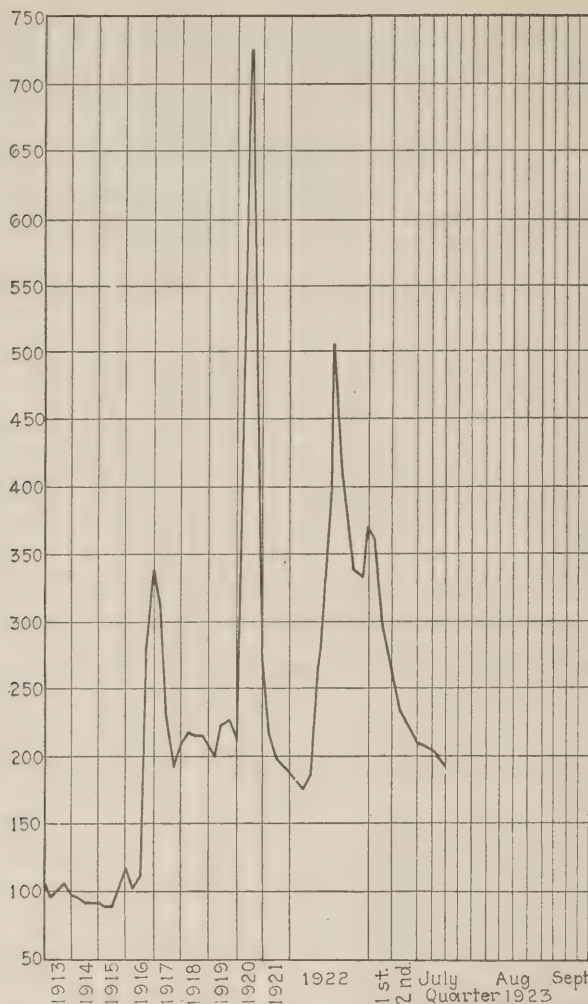
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike		July 2, 1923		July 9, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34		\$7.60@ 7.75		\$7.75@ 8.35		\$7.75@ 8.35
Broken.....	Philadelphia.....	2.39	\$7.00@ 7.50	7.75@ 7.85		7.00@ 8.10		7.00@ 8.10
Egg.....	New York.....	2.34	7.60@ 7.75	7.60@ 7.85	\$8.50@ 11.50	8.00@ 8.35	\$8.50@ 12.00	8.00@ 8.35
Egg.....	Philadelphia.....	2.39	7.25@ 7.75	7.75	9.25@ 10.50	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago.....	5.06	7.50	8.25	7.60@ 10.25	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34	7.90@ 8.20	7.90@ 8.10	8.50@ 11.50	8.00@ 8.35	8.50@ 12.00	8.00@ 8.35
Stove.....	Philadelphia.....	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 10.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago.....	5.06	7.75	8.25	7.60@ 10.25	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34	7.90@ 8.20	7.90@ 8.20	8.50@ 11.00	8.00@ 8.35	8.50@ 12.00	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 10.50	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago.....	5.06	7.75	8.25	7.60@ 10.25	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York.....	2.34				8.30		8.30
Pea.....	New York.....	2.22	5.00@ 5.75	5.75@ 6.45	7.25@ 8.00	6.00@ 6.30	6.75@ 8.00	6.00@ 6.30
Pea.....	Philadelphia.....	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.35	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago.....	4.79	6.00	6.25	6.25@ 7.25	5.50@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York.....	2.22	2.00@ 2.50	2.50	2.00@ 2.50	2.50	1.80@ 2.50	2.50
Rice.....	Philadelphia.....	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia.....	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York.....	2.22		2.00@ 2.50		1.60		1.60

* Net tons, f.o.b. mines † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913
Index	197	203	205	301	246	238	203	205	246	238	197
Weighted average price	\$2.38	\$2.46	\$2.48	\$3.64							

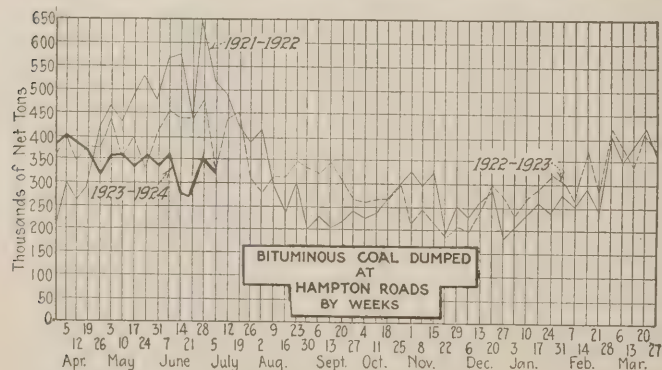
This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

ings have sold under \$4.25, which is considered standard at present. There is general talk of a 50c. anthracite advance in everything but buckwheat, to take effect Aug. 1.

The Milwaukee market continues dull. Demand from the city and immediate vicinity is very slow. Country consumers are doing most of the ordering now. Prices hold steady.

Doldrums Prevail in Southwest

The Southwest is still marking time. With two Kansas City retail boosts in Arkansas semi-anthracite in as many



months, and the promise of another 50c. advance at the end of this month, householders still are showing no interest in storing. There has been no change in Kansas prices, and operators say there is no immediate prospect of any. Threshing demand and industrial contracts keep the mines open one or two days a week.

The market in Colorado is inactive. No changes have been made in lignite prices. Industrial market for lignite is unsteady. Little or no slack is being made and there is a low supply of mine run. Prices increased 25c. on bituminous and semi-anthracite lump and nut July 1.

In Utah it is likely the present shortage rate will continue a few more weeks.

Buyers Scarce in Ohio Markets

Business at Cincinnati is practically at a standstill, following the holiday. Buyers are scarce with most of the tonnage moved going to the steel mills. West Virginia 2-in. lump is quoted at \$2.50@\$3, as compared with \$2.50@\$2.75 last week and southeastern Kentucky 2-in. lump at \$2.50@\$3, as compared with \$2.50@\$2.75. Conditions at Columbus are unsettled, with buying reduced to a minimum. Steam-coal users are in the market only for immediate needs, while there is a fair demand by the railroads and public utilities. Manufacturers are buying in the open market at low prices. With more mines closing, distressed coals are being gradually reduced. Production in the Eastern Ohio No. 8 district declined slightly during the week ended June 30 as compared with the previous week, the mines operating about 65 per cent of full time. The steam and retail trade is quiet. Fewer mines are in operation in northern West Virginia than there were in June, due to market conditions and low prices. Demand is lacking.

The weakness in the Pittsburgh market last week was in gas lump coal, in which there was a marked falling off in demand, due in part to a slight decline in steel operations. The Buffalo market is dull, with plenty of coal on hand awaiting buyers.

Dullness Continues in New England

In the New England market there is no material change. Quotations are only nominal, for the most part, and consumers show little interest. Buying is restricted almost entirely to small purchases for users of small tonnages and the trade sees little prospect of improvement during July.

At Hampton Roads there is little inquiry. Prices f.o.b. vessel receded to \$5 per gross ton for Navy Standard coals, with a few sales of No. 2 grades for \$4.75 and less. The volume of coal changing hands is very light indeed, and wholesale curtailment at the mines will soon so affect the available supply as to make it extremely difficult to put together a cargo of a few thousand tons except by bidding a figure higher than anything recently quoted. On the strength of this situation some of the agencies are predicting quotations of over \$6 in the near future.

Seaboard Market Dull but Optimistic

Demand is slow at New York tidewater, with quotations for most coals easier. Producers and shippers are optimistic however, and look for increased interest within the next few weeks. High-grade coals showed a tendency of being a little scarce in the Philadelphia market after the holiday, especially with those users who buy only for immediate needs and demand quick delivery. The soft-coal market at Baltimore is spotty, although the healthy export demand gives it a better tone than it otherwise would have. Buying at Birmingham is practically at a standstill.

There was a considerable drop in lake movement to Duluth last week because many boats went up light after ore, in order to prevent vessels being tied up over the holiday. Only fifty cargoes arrived during the week, of which eight contained anthracite. It is estimated that on June 1 there was in stock at Duluth 3,000,000 tons of bituminous coal and 200,000 tons of anthracite. Up to July 5 there had been received at Milwaukee 327,519 tons of anthracite and 1,142,881 tons of bituminous coal. Dumpings at Lake Erie ports during the week ended July 9 was 1,017,973 net tons of cargo coal and 54,854 tons of fuel coal, making the total dumpings for the season 11,290,657 tons.

Anthracite Consumers Show Interest

Now that the demands of the anthracite miners have been presented to the operators, consumers are becoming a little more anxious regarding their next winter's fuel. At the New York tidewater, however, retail dealers are not buying any more of the independent product than is absolutely necessary, but it is said that demand inland is heavy. As is the case in New York, retail dealers in Philadelphia have sufficient orders booked to carry them through the next few months. Dealers at Baltimore have received more orders since the demands of the miners have become known. Anthracite production during the week ended June 30 was well over the 2,000,000-ton mark, says the Geological

Survey. According to reports from the nine principal anthracite carriers, 39,901 cars were loaded, from which it is estimated the total output, including mine fuel, local sales, and product of washeries and dredges, was 2,087,000 tons.

Car Loadings, Surplusages and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended June 23, 1923	1,002,740	183,350		
Previous week	1,007,253	187,009		
Same week in 1922	866,321	96,204		
June 22, 1923	58,671	4,269	11,896	7,976
Same date in 1922	255,685	160,733		
June 14, 1923	51,988	3,129	12,787	9,257

Foreign Market
And Export News

Better Inquiry for Welsh Coals

There was a further decline in Great Britain's coal output during the week ended June 23, when 5,588,000 tons were produced, says a cable to *Coal Age*. The output for the previous week was 5,651,000 tons and for the week ended June 9 5,654,000 tons. The Welsh coal market is quiet but unsettled, and new business is very restricted. The decline in prices in the last two weeks has resulted in better inquiry. Welsh anthracite coal is an exception to the general rule. The production of the best classes of anthracite has not kept up with demand, and this coal still sells at top figures. Rail and dock facilities at Welsh ports have considerably improved. There is a slight improvement in the Newcastle market.

French Coal Market in Good Condition

The French coal situation is in good condition. Demand for domestic coals is active while industrial coals which had become much easier are again strong. The industrial activity in the north of France particularly in the textile trades, is now satisfactory. Coal imports from Great Britain have declined somewhat. Receipts from South Wales during the week ended June 10 were 170,000 tons as compared with 270,000 tons the previous week. From June 1 to June 10 the French

Office des Houillères Sinistrées received from occupied German territories 69,000 metric tons of coal, 56,000 tons of coke and 8,000 tons of lignite briquets. Since June 10 shipments from the Ruhr, especially of coke, have marked a substantial increase.

Prices at Hampton Roads Decline

Business at Hampton Roads last week continued to drag, in the face of declining prices, which reached the lowest level since 1921. Some slight decrease in dumpings was recorded. Foreign business held fairly strong, while bunkers was good, but coastwise trade showed a reaction to the season's laxity. Reports indicated that a number of operations in West Virginia and southwest Virginia are about to close down, because of the falling prices and the slump in demand.

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	June 28	July 5
Cars on hand	1,051	1,347
Tons on hand	61,210	91,724
Tons dumped for week	111,278	82,941
Tonnage waiting	3,175	3,550
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,820	1,963
Tons on hand	103,530	109,760
Tons dumped for week	80,896	91,281
Tonnage waiting	16,950	26,400
C. & O. piers, Newport News:		
Cars on hand	2,564	1,752
Tons on hand	127,579	88,645
Tons dumped for week	125,648	123,876
Tonnage waiting	9,090	10,600

Export Clearances, Week Ended
July 7, 1923

FROM BALTIMORE	
For Chile:	Net Tons
Br. SS. Chertsey	4,512
For France:	
Br. SS. Hypatia	8,645
Swed. SS. Alstren	5,214
Jap. SS. Raifuki Maru	8,600
Nor. SS. Romsdalshorn	10,554
For Holland:	
Jap. SS. San Francisco Maru	7,900
For Italy:	
Ital. SS. Giovanni	11,674
Fr. SS. Pytheas	9,100
Ital. SS. Livenza	8,500
Ital. SS. Aster	10,626
Fr. SS. Pytheas (Coke)	75

FROM PHILADELPHIA	
For Chile:	
Jap. SS. Atlantic Marua, for Valparaíso	
For Cuba:	
Nor. SS. Gefion, for Havana	
For France:	
Br. SS. Elswick House, for Dunkirk	
Swed. Motorship Luossa, for Dunkirk	
FROM HAMPTON ROADS	
For Brazil:	
Br. SS. Virgil, for Pernambuco	479
For Canada:	
Br. SS. Hartfield, for Montreal	6,596
Br. SS. Stanmore, for Three Rivers	6,814
For Cuba:	
Swed. SS. Colombia, for Santiago de Cuba	2,071
Nor. SS. Tonjer, for Havana	4,969
For France:	
Span. SS. Igotz Mendi, for Marseilles	6,133
For Holland:	
Du. SS. Aldebaran, for Rotterdam	11,087
Du. SS. Gemma, for Rotterdam	11,282
For West Indies:	
Nor. SS. Christian Michelsen, for Fort de France	4,892
Dan. SS. Norden, for Barbados	4,059

Pier and Bunker Prices, Gross Tons

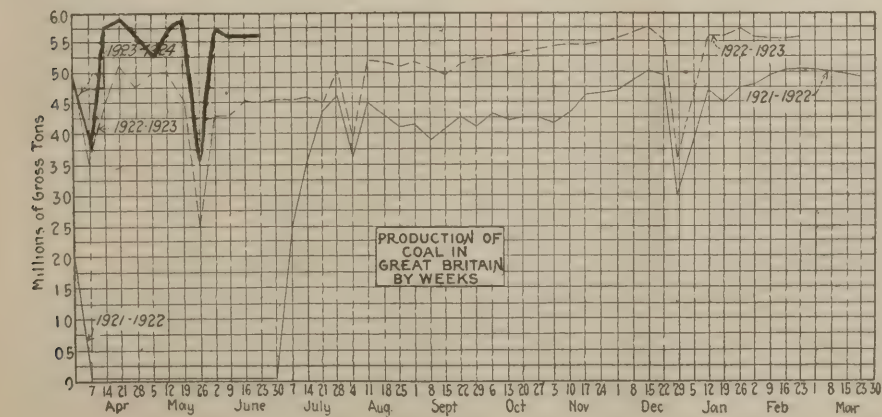
PIERS	
	June 30 July 7†
Pool 9, New York	\$5.50@ \$6.00 \$5.50@ \$6.00
Pool 10, New York	5.00@ 5.35 5.00@ 5.35
Pool 11, New York	4.50@ 4.75 4.50@ 4.85
Pool 9, Philadelphia	5.40@ 5.80 5.35@ 5.75
Pool 10, Philadelphia	4.50@ 5.30 4.45@ 5.25
Pool 11, Philadelphia	3.70@ 4.35 3.70@ 4.35
Pool 1, Hamp. Roads	5.50 5.00@ 5.25
Pools 5-6-7, Hamp. Rds.	4.50 4.25@ 4.50
Pool 2, Hamp. Roads	5.35 5.00

BUNKERS	
Pool 9, New York	5.80@ 6.30 5.80@ 6.30
Pool 10, New York	5.30@ 5.65 5.30@ 5.65
Pool 11, New York	4.80@ 5.05 4.80@ 5.15
Pool 9, Philadelphia	5.80@ 6.00 5.75@ 6.00
Pool 10, Philadelphia	4.80@ 5.55 4.75@ 5.50
Pool 11, Philadelphia	3.95@ 4.70 3.90@ 4.65
Pool 1, Hamp. Roads	5.50 5.00@ 5.25
Pool 2, Hamp. Roads	5.35 5.00

Current Quotations British Coal f.o.b.
Port, Gross Tons

Quotations, by Cable to Coal Age	
	June 30 July 7†
Admiralty, large	3Cs. 31s.@ 32s.6d.
Steam smalls	23s.@ 24s. 22s.6d.@ 25s.
Newcastle:	
Best steams	26s.6d.@ 27s. 26s.@ 27s.
Best gas	30s. 30s.
Best bunkers	28s.@ 30s. 28s.@ 29s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

The Pratt Consolidated Coal Co. is constructing a long sidetrack from its present railroad connections to the site of several new drift mines which it is developing near Dora, in Walker County.

The union miners who have been on strike at the Beltona Mines of the American Fuel Co. for the past two months have been notified of the withdrawal of strike benefits which have been paid by the United Mine Workers since the men went out. Operation of the mine was not seriously crippled for any length of time, the places of the strikers being filled without much trouble. It is stated by an official of the company that no agreement of any kind was made with the men who have been on strike, the mine having operated on an open-shop basis for the past two months and will continue to do so. The Beltona local was perhaps the largest in the district working under a union agreement.

A meeting of dealers and exporters of coal at the Gulf ports will be held in Birmingham at an early date with operators, sales agents, representatives of railroads and others interested in the building up and further expansion of the bunkering and export outlet for Alabama coal. Matters of freight rates, handling facilities, standardization of grades and qualities and other germane subjects will receive attention in an effort to bring about a greatly increased consumption of coal from this source. It is believed that the coal trade with Central and South American countries, West Indies, Windward Islands and other foreign points can be greatly increased with the proper standardization, assuring purchasers of getting a supply of uniform and dependable quality of fuel.

ALASKA

E. L. Bedell and Leopold David of the Alaska Bituminous Coal Co., at Anchorage, have gone to Seattle to complete arrangements for exporting coal to that city. The coal will be mined in the Moose Creek fields, where a spur is being rushed to completion. Five hundred men will be employed in the mining operations, according to Mr. Bedell.

Coal mined in Alaska has been placed on the market, according to reports received by the Department of the Interior from the Alaska mining station of the Bureau of Mines. It is now being retailed at Juneau, capital of the territory, at a lower price than is asked for British Columbia coal. The coal being sold comes from the Suntrana field of Alaska. Further information is to the effect that the Suntrana coal is proving very satisfactory for household use. During the past month the Bureau of Mines collected and analyzed 250 samples of coal from the Matanuska and Nenana fields of Alaska.

COLORADO

Coal production in Colorado for the first five months of 1923 increased 691,000 tons over a similar period the preceding year, according to the report of the State Coal Mine Inspector, James Dalrymple, for the month of May. Total production for the period was 4,269,897 compared with 3,378,787 for 1922. Production for the month of May was 732,473 tons.

ILLINOIS

The United Electric Coal Co. of Danville, is opening a new coal tract between Danville and Oakwood. The new field is to the north of the old one. In getting one of the big shovels out of the old field into the new it was deemed necessary to cut slightly into a river levee, which weakened it. High water, with heavy currents caused two old properties to be flooded. No. 6 mine was not seriously damaged but the No. 1 strip mine was flooded to a depth of 30 feet, the large shovels being barely visible in the water. Pumps with a capacity of 500,000 gallons an hour are being used to clear the pits.

The Norwood-White Coal Co. has opened a new coal property between Herrold and Grimes. The vein is 200 ft. below the surface and runs 4 to 5½ ft. in thickness and is uniform in depth over the entire holding of the company, which is approximately 1,000 acres. A shaft has been sunk and the superstructure erected and some coal has been hoisted.

The Oberheide Coal Co., 1355 Bradley Street, Chicago, has incorporated to mine and sell coal. The incorporators are: C. H. Oberheide, Fred Oberheide and William Oberheide.

Almost every official, great or small, involved in any way with the Herrin massacre of June 21, 1922, is charged with failure to properly perform his duty, a committee of the Illinois Legislature has reported after making an investigation. The committee condemned almost everybody except Governor Len Small, and omitted mention of that executive. Nothing of importance was developed by the committee. It complains because the State Senate blocked the continuance of the committee's work. A number of witnesses escaped appearing before the committee by the simple expedient of "disappearing" during the life of the committee.

George E. Haskins, purchasing agent, International Harvester Co., and James A. Galligan, assistant to the president, By-Products Coke Corporation, have resigned their positions to become vice-presidents of W. H. Harris, Inc., Chicago, wholesale dealers in coal and coke. The name of the company will be changed to W. H. Harris & Co.

KANSAS

Coal production in Kansas in 1922 was more than half a million tons less than the production for 1921, according to the annual production report of P. E. Keegan, statistical clerk in the office of James Sherwood, chief state mining engineer. The tonnage in 1922 was 3,518,243, as compared with 4,028,625 tons produced in 1921. Nine deaths resulted from accidents in the mines in 1922, the report shows, compared with fourteen the year preceding. In producing the tonnage last year the mines worked an average of 139 days, with a total of 9,626 employees. In 1921 the mines worked 151 days with 10,416 men. The mines upon which the report is based were distributed over the state as follows: Deep mines—Crawford County, 179; Cherokee County, 101; Osage County, 24; Leavenworth County, 4; strip mines—Crawford County, 15; Cherokee County, 14.

KENTUCKY

In the opening address at the meeting of the Kentucky Tax Commissioners' Conference at Frankfort, June 27, Rainey T. Wells, member of the State Tax Commission, declared that since 1917 the assessment of fourteen coal-producing counties of the State have been increased nearly 175 per cent, while the increase on the 106 agricultural counties has been but 90 per cent. This increase on coal lands, he said, refuted charges made by the press that the coal lands of the state are escaping taxation.

The political situation in Kentucky has swung around until it now looks more favorable to the coal interests of the state in the fall gubernatorial election. There have been many prospective candidates, several of whom were favoring a coal tonnage tax and other heavy taxation on the operators, and have attacked licensed racetrack betting. The Republican party on June 26 nominated Charles I. Dawson to carry its banner. Mr. Dawson, who is attorney general of the state, is a resident of Pineville, in the heart of the coal fields, and is not attacking either coal or racing. The Democratic nomination has not been made, but it appears to be between Alvin Barkley, of Paducah, and J. C. Cantrill, of Lexington. Mr. Barkley has been campaigning against racing and the coal producers right along, while Cantrill appears to favor the coal trade. Mr. Cantrill has become ill and may not be able to stay in the race. This would leave the campaign probably between Daw-

son, Republican, and Barkley. Dawson will have the advantage because the State is normally Republican now.

MISSOURI

The Mendota Mining Co. has been incorporated at St. Joseph, Mo., with a capital of \$200,000, and will do a general coal-operating business. The incorporators are Bertha C. Collins, J. J. Casey and J. H. Karnes.

The Co-operative Block Coal Co., of Macon, a large mine operated on the co-operative partnership basis by the miners, is meeting with success, and recently a dividend of 75c. per man per working day was declared by the company. This dividend is declared from the profits above operating expenses and goes to each man as a sort of a bonus over his \$7.50 per day wage. The rather remarkable result has been achieved in a vein of unusually hard bituminous coal, running from 20 to 22 in. in thickness. The co-operative method has been employed at the mine for a year and a half.

MONTANA

The Northern Pacific Railway has been authorized by the Interstate Commerce Commission to build a 31-mile branch line into the coal fields of Rosebud County, over which to haul coal, primarily for its own use. Extensive deposits are said to exist in this district.

NEW YORK

Dividends declared and awaiting payment, as reported currently in the Annalist include the following coal companies:

	Rate Per	Payable	Books close
Consol. Coal...	1½ Q	July 31	July 14
Davis Coal & Coke	\$3 ..	July 16	June 30
Del. L. & W. Coal	\$1.25 Q	July 16	June 30
Lehigh Coal & Nav.	\$1 Q	Aug. 31	July 31
Pittsburgh Coal. 1	Q	July 25	July 10
Pittsburgh Coal. 1½	Q	July 25	July 10
Sterling Coal... 1	..	July 3	June 20

Tentative awards for coal deliveries to State institutions recently announced by the State Department of Purchase, Albany, include the following: School of Agriculture, Delhi, 100 gross tons pea coal, to Perryman-Burns Coal Co., New York City, \$9.49 per ton; State Normal School, Brockport, 30 gross tons chestnut and 600 gross tons grate coal, Brockport Coal Co., \$15.28 per ton; State Normal School, Buffalo, 500 gross tons egg coal, George F. Francis, \$14.29 per ton; State Reservation, Saratoga Springs, 600 net tons No. 1 buckwheat, Lee Coal Co., New York City, \$5.99 per ton; State Normal School, Potsdam, 800 gross tons grate coal, 150 gross tons egg coal, and 125 net tons run of mine bituminous coal, to Eastern Fuel Co., New York City, at \$16.04, \$16.29 and \$5.29 per ton each, respectively; State Normal School, Oneonta, 500 net tons ½ lump, to Cleveland & Buffalo Coal Co., Buffalo, \$5.72 per ton, and 100 gross tons egg and 20 gross tons chestnut coal to Oneonta Coal & Supply Corp., at \$13.35 per ton each; State Normal School, Fredonia, 450 net tons 1½ lump coal, to Burton Coal Co., Buffalo, \$4.64 per ton; Institute of Applied Agriculture, Farmingdale, 40 gross tons each of chestnut and stove coal, Martin F. Shea, New York City, \$10.50 per ton, f.o.b. mine; 900 net tons run of mine bituminous coal, to Moreland Coal & Coke Co., Pittsburgh, \$5.14 per ton delivered; Department of Public Buildings, Albany, 8,000 net tons buckwheat No. 1, to Martin F. Shea, New York City, at \$5.64, and 825 gross tons stove coal, E. W. Howell Coal Co., Albany, at \$13.40 per ton delivered in bins; Mattawan State Hospital, Beacon, 4,200 net tons, run of mine bituminous coal, to Shawnee Fuel Co., New York City, at \$5.77 per ton.

Roger M. Magee has become associated with Fred D. Gearhart, Inc., New York City, as sales representative for all points in southern Jersey.

NORTH DAKOTA

The strike at Beulah of some 200 miners, now out for four months, has received the approval of officers of the United Mine Workers, which approves the demands of the local. The miners demand the operation of the mine under the eight-hour law, the right to weigh the coal under a checker hired by themselves and recognition of the union.

OHIO

A deal is about to be closed for the sale of the interests of **Henry Watkins in the Consolidated Mining Co.**, which has properties in the Hocking Valley, to **A. L. Groff** of New Straitsville, and **F. A. Sharshall**, of Shawnee. It is believed that another corporation will be organized to take over the property.

The **Raven Coal Mining Co.**, Steubenville, has been chartered with a capital of \$300,000 to operate coal mines and sell coal and coke. Incorporators are **Lee Van Tilburg**, **R. D. Stone**, **John Peterson**, **E. M. Morrow** and **M. H. Francis**.

Among Cleveland coal companies chartered recently are the **American Fuel Co.**, with an authorized capital of \$100,000, to produce and sell coal, by **E. W. Leeper** and others, and the **Denison Coal & Supply Co.**, a retail concern with a capital of \$25,000 by **George A. Naul** and others.

Trans-Michigan-Ohio railroad shippers' advisory committee to give the receivers and senders of freight a voice in opinion and car service problems of the railroads was formed in Toledo recently. **L. G. Macomber**, traffic commissioner of the Chamber of Commerce, Toledo, was named chairman; **H. M. Griggs**, manager of the Ore & Coal Exchange, Cleveland, was named vice-chairman, and **F. H. Baer**, traffic commissioner of the Cleveland Chamber of Commerce, was elected secretary.

OKLAHOMA

The **Arkansas Fuel Co.** has been incorporated in McAlester, with a capital of \$10,000, by **E. P. Joyner** and **J. G. Puterbaugh**, both of McAlester, and **T. H. Niles**, of Muskogee.

The mines and washer of the **Howe & McCurtain Coal & Coke Co.** at Howe were reopened July 1, when construction work was completed.

PENNSYLVANIA

The following bituminous coal companies were incorporated recently at the State Department: **Ringgold Coal Co.**, mining and preparing coal for the market; **Timblin**, capital, \$24,000; incorporators, **H. E. Kordes**, **Timblin**, treasurer; **J. F. Young**, **Mayport**, **R. D. A.** and **W. R. Freas**, **Ringgold**. **Turkey Hollow Coal Co.**, Monessen, mining and preparing coal for the market; \$50,000; incorporators, **C. F. Thomas**, **O. G. Frazier** and **M. H. Bamford**, **Demora**; **Eli H. Wolf**, **Monessen**, treasurer. **Reed Coal Mining Co.**, mining, quarrying, coal, stone and clay; **Bakerton**, **P. O. Elmora**; \$5,000; incorporators, **Robert P. Reed**, **Bakerton**, treasurer; **Edgar P. Reed**, **Bakerton**, and **Walter Jones**, **Ebensburg**.

Thirty-eight coal-producing companies during the past spring planted 1,137,175 trees, according to the State Forestry Department. These trees reforested 1,200 acres of idle land, and when they reach maturity they will yield at least 36,000,000 board ft. of lumber.

Important issues are raised in a strike of coal miners which has continued for two months or more at the **Cramer shaft** of the **Northwestern Mining & Exchange Co.**, generally regarded as the **Erie R.R.** interests' bituminous asset, near **DuBois**, **Clearfield County**. One of the results of the strike may be a suit against the **United Mine Workers**, District No. 2, for monetary damages based on the actual financial loss caused by eight or ten weeks' stoppage of work and failure to deliver coal. Employees of the **Cramer shaft** struck to enforce a demand that a wage differential be paid there because, as they allege, the coal seam is thin. After exhausting all other methods of obtaining an adjustment of the issue on the scale basis, the board has appealed to the board of arbitration in the district.

When a wreck occurred in the **Pennsylvania R.R.** east-bound tunnel about three miles east of **Spruce Creek**, June 22, one of the **Bethlehem Mines Corporation's** mine-rescue teams, in charge of **Edmund Williams**, trainer, and **Special Mining Engineer J. W. Bair**, was rushed to the wreck, all men supplied with helmets and all necessary first-aid equipment. Seven of the railroad workmen overcome by heat and smoke were brought outside and given first-aid treatment by members of the **U.S. Bureau of Mines** rescue car, **Red Cross** nurses, and the **Bethlehem** rescue team. The **Bethlehem** team was held at the tunnel until noon of the following day, when all danger was past.

The late **Captain W. A. May**, president of the **Pennsylvania Coal Co.**, and **Hillside**

Coal & Iron Co., left personal property valued at \$457,935.04, according to an inventory filed with Register of Wills **Harry T. Madden**, at **Scranton**. One of the items inventoried is salary due June 1, \$3,333.33. The inventory does not disclose if this represents one month's salary.

An agreement has been reached by counsel to continue trial of the case of the **Scranton Coal Co.** against the **Richter Coal Co.** without a jury, saving 300 pages of testimony from going into the discard. A jury was empanelled last January and since that time two jurors have died. A recess was taken in March. The case will now be heard by Judge **William T. Maxwell**, of **Towanda**. Before the taking of testimony is resumed it is intended that all parties to the litigation, including Judge **Maxwell**, shall visit the property in dispute, known as the **Canevin tract**.

The **Blue Lick Coal Co.**, which has recently been incorporated, contemplates the largest development in the history of the **Meyersdale** field. The promoters are **Frederick Rowe**, **Frederick E. Rowe**, **Clarence F. Rowe** and **Clyde J. Rowe**, all well known coal operators and residents of **Myersdale**, with the exception of **Clyde J. Rowe**, a resident of **Frostburg**, who has oversight of the **Rowe** coal mining properties in the vicinity of **Mount Savage** and north to **Wellersburg**.

An appeal will be taken by the companies involved against assessments of \$400,000,000 on the coal lands of **Schuylkill County** which includes an absolute increase of about \$325,000,000. Already 150 appeals have been filed. Some of the companies have paid their taxes under protest and some others have paid hundreds of dollars in penalties. If the companies lose in their law suits they will be obliged to pay one-half of the total taxes in the coal region towns hereafter and their officers have asserted that they cannot pay such heavy taxes, especially where the coal lands, as in **Pottsville**, are not being actively mined.

The **Penn Central Light & Power Co.**, Altoona, has purchased a tract of 2,500 acres of coal land in **Broad Top** township, **Bedford County**, from the **Kay Coal Mining Co.**, for \$230,000. The coal land is situated near the new **Saxton** power plant now being constructed by the **Penn Central**.

UTAH

The **Sevier Valley Coal Co.**, of **Richfield**, has increased its capital stock from \$250,000 to \$500,000. This is in order that greater development of the property may be made.

VIRGINIA

The **Dominion Coal Co.**, **Sydney, N. S.**, has ordered twelve colliers to **Norfolk** to load coal for **Canada**, on account of the strike of miners there. The coal for this shipment is on hand at the piers and can be loaded without delay. It is expected the ships will take in the neighborhood of 100,000 tons on each trip.

The **Supreme Court of Appeals** will review the case of the **State of Virginia** against **Castner, Curran & Bullitt**, coal operators and steamship owners, for collection of taxes on business during 1916-1918. The company is chartered in **New Jersey**, but was taxed in **Virginia**, and the **Virginia** courts have upheld the company. The state will appeal the case.

WEST VIRGINIA

During the last week of June a deal was consummated in the **Winding Gulf** district under the terms of which the plants, assets and properties of the **Lynwin Coal Co.** at **Mistletoe**, on the **Virginian Ry.** were purchased by **John A. Boone**, of **Beckley**.

Walter B. Thurmond, of **Logan**, formerly president of the **Logan Operators Association** and one of the leading operators in the **Logan** district, in association with others has organized the **Logan Eagle Collieries Co.**, for the purpose of operating on an extensive scale in the **Logan** field. The new concern is capitalized at \$500,000. Associated with **Mr. Thurmond** are his father, **J. S. Thurmond**; **J. Cary Alderson**, **W. R. Lilly**, of **Logan**; and **Angus MacDonald**, of **Charleston**.

The **Pax Mining Co.** has increased its capital from \$100,000 to \$300,000. The capital stock of the **Deep Hollow Coal Co.** has been decreased from \$50,000 to \$10,000.

The following foreign coal corporations have been authorized to transact business

in **West Virginia**: **Bertha-Consumers Co.**, of which **John H. Jones**, of 1203 **Chamber of Commerce Building**, **Pittsburgh, Pa.**, is president; **Brydon Brothers Coal Corporation**, of **Maryland**, of which **Harry G. Fisher**, of **Keyser, W. Va.**, is secretary; **Dundonald Coal Co.**, incorporated under the laws of **Delaware**, of which **W. G. Cochran**, of **Tioga, W. Va.**, is secretary; **Atlas Coal & Coke Co.**, of **Chicago, Ill.**

The **Moke Co-operative Coal Co.**, which has been operated for just about a year under the co-operative plan, with all workers owning stock in the mine, has held its first meeting of stockholders since the organization of the company in June, 1922, and has elected the following officers and directors: **W. L. Moke**, of **Clarksburg**, president; **F. M. Wattles**, of **New York**, vice president; **R. F. Holden**, of **Clarksburg**, secretary-treasurer; **John McNicol** and **John Elliott**, directors. Officers of the company assert that under the co-operative system the company has been highly successful, operating without interruption since the company was organized except at such times as lack of cars made operation impossible.

Increased production at the mines of the **Consolidation Coal Co.** in the **Georges Creek** field as a result of the larger number of men at work is due to the fact that over 100 men who had been on strike since April, 1922, returned to work during the closing days of June, so that the company now has a working force of about 850 men. With men returning to work at this rate, the backbone of the strike in the **Georges Creek** region has been broken, operators assert, notwithstanding the fact that the strikers are receiving about \$40,000 a week in benefits from the **International union**. No striking miner who has applied for work has been turned down, it is stated.

WASHINGTON

E. P. Lucas, general manager of the **Bellingham** coal mines, was elected president of the **Washington Coal Producers' Association** June 21. The association includes most of the open-shop operators of the state. **Prescott Oakes**, president of the **Roslyn Fuel Co.**, was chosen vice-president and **W. E. Maltby** was re-elected secretary-manager.

CANADA

Output of coal from **Canadian** mines during **March**, according to the monthly report of the **Dominion Bureau of Statistics**, amounted to 1,457,000 net tons, a decrease of 11 per cent from the total for the previous month but an increase of 12 per cent over the average for that month during the preceding three years. Production in **Alberta** showed a decrease of 202,000 tons and in **Saskatchewan** 2,000 tons, while the output for **British Columbia** was the same. **Nova Scotia** and **New Brunswick** reported increases of 24,000 and 3,000 tons respectively. The cumulative output from all mines for the first three months of 1923 amounted to 4,858,400 tons, which was 22 per cent above the three-year average for that period. Imports of coal during **March** were 1,817,700 tons, compared with 1,326,200 tons during **February**. Total importations during the three months were 4,785,600 tons, an increase of 33 per cent over the three-year average for the period. Exports of **Canadian** coal in **March** were 284,500 tons, compared with 185,000 tons in **February**. Comparison of **March** exports with the preceding three-year average for that month showed an increase of 41 per cent.

The steel and coal industries of the **British Empire Steel Corporation** at **Cape Breton** have been completely tied up by a strike of 8,000 coal miners who went out in sympathy with the steel workers who were striking for increased pay and the establishment of the check-off system. Troops were sent to maintain order and the miners demanded the withdrawal of the soldiers. Serious rioting has occurred but the presence of the military has restored order.

Obituary

Death has claimed **M. S. Browning**, of **Ogden, Utah**, widely known capitalist and director in the **Lion Coal Co.**, of that city. **Mr. Browning** died in the office of an attorney friend. He was 63 years of age.

Association Activities

Once again J. G. Bradley, former president of the National Coal Association, was elected as president of the **West Virginia Coal Association** at the annual meeting of that organization held during the convention of the National Coal Association at Atlantic City recently. Mr. Bradley is president of the Elk River Coal & Lumber Co. Ever since the West Virginia Coal Association was revived during the war, Mr. Bradley has been chosen year after year as its head. Vice presidents elected at the Atlantic City meeting were Everett Drennen, president of the West Virginia Coal & Coke Co., of Elkins, W. Va., and G. H. Caperton, of Charleston, W. Va. Walter H. Cunningham, who has served the association long and faithfully, was again chosen as the secretary of the organization.

The **Colorado & New Mexico Coal Operators Association** held its annual meeting and election of officers June 21 at the Denver Athletic club in Denver, Colo. Traffic problems were principal points of discussion. The following directors were elected: J. F. Welborn, J. J. Roche, W. H. Huff, F. R. Wood, S. M. Perry, Frank Bulkley, L. A. Hayden, J. Van Houten, H. F. Nash, W. D. Brennen and S. S. Murphy. All are prominent western operators. Following the meeting of the board of directors, these officers were selected: F. R. Wood, president; H. F. Nash, vice-president, and F. O. Sandstrom, re-elected secretary-treasurer and traffic manager.

Recent Patents

Breaker Plate for Crushers. Arthur F. Williams, St. Louis, Mo., assignor to Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.; 1,440,429. Jan. 2, 1923. Filed Sept. 1, 1922; serial No. 585,739.

Mining and Loading Machine. Edmund C. Morgan, New York, N. Y.; 1,440,791. Jan. 2, 1923. Filed Sept. 18, 1915; serial No. 51,332. Renewed Oct. 15, 1919; serial No. 330,854.

Shoveling Machine. D. C. Corner, St. Louis, Mo.; 1,441,216. Jan. 9, 1923. Filed April 1, 1921; serial No. 457,640.

Loading Machine. R. P. Greenleaf, Cleveland, Ohio, assignor to Frank Billings, Cleveland, Ohio; 1,442,939. Jan. 23, 1923. Filed July 23, 1920; serial No. 398,467.

Coaling Barge. L. S. Rosener, San Francisco, Calif.; 1,443,044. Jan. 23, 1923. Filed June 8, 1921; serial No. 475,909.

Rock Drill. C. C. Hansen, Easton, Pa., assignor to Ingersoll-Rand Co., New York City; 1,443,128. Jan. 23, 1923. Filed Dec. 29, 1921; serial No. 525,711.

Rope Thrusting Shovel. Walter Ferris, Milwaukee, Wis., assignor to the Bucyrus Co., South Milwaukee, Wis.; 1,443,353. Jan. 30, 1923. Filed Aug. 3, 1921; serial No. 489,407.

Coke Briquets. Wm. E. Davies, London, Eng.; 1,443,618. Jan. 30, 1923. Filed Dec. 20, 1918; serial No. 267,729. Renewed July 13, 1922; serial No. 574,864.

Belt Feed for Picking Tables. Archibald R. Stephen, Lodi, Calif.; 1,443,659. Jan. 30, 1923. Filed April 15, 1922; serial No. 553,260.

Mine-Car Door. Emil F. Tubach, Dushore, Pa., assignor of one-half to Arthur L. Tubach, Dushore, Pa.; 1,443,857. Jan. 30, 1923. Filed Dec. 30, 1921; serial No. 525,962.

Safety Retaining Mechanism for Mine Cages, Lifts, etc. Herbert Lydeard, Swindon, England; 1,443,882. Jan. 30, 1923. Filed June 19, 1922; serial No. 569,403.

Trade Literature

Pennsylvania Hammer Crushers. Pennsylvania Crusher Co., Philadelphia, Pa. Bulletin 1005. Pp. 15; 8x11 in.; illustrated. The armorframe single-roll coal crusher and steel-built top-feed hammer crusher are described on page 11, the former being built in capacities of 10 to 400 tons hourly for reducing run-of-mine bituminous coal to sizes required for automatic stokers and preparatory to pulverizing, and the latter specialized for preparing run-of-mine coal for stoker use and for the preliminary reduction in pulverized-fuel installations. Features of these crushers are their heavy fabricated unbreakable steel frames, all-

steel rotor, adjustable steel cage and patented tramp iron separator.

The Sullivan "Turbinair" Hoist. Single Drum, Type "HA." Sullivan Machinery Co., Chicago, Ill. Bulletin 76C. Pp. 11; 6x9 in.; illustrated. This bulletin while a reprint of an earlier edition contains additional matter. This hoist meets the demand for a small, compact but powerful portable hoisting engine for numerous uses in mines.

Sullivan "Turbinair" Hoist. Double Drum Type "HDA." Sullivan Machinery Co., Chicago, Ill. Bulletin 76D. Pp. 15; 6x9 in.; illustrated. This bulletin, like No. 76C, is a reprint of an earlier edition and contains additional material.

Link-Belt Electric Hoists and Overhead Cranes. Link-Belt Co., Chicago, Ill. Book 480. Pp. 32; 8x11; illustrated. This attractively bound book, in bright red cover, shows the many applications to which these hoists and cranes may be put.

Traffic News

The **Baltimore & Ohio R.R.** has announced the sale of the Sandy Valley & Elkhorn and Millers Creek railroads to the Consolidated Coal Co. and the sale of the Long Fork Ry. to the Chesapeake & Ohio R.R. The two transactions involve approximately \$8,000,000, of which \$6,000,000 is said to have been paid for the Sandy Valley & Elkhorn and Miller's Creek railroads and \$2,000,000 for the Long Fork Ry. It was said by officials of the Baltimore & Ohio that the contract was closed pending approval of the Interstate Commerce Commission. Funds from the sale, it was stated, would be used to develop Baltimore & Ohio property in West Virginia.

From June 1 to June 15 this year, 4,934 new freight cars were placed in service by the railroads of the country, says the American Railway Association, bringing the total number of new freight cars placed in service since Jan. 1, 1923, up to 70,594. One hundred and forty-three new locomotives also were delivered, and placed in service during the same period which brought the total number of new locomotives delivered since Jan. 1, 1923, up to 1,840. Of the new freight cars delivered by car builders to the railroads, coal cars, 28,757. The railroads on June 15 also had on order and awaiting delivery, 104,068 new freight cars, and 1,993 new locomotives.

Fewer freight cars are now in need of repair than at any time since January, 1921, according to reports filed July 2 by the carriers with the Car Service Division of the American Railway Association. These reports showed that on June 15 200,784 freight cars of various kinds, or 8.9 per cent of the total number on line, were in need of repair. This was a decrease of 10,932 since June 1, at which time there were 211,766, or 9.4 per cent. During the first 15 days in June, 1,280,277 freight cars were repaired and turned out of the shops. This was an increase of 102,320 freight cars over the number repaired during the period extending from May 15 to June 1.

Locomotives in need of repair on June 15 totaled 12,659, or 19.9 per cent of the total number on line, according to reports filed with the car service division of the American Railway Association. This was a decrease of 24 locomotives compared with the number in need of repair on June 1, at which time there were 12,683. The railroads of the country also repaired and turned out of the shops from June 1 to June 15 a total of 18,937 locomotives, compared with 21,406 during the last half of May.

The **New York Central R.R.** carried 2,255,616 net tons less of coal and coke in 1922 than it did in the previous year, as a result of the strikes in the anthracite and bituminous coal fields. During the twelve months ended Dec. 31 last 4,294,575 tons of anthracite was carried, as compared with 7,620,195 tons in 1921, 25,683,530 tons of bituminous as against 24,819,035 tons, and 736,430 tons of coke, as compared with 530,923 tons. Anthracite shipments decreased 3,325,620 tons, while bituminous and coke shipments increased 864,497 and 205,507 tons, respectively. Coal cars equipped for service on Dec. 31, 1922, numbered 55,621 as compared with 57,947 on the corresponding day of the previous year. There were 749,700 net tons of anthracite transported by the Boston & Albany R.R., one of the leased lines of the New York Central, during the year ended Dec. 31, 1922, as compared with 1,492,975 tons in the previous year, a decrease of 743,275

tons, while bituminous coal carried during the same period was 1,788,110 tons, as against 1,772,804 tons, an increase of 15,306 tons, and coke 132,689 tons as compared with 67,318 tons, an increase of 65,371 tons. Coal cars equipped for service on Dec. 31, 1922, numbered 1,446, as compared with 1,535 on the last day of the previous year. The Ohio Central Lines, also leased by the New York Central, carried 6,888 tons of anthracite, 6,005,996 tons of bituminous and 57,458 tons of coke during the year 1922. These lines had in service on Dec. 31, 1922, 13,229 coal and coke cars. The annual report of the New York Central R.R. states that mechanical facilities are being installed in the coal handling plant at Ashtabula Harbor, Ohio, for the transferring of coal from cars to fueling lighters and to tugs.

The **Erie R.R.** carried over its lines during the twelve months ended Dec. 31, 1922, 6,079,508 tons of anthracite, 7,797,689 tons of bituminous coal and 744,218 tons of coke, as compared with 9,973,687, 6,959,744 and 675,929 tons, respectively, in the previous twelve months. There was a decrease of \$11,861,149.44 in revenue for hauling coal and coke, as compared with the previous year, receipts in 1922 being \$21,353,924.49 as against \$33,215,073.93 in 1921.

Weston Dodson & Co., Inc., has attacked the rates on birdseye anthracite in effect between Winton, Pa., and North Adams, Mass.

The Interstate Commerce Commission has ruled against the contention of the Anaconda Copper Mining Co. as to unreasonable charges on coke from Sunnyside, Utah, to Black Eagle, Mont.

Alfred C. Dent and **W. T. Smith**, vice-presidents of W. A. Harriman & Co., and **Joseph Kraus**, vice-president of the Union Trust Co., of Cleveland, were elected directors of the **Pittsburgh & West Virginia R.R. Co.** on June 28, to represent the Tuttle-Harriman interests, following the closing of the latter's option on the 32,500 shares of stock of the railway company. The deal, involving approximately \$2,215,000, was engineered by the Tuttle Coal Corporation and W. A. Harriman & Co. through their representatives. The purchase was made from the Metropolitan Life Insurance Co. C. E. Tuttle was elected a director of the Pittsburgh & West Virginia at a recent meeting. No new chairman of the board was elected. Besides electing directors to the Pittsburgh & West Virginia, the new interests elected A. C. Dent and C. E. Tuttle as directors of the West Side Belt Line, a subsidiary of the Pittsburgh & West Virginia.

Coming Meetings

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The **American Institute of Mining and Metallurgical Engineers** will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The **American Mining Congress** will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

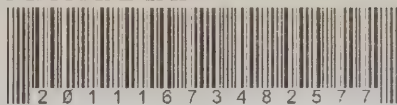
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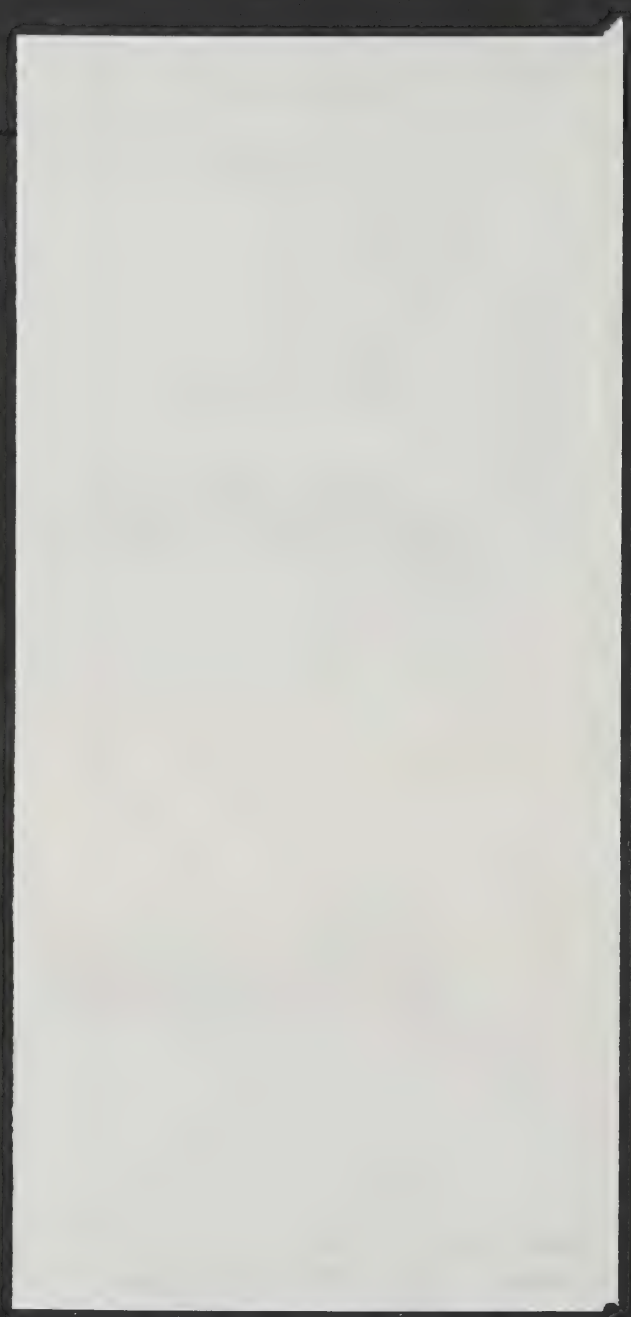
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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, JULY 19, 1923

Number 3

Assigned Cars

NOTHING has so disturbed the equanimity of the railroad men and sobered the soft-coal producers as the sweeping decision of the Interstate Commerce Commission in the matter of assigned cars. The operators began their fight against the practice in an organized way in 1918 through the Fuel Administration and later carried it into Congress in an effort to have assigned cars prohibited by the Transportation Act of 1920. The National Coal Association has been a consistent opponent of what it considers a form of special privilege, and after carefully exempting private cars from its attacks, has carried the fight through the several years to a victory in this decision of the commission.

The conclusions of a majority of the commission were unexpected by both sides. On the railroad side it was generally expected that the legality under the Transportation Act of the use of assigned cars would be sustained. So it was, and yet the railroads lost because it was further held that unless the Interstate Commerce Commission specify the occasion, such use of cars is not to be allowed. Which is to say that, having disposed of the case in one way on points of law, the commission turned around and, taking economic jurisdiction, rendered final verdict in another quarter.

The railroads have determined to ask the commission for a rehearing. It does not seem reasonable to expect that they will get concessions, not to mention a reversal, even if they get the rehearing. The Interstate Commerce Commission is concerned, but not overmuch, with precedent, and when a majority of the commissioners say that "The rule evolved in the earlier decisions [Hocking, Traer and Hillsdale] was not the fruition of ripe experience" and proceed to reach a conclusion based on the experience of the six years from 1917 to 1922, in which there was every shade of car supply, one is warranted in inferring that they are not going to change again very soon.

But if the railroads were surprised at the decision as respects the use of assigned system cars, the operators were taken back at the inclusion in the ban of private cars. A number of large, prosperous coal companies are owners of private coal cars. Many consumers, particularly public utilities and steel companies, have their own cars for coal. The investment in such cars, around \$30,000,000, has been made because of the advantage that accrues to the ownership during times of car shortage. In previous assaults on the assigned car for railroad fuel, the private car has been exempted. The Fuel Administration and the Railroad Administration did not disturb the customary use of the private car. Thus it has come to be more or less accepted that because the cars are privately owned they are entirely at the disposition of the owner, and that any other disposition would be in violation of the constitutional inhibition against confiscation of private

property. Any action that may be taken by private car owners to upset the decision of the Commerce Commission probably will be grounded on that premise.

It must be granted at the outset that had the commission undertaken to differentiate between privately owned and system cars in the matter of assigning to particular use it would have dropped into deep water. The gradation from the cars of a producer of coal through those of an industrial consumer or a public utility to those off an off-line carrier not originating coal is scarcely discernible. And what ground is there for distinguishing between the cars of an off-line carrier set apart for fuel-coal loading and those of an originating carrier when designated for the same purpose? The jurisdiction of the Interstate Commerce Commission over private cars appears to come when these cars enter the service of the carriers and become "instrumentalities of interstate commerce." They are none the less private property on which return is supposed to be made through the charges paid by the roads for their use, as prescribed by the commission. Private-car owners are considering testing the power of the Interstate Commerce Commission over their property as set forth in this decision.

Assigned cars are not abolished forever. However much their use by the railroads may be unreasonable and prejudicial, the Interstate Commerce Commission in the same decision says that hereafter it may in emergencies authorize their use for particular cases. The general tenor of the decision indicates that what is contemplated are service orders giving car preference not only to railroads but to utilities and others in distress. It is quite clearly indicated that the commission has found no substitute for assigned cars and by its promise to care for the needy and negligent in emergencies it has robbed the decision of much of its sting for those who fought to uphold the system. When there is need for fine distinction in the distribution of coal the government will take on the job. But, as Commissioner Hall pointed out in his dissenting opinion, it is rather difficult to understand how a practice that is discriminatory when practiced by the railroads can be otherwise when indulged by the commission.

By this decision the Interstate Commerce Commission has not solved the problem of assigned and private cars, except it listen to its own counsel.

GEORGE CUSHING HAS WRITTEN an analysis and criticism of the anthracite report of the Coal Commission. He finds that the conclusions of that body are all at variance with the facts as found, at odds with decisions of the Supreme Court, that less than satisfactory information was obtained on all major points, that the report presages general regulation of the coal industry, that the report is quite clumsily written and hardly worth anyone's time to read. He also finds that it is hardly understandable; the data confusing. If he can

frame any more adverse criticism he will spill it later. Cushing naturally would take this sort of sweeping position. He would have said the same had the angel Gabriel or George Cushing written the report. No one takes his opinion seriously, least of all Cushing, as he admits in the same article. He says: "From present indications the report of the Coal Commission will make no change in the policy of the coal industry. The bituminous-coal operators' case is still in court. They cannot change policy without doubting the fairness of the commission. *This, they have [despite what I have said] no reason to do.*"

Common Sense versus Cold Law

WHY not settle all these disputes between coal shippers and buyers by common sense instead of by cold law—or chance? Are there not better places than formal courts of law wherein to decide whether certain consignments of coal were up to standard of quality; whether quotations were correct; whether the refusal of coal was right and proper under the contract? At present there is no other recourse in case of dispute than to a court. Yet where breathes the coal producer who has not suffered by miscarriages of justice in cases of suit to collect from shifty buyers? That court sits in the buyer's county. The jury is composed of the buyer's fellow citizens. Where sentiment plays a part the advantage naturally lies with the buyer. Therefore producers, above all others in the coal industry, should be keen for a change that promises to raise the factor of justice in litigation.

Arbitration may do it. Arbitration, properly backed by statute, is getting a thorough trial in industrial disputes. The idea is spreading through the United States. Various industries, thinking of the harassments to the proper conduct of their business relations, are giving the matter serious consideration. The American Wholesale Coal Association has taken the lead in the coal industry. It is time operators also did some serious thinking. They should study arbitration's possibilities. Then, convinced of its merits, as they must be, they should join forces with other business interests to see that necessary supporting legislation is written on the statute books of every state.

There is nothing new about the principle of arbitration. There is nothing new in today's movement to get it generally adopted by industry, as described elsewhere in this issue, except that many a man has a new vision of its value to him. The movement is merely evidence that an old, old idea finally has sunk in far enough to stimulate the motor sense. After all these years of casual talk something actually is being done about arbitration in business. States are passing acts recognizing it as a standard method of meting out justice, and are clothing it with legal authority. In such states—notably New York—clauses are being written into contracts of all sorts in various industries, requiring arbitration of any disputes that may arise. Arbitrators, be they groups chosen by the litigants or boards set up within industries or single "judges" selected by whatever means, are actually settling disputes. The thing is at work.

What is the coal industry going to do about it? Surely it would be of value to producers and sellers of coal to set up within the industry bars of justice where disputes could get speedy attention and speedy

settlement, instead of the laggard recognition so often accorded even in the best-organized court of law. Surely it would be good for the coal industry if coal disputes could be settled by men who know coal from A to izzard instead of by a judge who knows cold law and by twelve butchers, bakers and candlestick makers who know when they've had enough. Long-winded harangues and vast bulks of technical testimony by "experts" make any average American jury tired of its job and ready to decide a coal case easily by a flip of a coin.

But arbitration is not something for nothing. It promises to remedy business evils in coal only if the men of the industry are willing to give time and effort to practice it. Somebody has to be the arbitrator. That arbitrator in each case must be a man whose judgment is recognized as sound and whose integrity is above reproach. There are enough such men in the country. They must be ready to serve. Also associations, groups and individuals must support the idea and seriously strive to make the arbitration contract clause universal.

Arbitration must be by methods so eminently sound and the personnel of arbitration boards must be of such high character that any honest and reasonable business man would be glad to subscribe to the clause in a contract when it is presented for his signature. It must not be arbitration by and for the producer as against the jobber, retailer and consumer; nor yet arbitration by and for the jobber as against the rest. There can be no arbitration where there is even a suspicion of prejudice. This thing must be entered upon high-mindedly and with justice as its single purpose. And there is no better time for such an enterprise in coal than now, when the industry is in a state of flux, when coal men would do well to prove that they can settle their own problems, and when, if ever, there is need to display common sense.

TORRENTS OF WORDS often fail where a few accomplish the purpose. A traffic expert said the other day, "I used to hear so many long-winded speeches to the Interstate Commerce Commission and used to see so readily the fatigue they brought the commission that I made up my mind I never would exceed 10 minutes in any such case. It is a good plan. I'm sure I get more results." Why not? Any commission or any individual grasps most easily facts and ideas stripped of all non-essentials. In the coal industry, as everywhere, intelligent brevity is valuable, whether in association reports, convention speeches, presentation of cases or whatnot. Condensing a 100-word idea into 10 words in a speech requires effort. But the idea "gets home" with more force. And Oh! the relief it brings the hearers!

EX-SENATOR WILLIAM M. CALDER admits, in an interview published in the Brooklyn *Eagle* of July 9, that it was through his efforts that the Coal Commission was brought into existence and that its findings, as a result of a most comprehensive study, are substantially in accord with his report on coal to the Senate, except that Mr. Hammond and his associates have made recommendations more drastic than those proposed by the former Senator from New York—and Brooklyn. What Mr. Calder has to say on coal always is entertaining to the coal industry.

Rosedale Byproduct Coke Ovens And What They Accomplish

Steep Grades and Undermining by Coal Workings Make Oven Construction Expensive—Semet-Solvay Ovens Have Automatic Reversal of Flue Gas—Keeping Carbon Out of Tar—Coal Mixture Used and Byproducts Obtained

BY GEORGE ATWELL RICHARDSON*
Philadelphia, Pa.



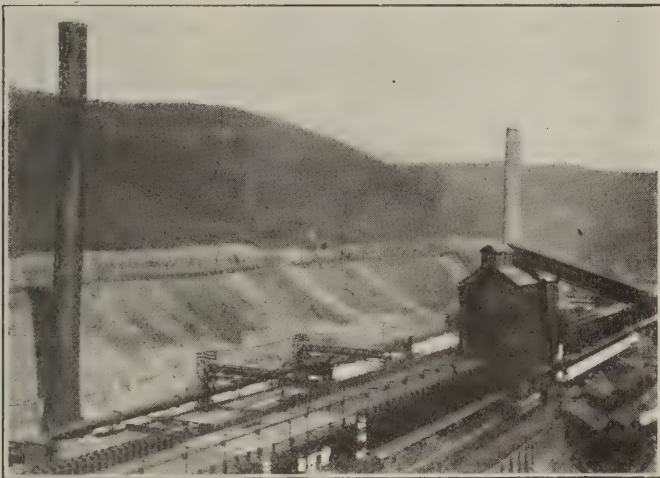
THE byproduct coke plants of the Cambria Steel Co. at Johnstown, Pa., form integral parts of two groups, the Rosedale and Franklin units, each comprising: (1) The mines from which the coal is hauled and brought directly into the coal-washer buildings; (2) the coal washer and subsidiary buildings, where the coal is washed and then mixed with coal from other mines to form the proper coking mixture; (3) the byproduct coke-oven plants, where the mixed coals are converted into coke for use in the manufacturing plants of the Cambria Steel Co. and into byproducts which are manufactured mainly for outside consumption.

In previous articles only the first two of the integral

same interesting features. When it comes to a discussion of the third division it is necessary to describe both plants, for two reasons: (1) Because the byproduct equipment at the Franklin plant is in every way as recent as that at Rosedale, being erected at the same time, and (2) because the plants are different, that at Franklin being equipped for the separation of light oils into their constituents, whereas that at Rosedale is not.

In several ways the Rosedale plant is unusual. At the time of its completion in 1922 it was one of the largest byproduct coke-oven installations ever constructed from the standpoint of actual quantities of materials used. Not only this but the location—on the steep side of a hill and in a deep, narrow valley—introduced engineering problems that would not ordinarily be encountered. These included the furnishing of an adequate and economical supply of coal, the washing and preparation for coking, all described in earlier articles, and more particularly the design and construction of the ovens and byproduct-plant buildings and equipment.

Hinckston Run is the name of a small waterway that flows into the Conemaugh River at a point just below the Cambria plant, west of Johnstown. At its narrowest point the comparatively level ground is less than 200 ft. wide, whereas the side of the hill on which the greater part of the plant was constructed rises sharply. The flow of water is not large, as the stream is im-



PANORAMA OF COKE OVENS FROM MINE HEADFRAME

In the center is the big coal bin holding 3,000 tons from which the larries are filled for the feeding of the coke ovens. The ovens in the foreground are of the Cambria type. Of these there are 120. In the rearground are the eighty-eight Semet-Solvay ovens with their two brick stacks.

parts of the Rosedale plant have been considered because of the newness of the equipment and the nature of the problems encountered. These same parts of the Franklin group are much older and do not have the

*Midvale Steel & Ordnance Co. and Cambria Steel Co. Since this article was received these two companies have merged with the Bethlehem Steel Co.

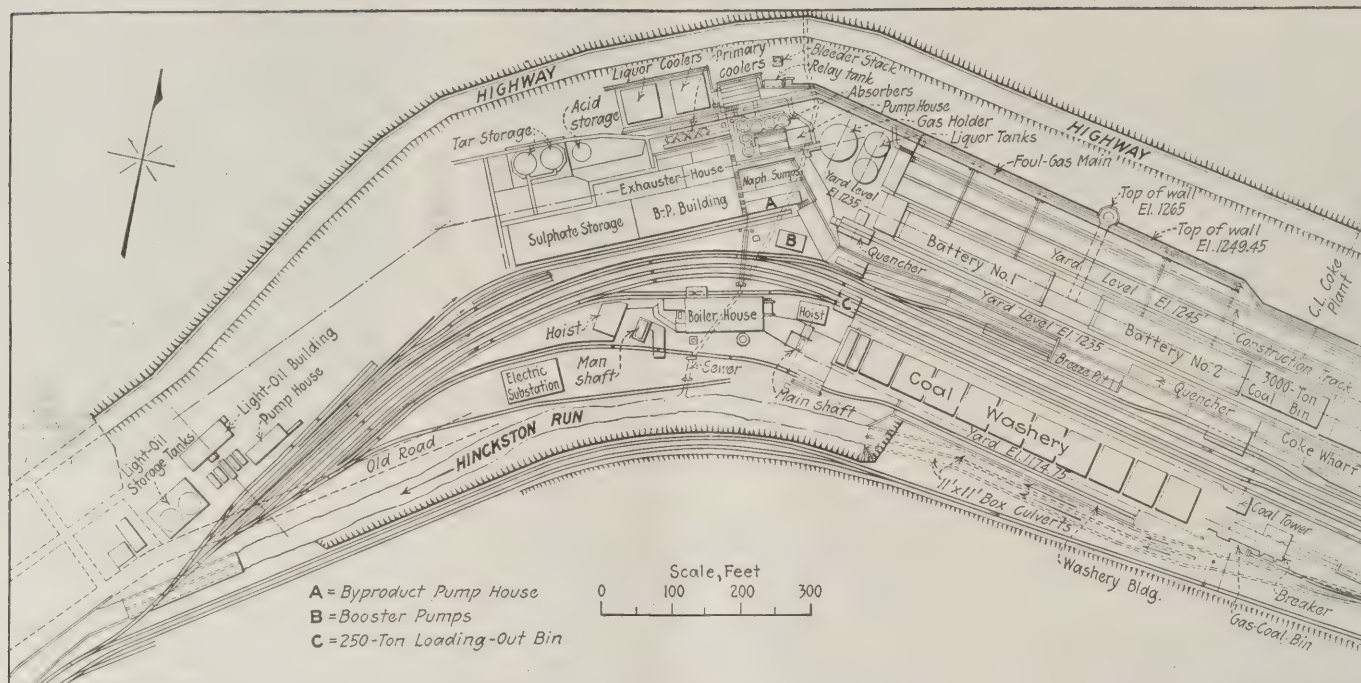
NOTE—This article is the fourth in a series of six describing an unusually interesting combination of modern mining methods and byproduct-plant practice. The three, which have already appeared, are entitled "Cambria Steel Co. Drops Coal Down Well, Loads it at Bottom and Hauls it to Ovens," "Haulage, Hoisting and Dumping Practices at Rosedale Mines" and "Rosedale Uses Bumping Tables to Wash Its Product, Mixing It for Coking Purposes with Gas Coal." They are to be found in the issues of *Coal Age* for Aug. 31, Sept. 7, 1922, and Feb. 15, 1923, respectively.

The headpiece shows the coke leaving an oven and falling red-hot into the quenching car which, containing a little water from previous quenching, is sending up a cloud of steam in which is entrained much smoke. A latticed guard keeps the coke mass intact till it reaches the edge of the wharf.



DISCHARGE SIDE OF CAMBRIA COKE OVENS

Coke is being quenched at the west tower. Note how the locomotive obtains its power and the provision made for the return circuit. The structure to the left and in the rear is the byproduct building.



WESTERN HALF, ROSEDALE BYPRODUCT PLANT; RECOVERY EQUIPMENT PROPER ON LEFT, OVENS ON RIGHT

A culvert, consisting in its upper part of a 16-ft. arched waterway and in the lower end of two waterways 11 ft. square set side by side, takes the water of Hinckston Run past the coke yards, making it possible to use the full width of the valley. It has a good gradient of 1.07 per cent. The end of this culvert can be seen near the coal wash-

ery, gas-coal bin and breaker. In order to reduce excavation costs the buildings and ovens are set at different levels; thus the level of the yard below the washery building is 1,174.5 ft. and that between the draining pits and the wharf wall is on a 1.58-per cent gradient and varies in elevation from 1,192 to 1,208 ft. The wharf wall

itself is at an elevation of 1,235 ft. and the coke-pusher track yard is at an elevation of 1,245 ft. Despite this the pusher track has to be protected by a retaining wall in some places reaching an elevation of 1,260 ft., though in other places it is only 1,246 ft. above datum. A new highway had to be built around the plant at a still higher level.

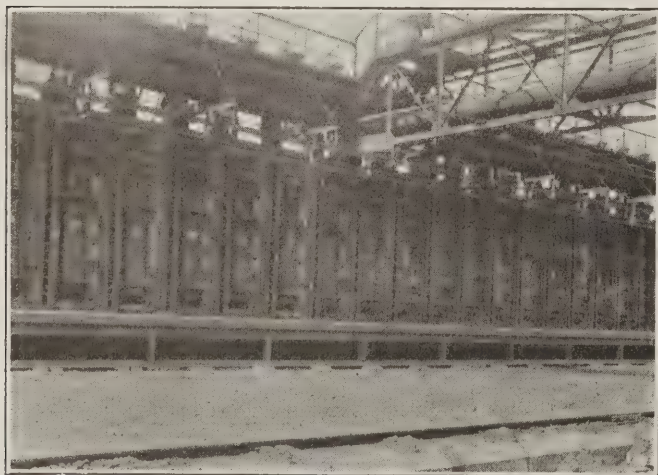
pounded farther up and as the reservoir forms part of the water supply used by the Cambria Steel Co. for manufacturing purposes.

One of the first problems that presented itself was that of providing suitable working space in the middle of the valley, and this was accomplished by the construction of a 16-ft. concrete arch culvert about 1,300 ft. long which, traversing the entire length of the plant, carries past the ovens the water it receives from the stream.

The plant itself was constructed in three levels. The coal washery and other coal-handling equipment were erected in the bottom of the valley. On the second or middle level were placed the various byproduct buildings and equipment pertaining thereto, the ovens being

built on the upper level. The average slope of the ground is $1\frac{1}{2}$:1. The elevation of the base of the rail of the tracks in the bottom of the valley averages 40 to 45 ft. below that of the base of the rail of the pusher tracks.

The actual construction was carried on under great difficulties. Unexpected troubles were encountered in laying the foundations of the ovens. The material near the surface was of such a treacherous nature that it became necessary to sink the 156 caissons to solid rock. Each caisson was 6 ft. in diameter. Their average depth was 36 ft. In several instances in sinking the caissons abandoned mine galleries were entered which lay about 40 ft. below the ground, these sometimes being filled with water, which added to the difficulties. Re-



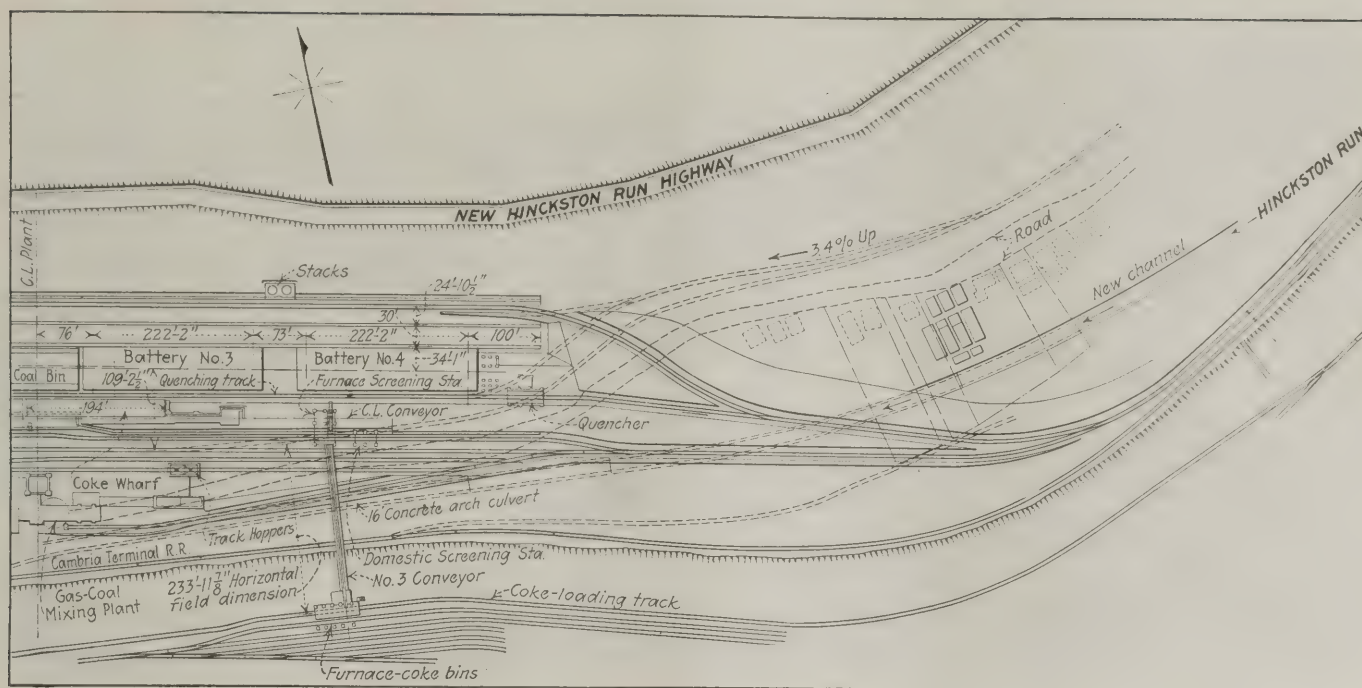
SEMET-SOLVAY OVENS SEEN FROM PUSHER SIDE

This shows one of the bridges or gantries carrying the suction main for gas and the hydraulic main which runs along the top of the ovens and collects the gases from which byproducts are obtained. Note the wide track on which the pusher runs. This is the narrow end of the ovens, the width increasing slightly toward the discharge side to facilitate the removal of the coke.



CAMBRIA-TYPE OF OVENS SEEN FROM ABOVE

On the left can be seen the rails for the coal larry and the five rows of ports by means of which the ovens are filled. On the right are the bridges by which the liquid and gaseous byproducts are conveyed to the suction or foul-gas main.



EASTERN HALF, ROSEDALE BYPRODUCT PLANT; SHOWING SEMET-SOLVAY OVENS AND COKE-HANDLING PLANT

In this plan nothing can be seen of the Cambria ovens, which lie on the far side of the big coal bin by which they and the Rosedale ovens are supplied with coal. The fill leading from the south side of the valley to the north is 35 ft. deep where it crosses the new subterranean channel made for Hinckston Run and 38 ft. deep where it

crosses the front line of the ovens, the gradient being 2.60 per cent in the northerly direction. All the slopes are made $1\frac{1}{2}$ to 1. Many difficulties had to be overcome in the building of the plant. Owing to the treacherous nature of the soil it was necessary to sink caissons 40 ft. to solid rock. In some cases abandoned mine galleries,

found full of water, added to the difficulties. Reinforced-concrete beams 6 ft. square were placed on the pillars thus erected, and these in turn were covered with a concrete slab 3 ft. thick and it was on these that the regular oven foundations were laid. The plans here published were slightly modified before construction was completed.

inforced-concrete beams 6 ft. square surmount the pedestals thus formed and these in turn are overlaid with a concrete slab 3 ft. thick upon which the ordinary oven foundations are placed. In this way all danger of settling or slippage of the ovens has been effectually eliminated.

Soil slides were another source of trouble. These had to be overcome by the construction of heavy retaining walls. In carrying out all this work more than 150,000 cu.yd. of excavation and 50,000 cu.yd. of back-filling were necessary. As the retaining walls were 2,000 ft. long they served with the foundation work to bring the quantity of concrete poured to 70,000 cu.yd.

Material handling, not only at this plant but also at Franklin, was complicated by the lack of level ground. As a result a storage plant was erected about a mile and

a half from Rosedale at a place known as "Ten Acre." Here more than 70,000 sq.ft. of covered storage space was provided, this including machine shops and equipment for doing a large part of the work of assembling. All material for the Rosedale and Franklin plants was handled at this place and aggregated more than 1,000 carloads.

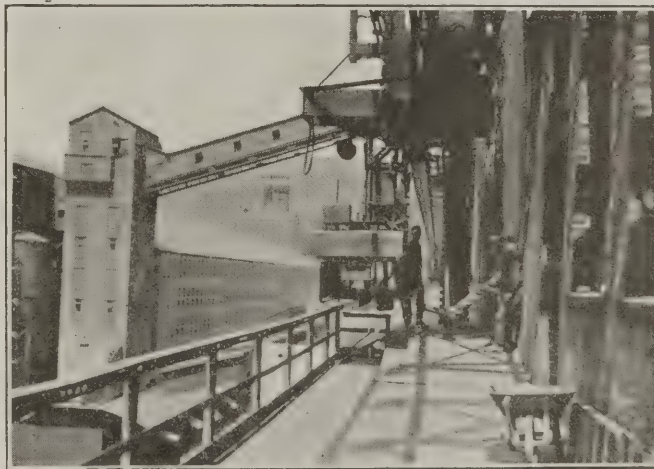
Despite these initial difficulties the proximity of an almost unlimited coal supply and the possibility in any cases of substituting gravity flow for pumping, as well as other conditions, made the proposition an advantageous one. With this background, the plant itself will now be illustrated and described in detail.

Part of the coal for cooking is hoisted directly from the mines and dumped in the coal-washer building. The local coal is low in volatile constituents and non-



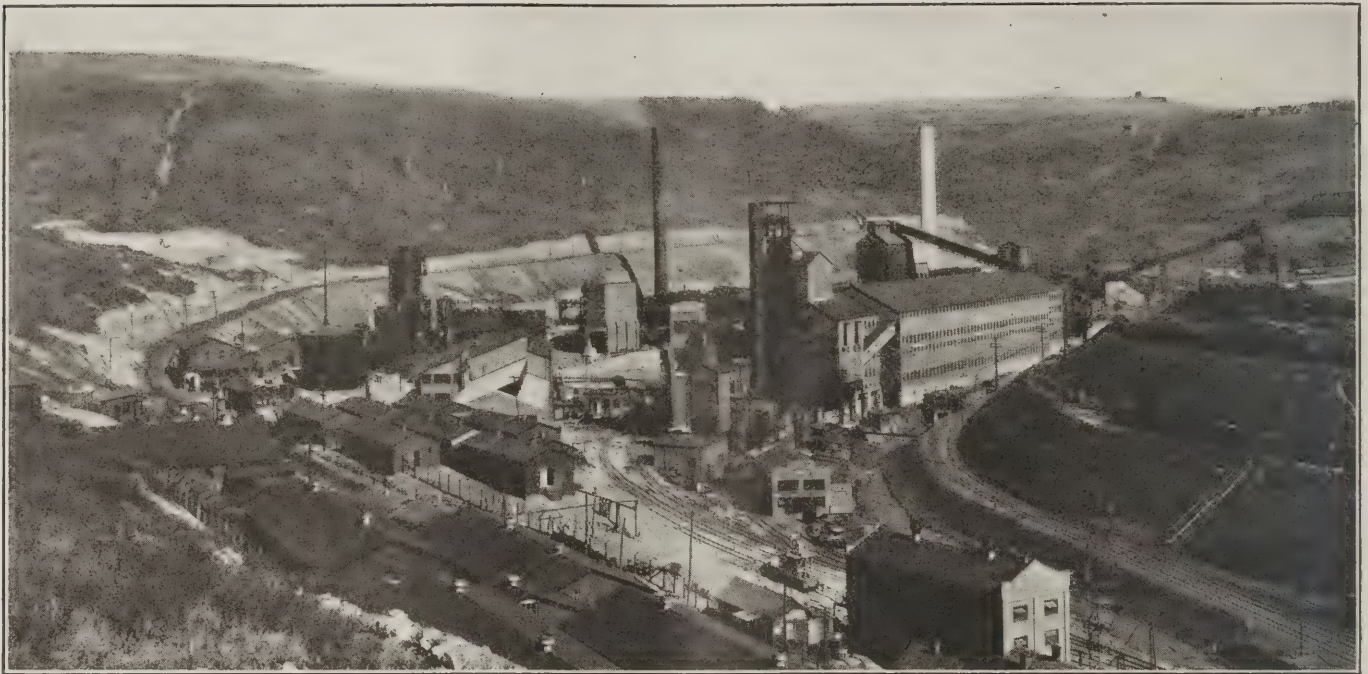
TOP OF SEMET-SOLVAY TYPE OF OVENS

Here the ports for filling the ovens are more plainly visible than in the illustration of the top of the Cambria-type of ovens. The pipes on the right carry the byproducts to the collecting hydraulic main. The view is taken looking west toward the coal bunkers.



MECHANISM FOR REMOVING DOORS ON DISCHARGE SIDE

This shows the equipment used at the Solvay ovens for placing and displacing doors. The building on the left houses the drier and washery and in the tower at the rear end of the building the mixed coal is elevated for transportation, by the conveyor bridge shown, to the coal bin in the center of the ovens.



ROSEDALE BYPRODUCT-OVENS AND REFINING PLANT ON HINKSTON RUN NEAR JOHNSTOWN, PA.

Only terracing made the irregular site feasible for so large a project. The 175-ft. headframe can be seen to the right of the center stack. Next to it is the coal washery where the Rosedale coal is washed and mixed with high-volatile coal. Closer in

the foreground may be seen the refining plant in which the more important byproducts are prepared for market. The light oil is condensed but goes to the Franklin plant for final refinement. Furthermore, ammonia is not made at Rosedale as a mer-

chantable product. All the ammonia obtained is used to make ammonium sulphate. The sheds in foreground are part of the construction equipment. Work was not entirely completed at the time this picture was taken, nor were all work sheds removed.

coking and must be mixed with gas or high volatile coal to produce a suitable coking mixture. For this reason, after washing, the local coal is mixed with gas coal brought from other of the company's mines and is then taken by belt conveyors to the coal bunkers over the ovens.

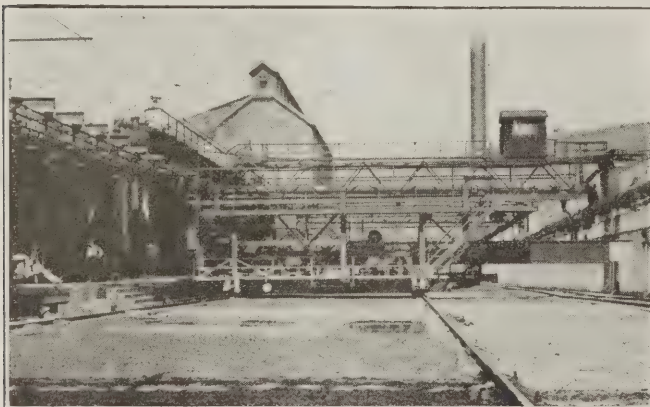
The Rosedale ovens, 208 in number, are contained in four blocks or batteries. Batteries Nos. 1 and 2 each contain sixty ovens of the Cambria type. Batteries Nos. 3 and 4 each with forty-four ovens are of the Semet-Solvay type. The bunker or coal-bin building, where 3,000 tons of coal can be stored, straddles the ovens at a point between batteries Nos. 2 and 3, and the larries that charge the ovens are themselves charged by gravity.

The Cambria and the Semet-Solvay types of ovens thus combined in a single plant have many points of difference. The Cambria oven takes a charge of 10.5

gross tons whereas the charge of the Semet-Solvay oven will average 15.5 tons. The coking time also is longer, in the first case averaging about 24 hours as compared with 15 to 16 hours in the second. If necessary, however, the pushing could be done every 20 hours in the first case. When running at maximum capacity the ovens as a whole therefore may be estimated to coke about 3,500 gross tons of coal per day.

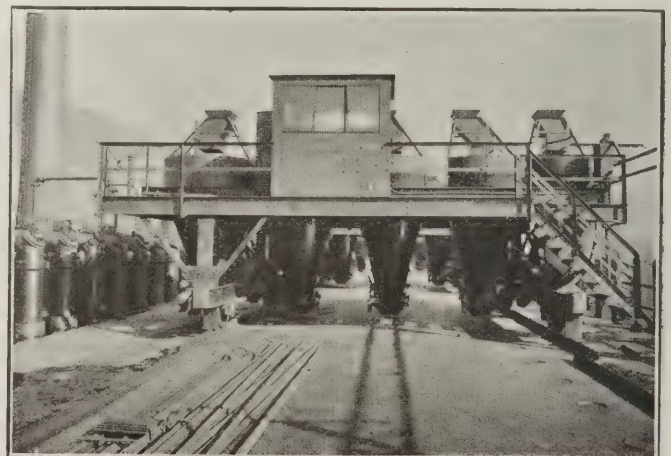
Both types of ovens are of the modern regenerator type, but the method of burning the gas used for heating varies considerably. In the Solvay ovens there are five gas inlets or ports, two on the pusher side and three on the coke side, which admit the gas to various parts of the flue. In the Cambria ovens the gas is mixed with the air and ignited underneath the ovens and the resulting flame then passes up through the flues.

Two electrically operated charging larries are used in charging the various blocks. All the ovens have five



COKE PUSHER AT SEMET-SOLVAY OVENS

A wide area has to be provided for a coke pusher, for when not pushing the ram stands out well behind the extremely wide-gage truck on which it is carried. The power of these rams obviously must be great to accord with the great depth of the coke in the oven. In this instance a big retaining wall had to be erected back of the area allotted to the pusher track and the ram clearance.



LARRIES WITH SPOUTED HOPPERS ON CAMBRIA OVENS

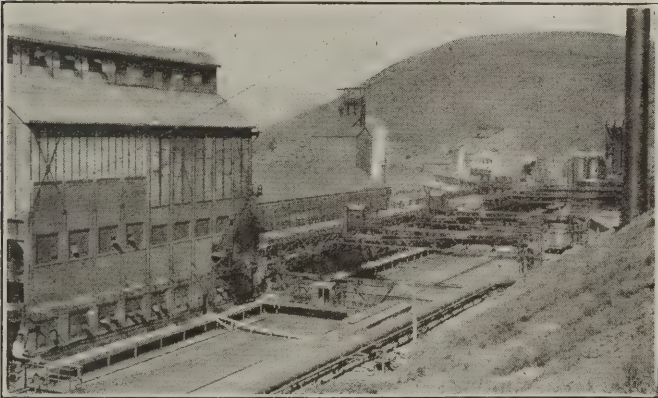
Three larries are shown here drawn up, one behind the other. Each hopper is provided with the proper quantity of coal to fill its section of the oven without waste and without deficiency—an important item in economical operation.

holes in the top for charging, there being spouts on the larries for each opening. The doors of the ovens are sealed with mud which is ground and mixed in the coal-bunker building.

The flow of air is automatically controlled in the Solvay batteries. Induced draft is used and the damper which regulates the flow is equipped with red- and green-light signals. The governor consists of a spring set against a float at given pressure. Electrical contacts are established by means of which the controls are regulated. The direction of the flue gases is automatically reversed at 15 minute intervals, a bell ringing to show that it has taken place. The Cambria batteries are manually, not automatically, controlled.

There is some question as to the real value of automatic control. Some feel that it is unnecessary, as a watch must be kept to see that the change in direction takes place with the desired frequency. It is argued that the very fact that the action is automatic leads to carelessness, which might have serious results should anything go wrong with the apparatus. The other, and what in my opinion appears to be the more logical, viewpoint is that automatic control is desirable if for no other reason than that it insures regular and uniform operation.

The following data are continuously recorded: (1) the gas pressure on (a) the coke side and (b) the pusher side of the ovens; (2) the reversing time; (3) the stack draft on (a) the coke side and (b) pusher side of ovens. In addition ordinary tube pressure gages indicate the gas pressure and ordinary inclined-tube



COAL BUNKERS AND PUSHER SIDE, CAMBRIA OVENS
In the foreground is the foul-gas main and in the rear the washery and the Rosedale shaft headframe. The coal bunkers are large enough to hold 3,000 tons of coal.

draft gages the stack draft. A Venturi meter measures the flow of gases. Each battery of Solvay ovens is entirely independent and has separate dampers, reversal mechanism, stacks, etc.

In charging the Semet-Solvay ovens it is customary to leave the damper open in the outlet which leads from the oven to the foul-gas main. This not only protects the men but serves to prevent carbon from getting into the tar. Practice of this kind is largely a matter of convenience and in some sections is not allowed on account of the smoke. The Cambria ovens are not provided with these dampers, one damper in the foul-gas main of those ovens controlling the entire battery. The dampers in the Semet-Solvay units also serve to regulate the back pressure if the suction fails.

For economical operation it is important that the ovens be charged with the correct quantity of coal. If the charge is made too small the oven space is not being



ELECTRIC LOCOMOTIVE WITH COKE-QUENCHER CAR
The coke ovens are pushed one by one and the hot coke loaded into the quencher car, taken to the quencher tower, shown in the rear, drenched with a measured quantity of water and then dumped as shown in Fig. 12.

used economically. On the other hand coal is wasted when the ovens are charged with an excess of coal, for the leveler pushes it out of the oven. Sometimes this wasted coal is put back on the next charge, but it is better to throw it away as it burns up and so is wasted regardless of the effort expended.

It has been stated already that the coal mined in the locality of Johnstown has to be mixed with other coal and it will be of interest to note the general composition and possibilities of the various kinds of coal now being used.

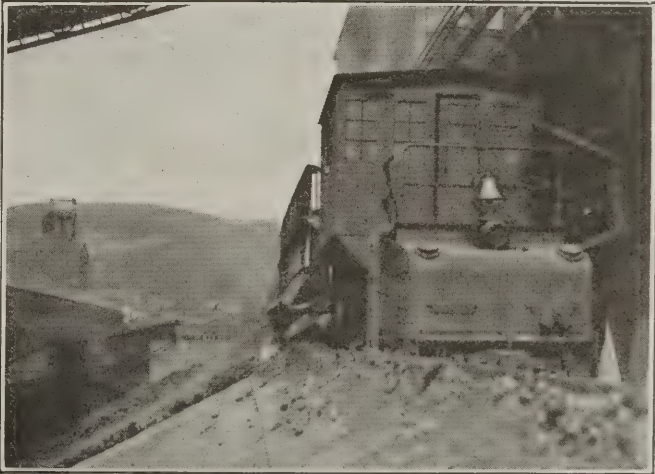
Local coal is low in volatile matter and analyzes roughly as follows when washed and later dried at 105 deg. C.:

Constituents	Percentage
Volatile matter.....	18.99
Fixed carbon.....	72.79
Ash.....	8.22
	100.00
Sulphur.....	1.51

This coal not only gives a small yield of byproducts but is likely to break down the oven walls owing to the excessive expansion that occurs when the coking process produces too small a quantity of gas. Leaving this danger out of consideration, the average yield per net ton would run about as follows:

Tar	4 gal.	Sulphate of Ammonia	17.1 lb.
Gas	10,050 cu.ft.	Coke	84.2 per cent
Light oil	2.3 gal.		

The light oil is estimated to contain 55 per cent of benzene and 12 per cent of toluene.



DUMPING A LOAD OF COKE FROM QUENCHER CAR
The coke is still too warm to handle, so it is allowed to fall on a steel slope set at about the angle of rest of coke. As it is conveyed away other coke slides down and is carried away in its turn. The action is almost automatic but sometimes a man with a light tool has to push the coke down the slope.

Coals from the Cambria Steel Co.'s mines at Slickville and from the Union Coal & Coke Co.'s mines at Marianna and Acme analyze as follows:

Constituents	Slickville Mines Percentage	Marianna and Acme Mines Percentage
Volatile matter.....	33.08	34.60
Fixed carbon.....	57.11	58.46
Ash.....	9.81	6.94
Sulphur.....	100.00	100.00
	1.42	1.15

The practical yield per net ton of these would be:

Byproducts	Slickville Mines Quantity	Marianna and Acme Mines Quantity
Tar.....	9.3 gal.	10.1 gal.
Sulphate of ammonia.....	24.5 lb.	25.7 lb.
Gas.....	10,500 cu. ft.	10,600 cu. ft.
Coke.....	70.4 per cent	70.0 per cent
Light oil.....	4.1 gal.	4.2 gal.

The light oil in each case is estimated to contain 50 per cent benzene and 15 per cent toluene.

The usual mix runs about 60 per cent low-volatile and 40 per cent high-volatile coal which will yield *per net ton*:

Tar	7.5 gal.	Coke 70 per cent of coal
Sulphate	24 lb.	Weak liquor 30 gal.
Gas	10,500 cu. ft.	Light oil 3 gal.

The mix is varied, however, to meet conditions and the coal available. The foregoing yields, as noted, are



COKE WHARF LOOKING TOWARD THE EAST

Here the wharf, which is 200 ft. long, is filled almost full of coke. In the rear can be seen the building to which the coke is carried by the conveyor for screening and crushing. Here coke passing over a 4-in. grizzly is crushed to smaller and more suitable sizes.

per net ton. The estimated daily yield of the four batteries of ovens based on charging 3,500 gross tons per day gives the following:

Furnace coke.....	2,695 gross tons
Domestic coke.....	40 gross tons
Breeze.....	65 gross tons
Sulphate ammonia.....	104,000 lb.
Light oil.....	12,000 gal.
Tar.....	32,000 gal.
Surplus gas.....	25,000,000 cu. ft.

For handling the coke, quenching cars 40 ft. long are provided, each of which is attached to a 27-ton electric locomotive. After the coke has been pushed from the ovens into the cars it is taken to one of two quenching towers (there is one at each end of the entire layout) where it is quenched with water for about 40 seconds. The breeze, which goes with the water through the bottom of the car, amounts to about 1.4 per cent of the weight of the coke quenched. It is collected and sent to the dump, as it cannot be used. The water from the quenching towers drains down into a sump and is circulated over and over with the same pump, the neces-



COKE CONVEYOR BELTWAY AND CRUSHER BUILDING

All the coke that will pass over a grizzly with $\frac{3}{4}$ -in. spaces is taken by a 250-ft. belt conveyor to the furnace loading station, where a shuttle conveyor distributes it into a 250-ton bin. Coke between $\frac{3}{4}$ in. and $\frac{1}{2}$ in. is loaded out for domestic use. The breeze is used at the boiler house of the plant.

sary additions being made to take care of water lost in the quenching operation.

After quenching the coke is brought back to a 200-ft. inclined coke wharf where it is dumped. Long-toothed gates control its admission to a 42-in. conveyor belt which takes it to the screening station.

There the coke passes over a rotary grizzly screen with 4-in. spaces. The oversize coke is then crushed, and all the material is then conveyed by a belt to a second grizzly having $\frac{3}{4}$ -in. spaces. The coke that passes over this grizzly is taken by a belt conveyor 250 ft. long across the valley to the furnace loading station, where it is distributed by a shuttle conveyor into a 250-ton inclined bin specially designed for the loading of the coke into cars without breakage.

The undersize coke which passes through the grizzly is conveyed to a shaking screen of the standard type where all that is over $\frac{1}{2}$ -in. in size is separated out for domestic use. The breeze is loaded into cars and used



GALLERY UNDER SEMET-SOLVAY TYPE OF OVENS

This illustration shows the fuel-gas main and burner pipes. The view is taken on the pusher side of the ovens and looking west. The explosion and control valves are shown in the foreground.

at the plant boiler house. A crusher also is provided which can be used to crush the $\frac{1}{2}$ -in. size still smaller when there is no demand for the larger coke in the domestic market.

IF FRANCE WILL ONLY WAIT a little while the German offers will be offers to accept an indemnity.—New York Tribune.

Welding and Brazing Practices That Make Repairs Easy

Building the Fire—Repairing a Broken Machine Casting—Good Job Gives Part 80% Per Cent of Its Original Strength—Preparing the Work—Various Kinds of Fluxes—Causes of Poor Weld

BY GUSTAV RADEBAUGH
University of Illinois, Urbana, Ill.

ONE of the most important essentials in all forge work is a good fire. Many failures of brazing and welding are caused not by the kind of material used, as is commonly supposed, but by poor heating in a poor fire. Although not generally appreciated, mostly all the brazing and welding difficulties that a beginner encounters are in the fire. The usual blacksmith fire is called an open fire, and it is used for general forging work.

As noted in the operations, care must be exercised in building a good clean fire. The only way this can be accomplished is by removing all the old dead material and sorting all coke from the fire before discarding. Always save the coke, as no better material can be obtained for use in a forge fire. The smith is sometimes wasteful with coke and it is discarded with the ashes, but every little piece should be saved. Clean coke is by many considered preferable to charcoal for brazing, because it makes a more even fire.

Coal that will coke must be the best grade of soft or bituminous coal. Good blacksmith coal will coke easily and also is free from sulphur. If much sulphur exists in the coal, it will make welding and brazing a difficult operation. A good method to test coal for forge use is to break a lump. If it breaks easily, crumbling into small grains, and the newly fractured faces show up bright, it is in all probability good firing coal. The coal should crumble rather than split up into layers. Soft coal used for home firing is not good for forge use, as it makes a dirty fire. A few bushels of regular blacksmith coal will last a long time.

In some brazing jobs a heavy scale may rise on the work when heating. This scale is called oxide and is caused by air coming in contact with the job while heating. To prevent this, use a good thick fire—that is, have an abundance of firing material between the tuyere and the work.

The preparing of the fire bed is important. For the average fire for shop jobs a block $3\frac{1}{2} \times 3\frac{1}{2}$ in. can be used. This block is placed over the tuyere, as shown in Fig. 1. The blacksmith coal is then dampened down—this is called green coal. The green coal is now placed around the fire block as snugly as possible. After this is done the block is removed. This hole keeps the fire together and holds in the heat.

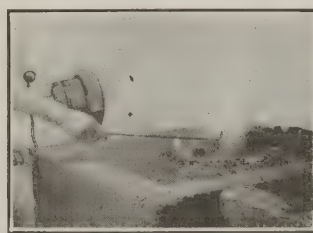
The fire is now ready to be started. Use shavings or oily rags. After lighting, as shown in Fig. 2, place them in the bottom of the fire hole and turn fan very slowly; this is necessary to prevent the firing material from going out. Break some of the pieces of coke that were placed to the rear of the hearth into small pieces. Place a few shovelfuls on the newly lighted fire. Increase the air blast just a little after the coke has been placed. After the firing material has burned for a few minutes the fire hole will become hollow. The coke is pushed into the hole by using the rake, as shown in Fig. 3.

When the coke is burning freely, Fig. 4, it is good practice to mound up the fire a little with more coke before using the green coal. The green coal is now placed on each side of the fire and it is gradually worked into the fire. When it is desired to hold a fire for a short period this is done by raking coke into a mound over the fire. It is then covered with green coal. A good method to hold a fire for a long period is by thrusting a piece of hardwood down the center of the fire before banking it.

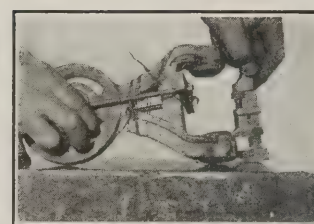
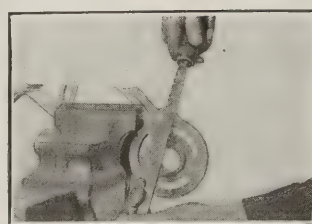
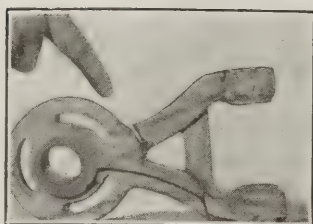
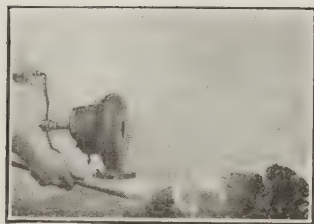
When the fire burns freely it is ready to use. A fire that is ready to receive the stock to be heated should not be giving off much smoke. In heating a job for brazing, too much blast should not be used, as the coal requires a certain amount of air to burn thoroughly. If too much air is used the oxygen is not all burned out and this passes through and strikes the heated job, forming an oxide or scale.

The repairing or replacing of broken castings on mine machinery sometimes leads to long and costly delays. The standardizing of mine equipment, however, has made it possible to obtain repair parts without lengthy delays. But many times a repair is needed at once and even the time required to go to the commercial repair shop would be a costly delay. The kind of material in the broken piece determines nearly in all cases the method of repair. If a steel strap, bolt, rod, or steel connection is broken, it is common knowledge among all that it can be welded, or replacement can be made usually from the mine's own repair shop. But in repairing a broken casting a somewhat different problem enters into the repair job.

We find that the components of mine machinery are



FIGS. 1, 2, 3 AND 4—PREPARATION OF THE FIRE IS HIGHLY NECESSARY IN WELDING AND BRAZING Heat control is more easily accomplished and impurities in the coal prevented from entering the weld when the fire is properly built. Packing of the fuel in a form which will accommodate the material to be repaired will greatly facilitate the work.



FIGS. 5, 6, 7 AND 8—MATCHING THE BROKEN PARTS TOGETHER

After the broken casting has been cleaned of all dirt and grease it should be filed and fitted so that all parts will be properly aligned when the work is completed. Clamp-

ing and binding the casting insures a good job in the minimum amount of time. Extra handling of the specimen while hot is undesirable and is rarely necessary if the

alignment of parts is properly made and maintained by sufficient clamps. The casting should not be removed from the fire while turning it over.

made from malleable iron, cast gray iron, and steel castings. In the repairing of these castings there are several channels open for determining the best methods. The casting can be patched—that is, a steel strip or sheet can be placed on the piece with bolts or rivets. Sometimes it is necessary to forge or form the steel patch so that it will fit the shape of the casting. In malleable and steel castings, if their design permits the placing of such a patch, considerable time can be spent on the repair, as it probably would be impossible to get a new casting made in a local foundry. In cast-iron repairing, however, it is sometimes advisable to have a new casting made, as the new part would be cheaper than a repair job. Foundries that cast gray iron are found in nearly all of our larger trading centers. The broken casting can, as a rule, be used for the pattern for making the casting. If a new pattern is required, the cost would be high and it would not be advisable unless all other channels of repair had been investigated and this method found to be the only solution of the problem.

SEVERAL METHODS FOR REPAIRING

Another method that is being used successfully, especially when the mechanic doing the job understands the operation, is repairing the broken components by using the oxyacetylene process. In this method a welding flame which has an intensely high temperature—6,300 deg. F. maximum—is obtained by the combustion of acetylene and oxygen. The broken pieces are fused together when at a melting temperature.

The brazing method of repairing broken castings has not been fully appreciated by the repair man as a method of repairing that he may employ. In using this method there is no reason why even the inexperienced man cannot familiarize himself with the process and perform the operation, with a little practice, the same as a repair man in the commercial shop. In brazing, the only supplies needed are the brazing smelter or solder and flux. One good flux is the household powdered borax. The tools required are the file, hammer, pliers, wrench, forging tongs and a forge. With these few tools a good job of brazing can be done on any of the three castings named.

The brazing smelter consists of 50 per cent copper and zinc. This percentage may be changed somewhat by makers of the smelter, but a mixture of about this proportion generally is used. This is cast into ingots and granulated into grades known as long, short, and fine. The short grade usually is used for broken casting repair work. This smelter can be purchased through any local implement dealer or general supply house.

In brazing cast-iron castings, in case the borax flux does not give results, a flux of the following formula can be used: boric acid, 16 oz.; chloride of potash (pulverized), 4 oz.; carbonate of iron, 3 oz. This mixture

should be kept in a good tight jar, as moisture or long exposure to the air lessens its effectiveness. This preparation is added to the smelter just before applying it to the casting.

In brazing, all grease and dirt must be removed from the casting. This can be done by heating the casting to a dull red heat and then using a wire brush or old file to remove any particles left on the casting. The casting is then permitted to cool. The broken edges of the parts are filed and are then clamped together by using baling wire strap clamps and bolts. Sometimes a job is of such design that it can be bolted together. After the parts are joined with this clamping arrangement, the job is placed in the forge fire, which should be well coked and with a fairly deep bed. It is heated slowly until it gets to a bright yellow color. The flux is then applied separately or jointly with the smelter. This smelter and flux can be placed on the job with a rod which is flattened at the end. When brazing cast iron let it cool slowly, as sudden chilling may cause check cracks. It is estimated that if a good job of brazing is done on a casting it has within 80 per cent of its original strength.

In preparing a broken casting for brazing, Fig. 6, the casting must be thoroughly cleaned, placed in the forge fire, and heated to a dull red heat. It is then taken from the fire and the dirt and scale are easily removed with a wire brush or an old file. The edge of the casting should be beveled as shown in this view. This is done to permit easy flow of the smelter when the brazing operation is being performed.

The broken casting in position to be clamped together as shown in Fig. 7 should be fitted together and the clamping arrangement decided upon that will hold the casting in a positive position. The alignment of holes must receive careful attention when clamping, for if the holes are out of alignment there is possibility of trouble after the brazing is completed. Some mechanics have found that by placing the flux on the cracked surfaces of the job before placing them together causes the smelter to flow freely.

The clamping or fastening may be done by using screws, wires, bolts, or clamps, as shown in Fig. 8. If it is at all possible, the pieces should be held in such a way that the job can be turned over during the brazing operation without changing the alignment. This is essential in order that the brazing flux and the smelter can be placed on all sides of the casting.

A good job of brazing cannot be done unless the pieces have been securely clamped together. It pays to spend considerable time on this operation, because discouraging conditions will be encountered when the job is in the fire if the pieces are not firmly held together. Malleable castings, gray-iron castings, and steel castings can be brazed. The same brazing methods and materials are used on these castings.

After the pieces have been clamped, as shown in the preceding operation, a fire is built in the forge as already described. Heat slowly until the casting is a bright yellow. With a flattened steel rod, as shown in Fig. 9, apply the flux and smelter. This must be done while the heat is maintained at the bright yellow temperature. This smelter should run freely at this temperature. Do not remove the casting from the fire when turning it over. When you are satisfied that the smelter has flown into the break, the casting is then permitted to cool. When brazing a gray-iron casting it is good practice to permit the casting to cool with the forge fire. This will prevent check cracks.

The job is now removed from the cooled fire, and if still hot it is placed in ashes. This, of course, is not necessary unless it is thought that the casting will crack by contraction strains coming on the weaker parts of the casting. After the job has cooled so that it can be handled, the braze seam, Fig. 10, can be cleaned up with a file. The casting is now ready to place in service.

Three important essentials govern the welding of iron and steel: (a) The kind of fire; (b) shape of end prior to making weld; (c) kind of fluxes used. All of these are so important that if difficulties are encountered when welding, investigate the job for improper practice related to any of these essentials and no doubt your obstacle can be overcome.

Coke, coal and charcoal are used in a forge for heating steel or iron for welding. Bituminous coal low in sulphur is the most common fuel used. In preparing the fire for welding see to it that the fuel is free from lead, bronze or brass that may have become mixed in the fuel from previous brazing or babbitting operations. Do not try to weld with a "green" fire; see to it that the coal is well coked. The fire used for welding should have a thick bed between the tuyeres and the work. The necessity for this precaution is to hold to a minimum the amount of air that strikes the steel when being heated.

There are five common methods of forming the ends of stock prior to making a weld. They are classified as follows: Scarf weld, butt weld, lap weld, cleft or split weld, and jump weld. Reference to Fig. 11 shows the form of these different welds. In all of these but the lap weld the surface of the laps are crowned. This is very important. If brought together when hot the ends stick in the center, and upon being forged together all the slag and dirt sticking to the metal is forced from the center outward, leaving the hot metal free from any oxide of iron. In making the lap weld the hammering should begin in the center, as this has a tendency to work all the slag free from the welding surface. It is understood that a defective weld will be caused if the job is not entirely free from this scale.

Fluxes are used in welding for two purposes. Oxida-

tion of scale formation is prevented by the flux melting and covering the heated surface, and it also aids in dissolving any oxide that may have formed. Wrought iron, unless it is very thin, can be welded without flux, because it can be heated to such a high temperature that the oxide is melted. When welding machine steel or tool steel it is necessary to use fluxes. Sand and borax are the two most common fluxes used on machine or soft steel, which is the common grade of steel used.

Wrought iron is not used to any great extent. Some smiths use the borax plain, others mix it with equal quantities of fine, clean sand, putting in 25 per cent iron filings. Another good practice is to burn the borax before it is used, which yields better results. Heat the borax in a cast-iron jar until melted, pour on a bench plate or any flat surface so that it will form a sheet. Small pieces can be broken off for use or it can be pulverized, as desired. There are many welding compounds on the market, but for welding the ordinary machine steel, sand and borax are about as effective as any.

A flux that has been offered as a trade secret and sold on the market is made by this formula: Copperas, 2 oz.; saltpeter, 1 oz.; common salt, 6 oz.; black oxide of manganese, 1 oz.; prussiate of potash, 1 oz. Pulverize these ingredients and mix with them 3 lb. clean, white sand. If these fluxes will not work the fire is not as it should be or the operator does not use the proper judgment in welding heats.

For tool steel use a flux made of one part sal-ammoniac and twelve parts borax. For welding tool steel to iron or soft steel, flux made from the following formula is used: 500 parts by weight of borax, 70 parts sal-ammoniac, 70 parts prussiate potash, 35 parts clean, unrusted iron filings. Pulverize and add water until thick paste results. Heat until very thick, stirring constantly; when cold pulverize and it is ready to use.

The job is heated and the ends formed for the welds. Being soft steel it should be worked at a yellow heat, as the steel can be forged more easily to shape at this heat. After the two ends have been properly formed for the weld, being sure that the surfaces that are to be welded together are crowned as shown in the sketch, the job is ready to be heated for welding. Place in the fire the pieces to be welded, cover well with coke (not green coal), heat slowly and steadily until the steel shows a bright yellow. This is the time to make the first application of the flux either by removing the piece from the fire (this is not recommended, although it is done by some smiths), or with a flux spoon made from a $\frac{3}{8}$ -in. rod.

The heat is more rapidly increased and more flux added until a sparkling white heat is reached. When the steel has a glazed appearance and is sparkling freely, remove quickly from the fire and after a shake or a light tap to remove oxide, stick the laps together and with extremely light, rapid blows from the hammer at first and heavier blows as the weld proceeds, the job is completed. Do not work the steel too cold. If the weld cannot be finished down in one heat, reheat and work at the usual forging temperature.

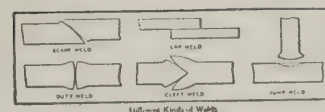
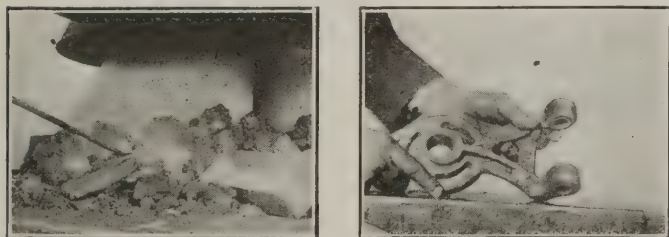


FIG. 11—DIFFERENT WAYS OF MAKING A WELDED JOINT

Much depends upon the material to be welded as to the method in which the parts are prepared and the type of weld best suited for the job.



FIGS. 9 AND 10—MAKING THE WELD IN THE FIRE

The flux and smelter should be applied when the specimen has reached a predetermined temperature. During this part of the work the temperature should be maintained as near constant as possible so as to produce a uniform weld.

ERAS	SUB-ERAS	AGES—SYSTEMS	PERIODS—SERIES	EPOCHS—GROUPS
CENOZOIC (Recent Life) Era of Mammals Maximum thickness, 40,000 ft. Estimated duration, 61,000,000 years	LATE CENOZOIC QUATERNARY	O. QUATERNARY Age of ice and man 1,000,000 years	LOWER or PLEISTOCENE	100 Recent 99 Glacial
	EARLY CENOZOIC or TERTIARY	N. NEOGENE Average thickness, 35,000 ft. Duration, 30,000,000 years	UPPER or PLOCENE Maximum thickness, 5,000 ft., in California	98 Merced, Calif. (1894) 97 Purissima, Calif.
		M. EOCENE Average thickness, 3,000 ft. Duration, 30,000,000 years	LOWER or MIOCENE (1833) Maximum thickness, 1,400 ft., in Nevada	96 San Pablo, Calif. (1898) 95 Santa Margarita, Calif. 94 Monterey, Calif. (1856) 93 Vacuero, Calif.
			UPPER or OLIGOCENE Maximum thickness, 12,000 ft., in Italy	92 Chattahoochee, Ga. (1891) 91 Vicksburg, Miss. (1840)
MESOZOIC (Middle Life) Era of Reptiles Maximum thickness of rock, 100,000 ft. (Average 15,000 ft.). Estimated duration, 150,000,000 years	LATE MESOZOIC or CRETACEOUS (1822)	L. CORDILLERAN (New) Maximum thickness, 24,000 ft., in Montana Average thickness, 3,000 ft. Duration, 35,000,000 years	UPPER or MONTANA (1888) (including Laramie)	90 Jackson, Miss. (1850) 89 Claiborne, Miss. (1897) 88 Wilcox, Ala. 87 Midway, Ala. (1887)
		K. COMANCHIAN (1887) Maximum thickness, 26,000 ft., in California Average thickness, 5,000 ft. Duration, 40,000,000 years	LOWER or COLORADO (1877) (including Dakota)	86 Laramie, Wyo. (1877) 85 Bearpaw, Mont. (1905) 84 Judith River, Mont. (1811) 83 Claggett, Mont. (1905) 82 Eagle, Mont. (1899)
			UPPER or WASHITA (1857)	81 Niabrara (1861) 80 Benton, Mont. (1861) 79 Bear River, Wyo. (1874) 78 Dakota (1862)
			MIDDLE or FREDERICKSBURG (1843)	77 Buda, Tex. (1900) 76 Del Rio, Tex. (1898) 75 Georgetown, Tex. (1900)
			LOWER or TRINITY (1888)	74 Edwards, Tex. (1898) 73 Comanche Peak, Tex. (1857) 72 Walnut, Tex. (1891)
				71 Paluxy, Tex. (1891) 70 Glen Rose, Tex. (1891) 69 Travis Peak, Tex. (1890)
	J. JURASSIC (1795) Maximum thickness, 18,000 ft., in California Average thickness, 2,000 ft. Duration, 40,000,000 years	UPPER		68 Upper 67 Middle 66 Lower
			MIDDLE	65 Upper 64 Middle 63 Lower
			LOWER	62 Upper 61 Middle 60 Lower
	I. TRIASSIC (1834) Maximum thickness, 30,000 ft., in Pennsylvania Average thickness, 3,000 ft. Duration, 40,000,000 years	UPPER or HOSELKUS (California, 1892)		59 Upper 58 Middle 57 Lower
			MIDDLE or PITT (California, 1894)	56 Upper 55 Middle 54 Lower
			LOWER or INYO (California, 1885)	53 Upper 52 Middle 51 Lower

A Geologic Time Scale*

Classification Using Numerals as Aid in Designating the Various Group Formations—Some Modification of Existing Nomenclature Necessary

BY GEORGE H. ASHLEY
State Geologist of Pennsylvania, Harrisburg, Pa.

A GEOLOGIC TIME SCALE is based on the order and fossil content of beds of sandstone, shale, and limestone which were originally laid down as sand, mud, or limy deposits in the sea. Earth movements have lifted and locally folded these rocks while erosion has cut into or planed off and exposed the edges, allowing beds several miles thick to be studied.

Remains of organisms then living in the sea were buried with the sediments and form a record of life at that time. This life horizontally was widespread, but changed rapidly with time, so the fossils make it possible to determine what rocks were laid down at any given time.

Owing to the rapid change in life forms and the slow accumulation of the rocks, it is now possible to distinguish several hundred life zones. For example, in 1839, certain rocks in the Jura Mountains of Switzerland, called the Jurassic system, were divided into three groups, as black, brown, and white. In 1858 the same rocks were divided on fossil evidence into eighteen zones, later increased to forty, which may ultimately be divided into a hundred zones. These very thin life zones are frequently delimited by the presence of one or more of the then existing dominant species of animals or plants.

Study of the fossils and rock relations seemed to indicate long periods during which no rocks were laid down. During these "lost intervals," generally representing periods of widespread uplift, life forms changed so as to be entirely different after than before the break in sedimentation. These great breaks formed convenient lines for dividing all the rocks into ten great "systems," named from a locality or some surface feature where first described or from some other circumstances, as follows: 1, Cambrian; 2, Lower Silurian; 3, Upper Silurian; 4, Devonian; 5, Carboniferous, 6, Triassic; 7, Jurassic; 8, Cretaceous; 9, Tertiary; 10, Quaternary.

Study of other areas eventually disclosed other rocks laid down during the "lost intervals" of the earlier

LATE PALEOZOIC or CARBONIFEROUS (1821)			PERMIAN (1841)			UPPER			50 Upper 49 Lower		
Maximum thickness, 24,000 ft. (Average thickness, 9,500 ft.) 115,000,000 years	Age of coal and amphibians—Evolution of reptiles	Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Maximum thickness, 20,000,000 ft. (Average thickness, 4,000 ft.) Duration, 50,000,000 years	Maximum thickness, 7,300 ft., in Massachusetts (Average thickness, 2,000 ft.)	Maximum thickness, 4,500 ft., in Pennsylvania (Average thickness, 1,000 ft.) Duration, 60,000,000 years	Maximum thickness, 3,000 ft., in Pennsylvania (Average thickness, 1,000 ft.) Duration, 50,000,000 years	Maximum thickness, 40,000 ft., in British Columbia (Average thickness, 4,000 ft. + Duration, 90,000,000 years	LOWER or OKLAHOMA	48 Cimarron, Kan. (1896)	47 Big Blue, Kan. (1896)	
								Thickness in Pennsylvania, 1,300 ft.			
								UPPER or PITTSBURGH (New)	46 Monongahela, Pa. (1840)	45 Conemaugh, Pa. (1874)	44 Allegheny, Pa. (1840)
								LOWER or POTTSVILLE (1877)	43 Kanawha, W. Va. (1877)	42 New River, W. Va. (1874)	41 Pocahontas, Va. (1896)
Maximum thickness, 7,000 ft. (Average thickness, 1,500 ft.) Duration, 40,000,000 years	Age of fish—Evolution of amphibians	Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Maximum thickness, 20,000,000 ft. (Average thickness, 4,000 ft.) Duration, 50,000,000 years	Maximum thickness, 7,300 ft., in Massachusetts (Average thickness, 2,000 ft.)	Maximum thickness, 4,500 ft., in Pennsylvania (Average thickness, 1,000 ft.) Duration, 60,000,000 years	Maximum thickness, 3,000 ft., in Pennsylvania (Average thickness, 1,000 ft.) Duration, 50,000,000 years	Maximum thickness, 40,000 ft., in British Columbia (Average thickness, 4,000 ft. + Duration, 90,000,000 years	UPPER or TENNESSEE	40 Chester, Ill. (1857)	39 St. Louis, Mo. (1847)	
								Thickness in Pennsylvania, 3,000 ft.			
								LOWER or WAVERLY	38 Osage, Kan. (1888)	37 Kinderhook, Ill. (1866)	
								UPPER or SUSQUEHANNA (New)	36 Chemung (inc. Catskill), N. Y. (1839)	35 Portage, N. Y. (1840)	34 Genesee (inc. Tully), N. Y. (1839)
Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Age of invertebrates—Evolution of vertebrates	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 20,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	UPPER or CAYUGA (1864)	28 Monroe, Pa. (1882)	27 Salina, N. Y. (1863)	
								Thickness in Pennsylvania, 1,300 ft.			
								LOWER or ONTARIO (N. Y., 1843)	26 Niagara, N. Y. (1842)	25 Clinton, N. Y. (1841)	24 Medina, N. Y. (1839)
								UPPER or CINCINNATI (1859)	23 Oswego, N. Y. (1841)	22 Hudson, N. Y. (1840)	21 Utica, N. Y. (1841)
Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Age of invertebrates—Evolution of vertebrates	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 20,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	MIDDLE or MOHAWK (1840)	20 Trenton, N. Y. (1837)	19 Black River, N. Y. (1842)	
								Thickness in Pennsylvania, 500 ft.			
								LOWER or CHAZY (N. Y., 1842)	18 Blount, Tenn.	17 Stones River, Tenn. (1851)	16 Big Buffalo, Ark.
								UPPER or BEEKMANTOWN (1890)	15 Bellefonte & Axeman, Pa. (1911)	14 Nittany, Pa. (1911)	13 Stonehenge & Schaghticoke (1903)
Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Age of invertebrates—Evolution of vertebrates	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 20,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	LOWER or OZARK (1891)	12 Gasconade, Mo. (1892)	11 Copper Ridge, Tenn.	10 Little Falls, N. Y. (1903)
								Thickness in Pennsylvania, 300 ft.			
								UPPER or SARATOGA (1903)	9 Hoyt, N. Y. (1910)	8 Potsdam, N. Y. (1838)	7 St. Croix, Wis. (1873)
								MIDDLE or ACADIA (1874)	6 Upper	5 Middle	4 Lower
Maximum thickness, 20,000 ft. (Average thickness, 5,000 ft.) 90,000,000 years	Age of invertebrates—Evolution of vertebrates	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 20,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	Maximum thickness, 55,000 ft. (Average, 10,000 ft.) Estimated duration, 200,000,000 years	Maximum thickness, 100,000 ft. (average 25,000 ft.). Estimated duration, 400,000,000 years.	UPPER or WAUCOBA (1912)	3 Upper	2 Middle	1 Lower
								Thickness in Pennsylvania, 5,800 ft.			
								LOWER or WAUCOBA (1912)			
								UPPER or WAUCOBA (1912)			

geologists, until now the great "breaks" dividing the systems are nearly or quite filled. By piecing together fossil evidence from various localities, a nearly complete story of the development of life can be told, or a complete column of rocks devised.

Closing the gaps in the records by transitional beds and life forms has made it difficult to draw the line between the great systems. Broader knowledge has also revealed other major earth movements than those first known and has led many geologists to subdivide some of the larger systems so that all of the systems shall be of more nearly equal length. Furthermore, some geologists believe that these great earth movements used as time markers were rhythmic. This idea, though not widely accepted, has served as a basis for the increase in the number of systems. Certain of these subdivisions have long been recognized in this country, although not always accorded the rank of a system. Believing that their recognition as "systems" is only a matter of time, they are so designated in the accompanying time scale.

BARRELL METHOD OF ESTIMATES

A few years ago the late Professor Barrell, of Yale, made a comprehensive review of all the estimates of geologic time, including the results of the studies of radioactive minerals. He concluded that from the beginning of Cambrian time to the present was about 600 million years. Each system in the table represents from 30 to 50 million years. The figures given on the table are an average of Professor Barrell's estimates. They may be too short or much too long. The estimate for each system takes account of many factors, including, first, the area, the average and maximum thickness of rocks laid down; second, lithologic character of the rocks; third, the number and character of subdivisions already recognized or likely to be recognized in the future; fourth, contemporaneous earth movements (each system is supposed to represent in general a widespread sinking of continental areas, accompanied by deposition of sediments and followed by a general uplift).

I have found the need of adopting a standard time scale for the publications of the Pennsylvania Geological Survey. A preliminary study revealed no time scale universally accepted. State and federal surveys and textbooks differ in their usage. The principal subdivisions are the same but with major differences. For example: the U. S. Geological Survey treats the Cretaceous and Carboniferous as systems, whereas several modern textbooks divide the Cretaceous into two sys-

*Abstracted from *Engineering & Mining Journal-Press*.

tems and the Carboniferous into three systems. In starting the publications of a new series of reports it seemed desirable to review the whole subject critically and if possible to make a time scale combining the best available information.

In reaching the conclusions, all pertinent factors were considered. Thus, the Cambrian system is not divided, although it is probably as long and the rocks are several times as thick as the Silurian. Cambrian time, though apparently favorable to thick formations of rock, did not foster rapid development of life forms, so that minute subdivisions on the basis of the fossils is almost impossible. However, some of the later systems represented by relatively thin series of rocks are so fossiliferous as to be divisible into many thin zones. This division multiplied the number of individual bed names.

Neogene and Eogene, as here used, have been used for some years for the Tertiary. Textbooks have used Comanchian for Lower Cretaceous for about twenty years. Geologists recognize that the Comanchian in America is not exactly the same as the Lower Cretaceous in Europe. Cordilleran is therefore introduced to designate the time and the rocks from the end of the Comanchian to the beginning of the Eogene. Permian, Pennsylvanian, and Mississippian, as subdivisions of the Carboniferous, have been used for many years. The Ordovician, though estimated to be of nearly the same duration as the Carboniferous, has here been divided into two parts, Ordovician and Canadian. Some geologists would classify the Ozark rocks as one system, the Beekmantown and Chazy as a second, and the Mohawk and Cincinnati as a third. My studies, however, have failed to convince me that either the Ozark or Cincinnati rocks are of correlative rank with Silurian, Devonian, Pennsylvanian, or Jurassic. The Ozark "period," including the upper part of the "Ozarkian system" of Ulrich, is placed in the Canadian. The lower part of Ulrich's "Ozarkian system" is included in the Cambrian. The Cambrian, although of long duration and comprising a great thickness of rocks, is considered as one system, as it is not readily divisible.

The rocks have been divided into systems and the systems subdivided into two or three "periods," which are designated as upper, middle and lower, or upper and lower. These periods have been given names which are in general use. The Jurassic periods have not been given geographic names, because the Jurassic is not well represented in this country. Several names are used here in a broader sense than is customary. For example: Montana is used for the Upper Cordilleran, as including all rocks between the top of the Colorado and the base of the Eocene. The Montana therefore includes the Laramie, which was formerly independent. The Dakota sandstone has been included with the Colorado series in the Lower Cordilleran system.

In like manner each series or period has been divided into two to five groups, each group representing an epoch of time. Most of these groups have been known in the past as "formations" or the smallest unit that can or is likely to be shown on a map. More detailed work, however, has divided formations into named parts and subdivisions that are often recognized across several states. In illustration: The Allegheny group, (formerly the Allegheny formation), is now divided into the Freeport, Kittanning, and Clarion formations. Each of these formations is comprised of several beds of coal, clay, limestone, sandstone, and shale. Thus, the Freeport formation contains (in descending order): Free-

port, upper coal; Freeport, upper clay; Freeport, upper limestone; Bolivar, flint clay; Butler, sandstone; unnamed shales; Freeport, lower coal; Freeport, lower clay; Freeport, lower limestone; Freeport, sandstone and unnamed shales.

The time scale was made with two ideas in mind: first, to make a time scale in which the various "systems," "series," "groups," and "formations" would be of comparable rank. Thus a "group" of rocks has an average thickness of several hundred feet but usually less than a thousand feet. A "series" averages several thousand feet thick. The "systems" are usually represented by tens of thousands of feet. The "formations" are a few hundred feet thick, or more commonly less than one hundred feet. The thicker members of these correlated divisions usually represent masses of rocks apparently incapable of ready subdivision.

The second object was to devise, if possible, some method by which the position of any bed in the stratigraphic column could be handily designated. After the table was practically in the present form, I noticed that there were almost exactly one hundred epochs. Therefore, if it is assumed that all time from the beginning of the Cambrian had been divided into one hundred more or less equal epochs, and if these were numbered from 1 to 100, the general position of any epoch in the column would at once be clear. Furthermore, many rock groups in Pennsylvania, as in other places, do not exactly correlate with the epochs indicated in the time scale.

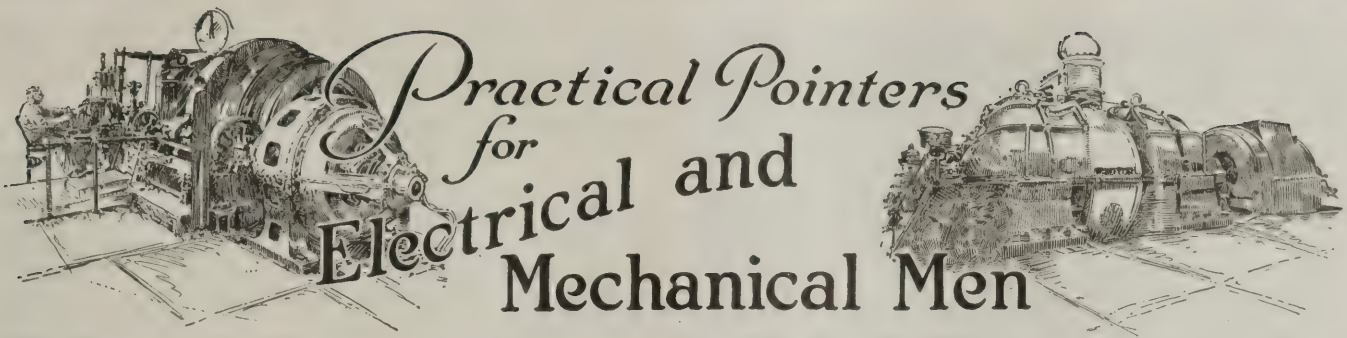
THE USE OF NUMERICAL SYMBOLS

In order to have exactly 100 epochs, the table as originally written was slightly modified. Thus, in the Upper Devonian five epochs, the Tully, Genesee, Portage, Chemung, and Catskill, were reduced to three. The Tully, a thin limestone occupying a relatively limited area in central New York, and unworthy of group rank, was combined with the Genesee. Likewise the Catskill was combined with the Chemung, as it has long been known to be in part, if not in whole, simply the eastward extension of the Chemung.

The Pennsylvania Geological Survey proposes to use the name of a formation or bed with its group name. Thus, the Becraft limestone would be referred to (except where used frequently) as the Helderberg limestone, 29 (Becraft). The name Helderberg, in use since 1838, has gained certain familiarity which at once reveals to the frequent reader of geological reports the place of the Becraft limestone. The number 29 shows that the rock is a little above the middle of the Paleozoic and should be of greater value in reminding the reader of the relative position of several beds mentioned.

In the table here given account has been taken of what might be called the "historic" periods only. Below the Cambrian lie great thicknesses of rocks believed to represent vast areas of time during which life was slowly unfolding; but of that life only the most meager traces remain unless we except limestones, iron ores, and certain other rocks as *prima-facie* evidence of life.

Thus before the Paleozoic era came the Proterozoic and Archiozoic eras, each possibly as long or longer than the Paleozoic. The Proterozoic, represented by Algonkian rocks, which in Canada are estimated to have a thickness of 74,000 ft., is divided into the Keweenaw and Huronian ages or systems. Archiozoic time, represented by Archean rocks, with an estimated thickness in Canada of 94,000 ft., has been divided into Laurentian and Keewatin time.



Safety in Gas Welding and Cutting

IN A paper recently prepared by C. F. Worfolk, of the faculty of the Michigan State Automobile School of Detroit, for the National Safety Council, the following suggestions and precautions were offered to employers of welders and welders themselves:

A canvass of industrial plants reveals the fact that burns resulting from carelessness form the majority of injuries to persons in the oxyacetylene welding trade. Injuries to the eyes due to failure to wear proper goggles are second. The employment of only properly trained men for this work would greatly reduce accidents from these two sources.

Injuries from fires and explosions due to defective apparatus are comparatively few now, thanks to the many improvements that have been made in appliances. There are some, however, and in most cases they could be prevented. We might class them, in their order of frequency, as:

CLASSIFIES INJURIES IN ORDER OF FREQUENCY

(1) *Gas fires*; due to leaky, defective, or open valves in acetylene tanks. An open valve needs no comment. It is just plain carelessness. The average welder has a tendency to become careless. Perhaps in his case familiarity breeds contempt. He is quite likely to get his torch too close to the tanks or the manifolds. Unless the shop is very well ventilated indeed, any escaping acetylene will lie near its sources and the heat of the torch will ignite it. Such a fire is difficult to extinguish. An extinguisher of the Pyrene type is no doubt one of the best means of stopping this blaze, but a tank of carbon dioxide or carbonic acid gas similar to that used in soda fountains will have such a blaze out very quickly. All welding shops should have a tank of this gas on hand for such emergencies.

(2) *Gas explosions*; due mostly to getting a mixture of the gases into a confined space and then igniting it. Shop explosions frequently are produced in this way. They are almost invariably due to leaky apparatus or to carelessness.

(3) *Tank explosions*. These are very rare, as the tanks are built to withstand very high pressure and in each tank is a safety plug intended to blow out and relieve the pressure before the bursting point is reached. The blowing out of this plug at 4,000 or 5,000 lb. pressure can be attended with very exciting results. Tank pressures are known to run up to 4,000 lb. sometimes. This is not the filled pressure; but with perhaps 1,800 or 2,000 lb. of gas in the tank if it is left in direct sunlight or in a very warm temperature the pressure begins to mount. These tanks should be stored in a cool place.

(4) *Valve explosions*. These are likely to occur only with old-style apparatus and because the operative has

let it get into bad condition. There have been many accidents with old-style apparatus but today most of it is in the discard.

Frequent and regular inspections should be made to insure proper condition of apparatus.

The operator himself presents a much more difficult problem to deal with than the apparatus he handles. He is quite likely to be a green boy unfamiliar even with the dangers attendant upon the use of ordinary city gas. Somewhere he has seen a workman use a torch and, inspired with the belief that he can do equally well, he signs a long story to the employment man and gets a job as a "welder." The worst of it is, the work looks easy. Anyone can turn on a valve and light a torch, no matter how ignorant he may be of the tremendous forces he is setting in motion. At times industry seems to be woefully short of acetylene welders and the employment man at his wits' end to obtain competent hands grasps at the first straw and so our green hand goes to work.

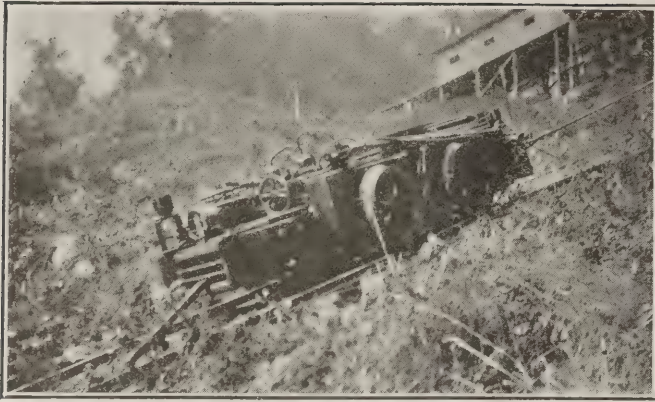
What does he know of hot or cold metal, of expansion or contraction? How is he going to harness this molten destruction to constructive purposes? Perhaps the boss welder gave him a few inadequate instructions. Perhaps all he said was "There's your place; hop to it." He hops. He heats a metal article of some sort and fails to mark it properly. Along comes another workman. The article looks just the same to him cold or hot and he picks it up. The first-aid man now has a nasty burn to fix up. The injured workman is off the job for a few days and there is compensation to pay for his injury and enforced vacation.

Burns form the vast majority of welding injuries. The man who gets burned is not always the welder. Burns from picking up hot metal that has not been properly marked or safeguarded lead the list. Chalking the word "hot" on the metal isn't going to help the man whose only English is "No spik Inglis" unless you tell him very forcibly what it means and train him to look out for it in the welding shop.

Mine Locomotive Taken Up Mountain Side

THE problem of getting heavy mining machinery from the railroad tracks in a deep valley to the coal tippie or mouth of the mine is sometimes very real and difficult. The Branch Coal & Coke Co. at Elverton, W. Va., recently was confronted with the task of taking a new 5-ton mine locomotive from the railroad track to the mine. The only feasible way was up the steep mountainside and it was decided to build a temporary inclined plane.

When finished the plane was 1,600 ft. long and had an average grade of 40 per cent. After the locomotive was unloaded from the railroad car it was run a short distance to the foot of the plane, where it was at-



GOING UP ITS HEAVIEST GRADE

While in service locomotives usually negotiate some stiff grades. Here is one on which the locomotive needs help.

tached to a steel rope. At the top of the plane was a small hoist run by a 6-hp. motor.

The trip up the plane was made slowly and without mishap. As a safety precaution, a drag was fitted to the rear of the locomotive as shown in the photograph. Chicago, Ill. GEORGE F. PAUL.

Care and Repair of Commutators

Cleaning.—The band over the front V-ring of a commutator should be wiped off every month. After cleaning, painting with an air drying varnish makes cleaning easier next time. Painting every six months is advisable.

Soothing Commutator Face.—Flat spots, high or low bars, ridges, burned spots, etc., should be smoothed up. The armature should be removed from the locomotive and placed in a lathe for turning the commutator if its face is very rough. Holes left by defective mica or pits in the side of bars can be filled with commutator cement supplied by dealers.

Undercutting.—The commutator should be re-undercut before it is worn flush, since the groove left will guide the saw and make the work much easier. Where commutation trouble is frequent, it is good practice to use a V-shaped hand tool to round the edges of the undercut grooves between bars to about 1/42-in. radius. This can be done with the motors in the locomotive. All particles of mica, copper or dirt should be removed from the grooves after undercutting.

Removing Leads From Commutator Neck.—A thin drift driven in the top of the slot in the neck toward the shaft between the side of the commutator neck and the top filling piece will loosen the filling piece so that it may be forced out by a gouge. Similarly, windings may be taken out of the first bar. With one set of leads removed there is enough space left to bend one side of the next neck, thus permitting the removal of the leads by means of the gouge. This can be done without heating the soldered joints.

Replacing Parts—Commutator and Winding Left on Shaft.—Where a small number of bars are to be replaced it is not necessary to remove all the leads from the armature neck to take the commutator from the shaft. Stand the armature on end, commutator up. Mark each separate piece so that it may be put back in its old position. After removing the ring nut or bolts, take out the metal V-ring and mica V-ring. If the bars are tight, tapping with a wooden or rawhide mallet will loosen them. The new bar must be filed to the shape and thickness of the one which it replaces, to prevent the

new bar or the old bars next to it becoming loose. Clean out the space where new bars fit and tap them in with a soft mallet.

Detached parts of the commutator must be kept clean and dry. When the parts are ready for rebuilding, sandpaper the mica V-ring. Clean the metal V-ring and the V in the commutator bars, and paint the V in the bars with shellac. The shellac and brush must be absolutely free from all dirt or moisture. After putting the mica V-ring and the metal V-ring back in their original positions, the ring nut or bolts are drawn up fairly tight.

Painting the threads of the ring nut or bolts with very thin white lead will make it easier to remove these parts next time. The commutator should now be heated to 110 deg. C. in an oven where the air is dry and the ring nut or the bolts drawn up tight while the commutator is hot. The commutator should then be turned in a lathe.

Test after these repairs should be 110 volts alternating current between commutator bars and 1,000 volts alternating current to ground.

Replacing Parts—Commutator Removed From Shaft.—When it is necessary to replace the rear mica V-ring, a number of segments, or a complete set of segments, it is advisable to remove the commutator from the shaft. The method of taking down and rebuilding is the same as before described, but care should be exercised, to heat the commutator thoroughly to soften up the new mica parts, so that the ring or bolts can be drawn up tight. To this end when the commutator is assembled it should be put in an oven and heated to a temperature of 125 to 140 degrees C. While at this temperature the commutator is placed in a press, using a pressure of 20 to 25 tons for a 50-hp. motor, and the ring nut is drawn up tight while under pressure.

Complete sets of segments are shipped, temporarily banded together, with the mica and copper segments in their proper position. The complete set should be assembled in the commutator as a unit and the temporary band should be removed just before the commutator is finally tightened.

Tests after these repairs should be 300 volts alternating current between commutator bars and 2,000 volts alternating current to ground.

Important Details.—Commutator well undercut $\frac{3}{4}$ -in. maximum; $\frac{1}{4}$ -in. minimum.

Front V-ring clean and well painted.

Edges of commutator face rounded, $\frac{1}{8}$ -in. radius, front; $\frac{1}{16}$ -in. radius, rear.

Commutator free from oil.

Rear of commutator sealed from dirt and moisture. Commutator tight.

Face of commutator smooth.

Neck full width

Mica extending $\frac{1}{8}$ -in. at rear.

Free from grounds and short-circuits.

12,382,000 Barrels of Cement Made in June

Production of portland cement during June, 1923, according to the U. S. Geological Survey, totaled 12,382,000 barrels compared with 11,245,000 barrels in the corresponding month of 1922 and 12,910,000 barrels in May, 1923. Shipments for the month were 13,307,000 barrels against 13,470,000 in May a year ago and 14,257,000 in May, 1923. Stocks at the end of June were 9,219,000 barrels compared with 10,718,000 barrels at that period in 1922 and 10,144,000 barrels at the end of May, 1923.

Should Speed of Air Through Inlet of Fan Be Limited to 2,000 Ft. per Minute?

BY J. R. ROBINSON

Consulting Engineer, Pittsburgh, Pa.

I AM frequently asked, "At what speed should air pass through the inlet of a fan?" and then the questioner supplements his inquiry with the words, "I know it ought not to exceed 2,000 ft. per minute, but how do you go about to find it?" When I ask him how he arrives at the 2,000 ft. per minute he usually says that he saw that figure given in some textbook or in some manufacturer's catalog.

When fans were first introduced at coal mines they were built of wood, and the carpenters who originally erected them put them together by rule of thumb with a hatchet and a saw and had no scientific data to guide them. Quite by chance the inlet, or "eye" of the fan, as it was called by the earlier builders, was made about five-eighths of the diameter of the wheel, and as these fans were slow-moving machines it also happened that the speed of the air usually did not exceed 2,000 ft. per minute through the inlet orifice of the fan.

All these things just happened, but builders of machinery are careful to copy what seem to be the most successful machines without much investigation as to why the machines are successful. If they can get them on the market and make profits from their sale they are not likely to be inclined to go further. The investigating and tabulating of data of such machines must be done by some crank who is not considered practical by the manufacturers.

INLET SPEED DETERMINED BY OUTLET SPEED

The speed of the air passing through the inlet orifice of the fan is determined directly by the speed at which the air is leaving the tips of the fan blades. It is a well-known fact that the tip speed of the fan blades determines the speed of the air leaving the blades. This tip speed is dependent on the shape of the blades and the manner in which they advance or retreat from a radial plane. But in all fans a certain tip speed is required to give a corresponding speed to the air as it leaves the blades.

Now the speed with which the air leaves the blades creates a certain pressure which is measured by the water gage, so that we have for a given water-gage reading a corresponding speed of the air, the values being interchangeable. For instance, if the water-gage reading is 1 in. the speed of the air is 3,946 ft. If the water-gage reading is 2 in. the speed of the air is 5,587 ft. If the water-gage reading is 6 in. it is 9,672 ft. per minute. Now it is obvious that if we are running our fan to make 1 in. of water gage and the speed of the air leaving the blades is 3,900 ft. we can have a higher velocity in the intake orifice of the fan than 2,000 ft. per minute, for on the outside of the wheel we have the atmospheric pressure forcing the air into the wheel to take the place of the air we expel from the wheel due to its rotation, and this atmospheric pressure is upward of 14 lb. per square inch of pressure where our 1 in. of water gage is only 5.2 lb. per square foot.

In other words, there is about 400 times as much pressure on the outside of the wheel as the depression we make on the inside of the wheel due to its rotation when we are making a 1-in. water gage. The air will

therefore find its way into the wheel due to the atmospheric pressure, and the speed at which it goes into the wheel through the intake will be directly proportional to the speed of the air as it leaves the tips of the fan blades.

It will be seen, therefore, that the fan is not performing work on the inlet of the wheel. The atmosphere takes care of that, so it may be well to cite a few illustrations of a practical nature to prove that a fan may work with the greatest economy while the air is passing through the inlet orifice at a speed greater than 2,000 ft. per minute.

INLET SPEED, 3,400 AND 6,000 FT. PER MINUTE

A 6-ft. multivane fan working at the Donald No. 2 mine of the Consolidated Coke Co., at Gray's Landing, Pa., is making 105,000 cu.ft. of air per minute at 1.6 in. water gage. It is using 41.6 hp. on this load. It is a double-inlet fan and the sum of the two intake orifices is about 38 sq.ft.

Now if no "vena contracta" is applied to this intake orifice the mean speed of the air is upward of 3,000 ft. per minute and if a "vena contracta" of 80 per cent is applied the mean speed of the air is upward of 3,400 ft. per minute. This fan is belted to a 50-hp. motor and allowing 5 per cent loss for the belt and 10 per cent loss for the motor the fan is running at about 77 per cent mechanical efficiency.

There is a 4 ft. 9-in. multiblade fan working on the Emeigh Run mine of the Cherry Tree Coal Co., near Cherry Tree, Pa., which is making 116,000 cu.-ft. of air per minute at 5.4 in. water gage. It is using 127 hp. on this load. It is a double-inlet fan and the sum of the two inlets is about 24 sq.ft. If no "vena contracta" is applied to this intake orifice the mean speed of the air is upward of 4,800 ft. per minute and if a "vena contracta" of 80 per cent is allowed the mean speed of the air is upward of 6,000 ft. per minute. This fan is direct-connected to a 150-hp. motor and, making no allowance for loss in the motor, the mechanical efficiency of the unit is upward of 77 per cent.

PLANNING TO OVERCOME IMAGINARY DIFFICULTY

Only a few years ago a number of fan builders were putting scoops on the blades of the fan wheel at the intake orifice. This practice was due to the manufacturers' want of knowledge of the natural laws governing the flow of air and also to the old myth that it was necessary to limit the speed of the intake air to 2,000 ft. per minute.

It will be seen from these illustrations that the air will find its way into the fan at upward of 2,000 ft. per minute if the fan wheel is making a pressure in excess of that required to create that speed.

This old myth of inlet orifice speed is the direct cause of many installations being wasteful of power. As an illustration of this I will cite an instance that occurred a short time ago. A coal company was about to install a fan to make 80,000 cu.ft. of air per minute when the required water-gage pressure would be 4 in. to pass the air through the mine. Owing to this old myth of the limit of 2,000 ft. per minute the company's engineer insisted on a fan much too large for the work, and it is now running at less than 30 per cent mechanical efficiency. The manufacturer who made the fan guaranteed his fan for 75 per cent mechanical efficiency and the officials at that mine are one and all still wondering now what is the matter with the installation.

Coal Men Could Settle Own Trade Disputes, Avoiding Aches and Pains of Court Action

In arbitration of business difficulties between coal men lies the cure for many harassments of coal selling, Vincent Gilroy, representing the Arbitration Society of America, told the American Wholesale Coal Association at its Cincinnati convention in June. Producers of coal, suffering periodically in disputes over price, quality and whatnot with buyers located all over the country, may see great benefits in arbitration over the cumbersome and none too just methods of American courts.

If an arbitration clause were written into every contract between producer and buyer, each agreeing to submit any disputes arising out of the contract to three coal men, one chosen by the producer one by the buyer and the third by the chosen two, or to a permanent commission, or to some other form of arbitration, the Arbitration Society of America believes much good would be accomplished including these advances over present methods of "going to court": (1) Settlements would be speedier; (2) they would be more just because the decisions would be by men who know the problems of the trade and because ignorant juries would not be confused by so-called "experts," by oratory, or by technical rules of evidence; (3) trade secrets would not be divulged to the public; (4) the courts of the land would be relieved of a crushing burden of litigation; (5) less underhandedness would be attempted at the expense of the producer of coal because present evasions through the courts could not be practiced.

"It seems to me that there is a vital need for coal men to realize the fact that there is a trade evil that needs correction," said Mr. Gilroy. "That evil relates to the disputes that arise between you and the men that are purchasing the coal from you and that fail to make the proper payments, or set up fictitious defences against your just claims. Let me say that throughout the United States, in every line of industrial activity, we have found the same degree of dishonesty and unwillingness to pay just obligations that you are confronted with.

RUSE TO EVADE CONTRACT OBLIGATION

"Suppose you, separated by a great degree of space from the purchaser, ship your product, relying upon his honesty and character, only to find that when your commodity has reached its destination and has left your control, the purchaser seeks to evade the obligations of his contract and refuses to pay the agreed price. The refusal is based upon technicalities. Really it is an attempt to obtain the coal at a price below the contract obligation, and it succeeds in many instances because you, realizing the cost and ultimate loss of litigation, do not seek your just means of recompense. You know that the violation of a contract means that you are required to go into a court of law to place it before an unfriendly and, maybe, an ignorant jury, and in the end you receive a verdict that will not accord you justice and which will mean loss to you.

"The old jury system grew up in Anglo-Saxon times, when it was held that a man with any sort of litigation should place it before a jury of his equals—equals in trade and business. But today how is it? Men are selected from every avenue of business and industrial activity; men who are unfamiliar with you and your character and your business standing, and ignorant of the customs of the trade in which you are engaged. When the case is finally submitted there is a jumble of evidence from which they must select the truth. The judge, a man selected because of his superior knowledge of the law, but unfamiliar with your business, has charged them on the law of the case, and they retire and deliberate. They sit there, and in many instances draw lots to see which side shall be given the victory. And you are in many instances the victims.

"Then again litigation is the subject of deliberate delay. Delays by men who refuse to meet their just obligations and know that by appeal to court they can set back the day of reckoning until it suits them to settle or until they tire you out, and make you take a smaller amount of compensation than you are entitled to.

"While I say this condition is particularly pertinent to your industry it applies to every large industry in the United States. With a realization of this condition, gentlemen belonging to the New York Chamber of Commerce sought to devise a better system, a more ready means for determining business controversies, and they developed the 'New York Law of Arbitration.'

"Arbitration is not a new principle. It is recognized in every state in the Union. Any two men who have a controversy may submit it to an umpire under the law in the State of New York. But there was no means whereby a man could be compelled to submit to arbitration. When the decision was rendered there was no means to put it into effect. Parties refused to be bound by it. The Chamber of Commerce in New York agitated for several years to have a law placed on the statute books which would make controversies once submitted to arbitration binding upon both parties. That law was finally passed in 1920. Now, men who have differences in business and agree in writing to submit to arbitration are bound to do so and are bound by the decision which is made by the arbitrators.

SIMILAR LAWS INTRODUCED IN EVERY STATE

"The Arbitration Society of America was organized to give this publicity. Charles M. Schwab is the president. Others of similar character are officers. Since 1920 we have introduced into every state Legislature of the Union laws similar to this and we are going to keep on with our efforts until we are successful.

"The operation of this law in New York is as follows: Two of you coal men have a difference of opinion—legitimate in every way. You have different viewpoints. A difference arises. We have provided for every trade association that wants to adopt this system a clause by which the men who enter into that contract agree to submit every question in controversy to arbitrators selected by the parties themselves in a manner specified by the clause. Once signed, the contract is binding. Men cannot evade submitting their controversy to a tribunal thus selected.

"The result is as follows: You men, instead of setting your controversy before an ignorant jury and judge who is only familiar with the technique of the law, select your own judge and jury, men who will come from your own industry, who are familiar with every trade and trade custom that govern you. You pick your men and then instead of waiting, you fix your day for a hearing. You don't have to have your witnesses attending day after day in a vain attempt at being heard. Nor are they burdened by the technical rules of law. They are not confused by men legally trained. They can tell their story in their own way. The arbitrators will make their decision.

"EXPERTS" EASILY OBTAINABLE FOR EITHER SIDE

"In a court, to establish a trade custom before a jury you men have to call an expert (and you should know it is just as easy to employ experts on one side of a controversy as on the other) and the result is confusion. But the jury must decide the truth. It is a toss up the way most legitimate controversies are determined. In arbitration we don't have that. The arbitrators themselves select the leading men or the leading firms of the country, whose word upon trade customs could be received without question.

"Now a court of law is a public tribunal. The public is permitted to listen to all proceedings. In many instances men have business secrets which are sacred. Instead of publishing them before a jury in a court of law, you are able to have the testimony given without a violation, before an arbitration committee.

"It seems to me that associations composed of men who control the business of the coal industry should adopt a clause in every contract made with a jobber or retail dealer to the effect that any controversy will be submitted to arbitration by the rules of your organization. Then when a controversy does arise these men will be compelled to submit their differences to arbitration, and if they do not you can place them upon the list of discredited ones. You can circulate this list and you will all know with whom you can deal on a fair basis. You will cut your losses to a great extent."



Problems of Operating Men

Edited by
James T. Beard



Retimbering Old Slope to Open a Longwall Mine

Need of Providing Good Headroom on Main Slope—Double Timbering or Hitches Cut in Ribs Alike Inefficient—Support Crossbars on Cribs

SOME time ago an inquiry appeared in *Coal Age* regarding two methods attempted in the retimbering of an old slope for the purpose of opening a longwall mine in a 4-ft. coal seam. The roof being a frail soapstone had fallen to a considerable height requiring the lagging to be built up in the form of cribs above the timber-sets. The inquirer stated that in the first attempt, double timbering was used to support the lagging.

Finding that this first method was unsatisfactory, the plan was changed and the crossbars supported in hitches cut in the ribs, believing that the timber would then settle more uniformly with the strata than when double timbering was used as at the first. The sketch shown in the inquiry (Mar. 1, p. 380) indicated that the crossbars were set in below the roofline, which would give scant headroom for haulage on the main slope, in a 4-ft. seam, after deducting the necessary 6 or 8 in. for depth of the collarbeam.

Such a plan, would suggest the idea that very low cars were used in that case. However, in a later article, which appeared in the issue for May 10, p. 760, it was explained that the hitches supporting the collarbeams were cut in the solid formation, about 3 ft above the coal, and this would provide ample headroom on the haulage slope.

EFFECT OF PRESSURE IN LONGWALL WORK

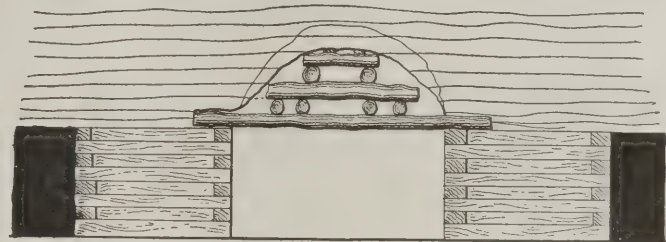
The situation is not entirely clear regarding the proposed development of the longwall mine, after the slope has been put in suitable condition. If, as suggested in the reply to the inquiry, it is the intention to extend the longwall work above the foot of the slope and extract the coal on either side of that opening, to my mind, neither of the methods proposed will prove satisfactory for the support of the pressure that will undoubtedly be thrown on the slope as the work proceeds.

In my opinion, the roof weight due to the extraction of the coal, will develop crevices and breaks in the supporting pillars that will eventually let down the timbers and give no end of trouble if the crossbars are to be supported in hitches cut in the ribs. Or, if double timbering is employed as first suggested, the oncoming weight will break the posts and cause them to bulge into the roadway where they would be a constant menace to the safety of drivers and motormen.

At the best, either of these methods would require constant renewals in the timbering of the slope. Allow me to suggest, therefore, the adoption of a method that I have seen successfully employed under practically the

same conditions as those described in this instance. The plan was put in operation after other methods had been tried and failed. The increased first cost, I may say, is largely offset by the coal recovered from the ribs when the cribs or cogs are built.

As shown in the accompanying figure, which needs little explanation, substantial cribs are built on each side of the roadway. In order to make room for these cribs, skips from 4 to 6 ft. wide are taken along the rib on each side of the road. Owing to the soft nature of the roof, in this case, it will be necessary to build up the cribs shortly after the coal is taken out. To provide the required headroom over the track, in low coal, it will be necessary to cut channels in the soft formation



SUPPORTING TIMBERS ON CRIBS AT ROADSIDE

above the coal for the insertion of the ends of the collars, which should project well over the cogs, as indicated in the figure.

In the adoption of this method, the weight due to the extraction of the coal will be taken by the cogs and what breaks occur will be on the line of the ribs, inside of the cogs, and not on the edge of the roadway, as would result in either of the methods previously mentioned. What settlement of the roof takes place will be gradual if the cogs are well built.

In addition, the collarbeams being supported on the cogs will settle with them without breaking and most of the evils of the other method will be eliminated. It will be found that cost of maintenance of the road on the main slope will be relatively small and this, together with the extraction of the rib coal, will practically offset the expense of building the cogs.

Victoria, B. C.

L' INCONNU.

OTHER LETTERS

REFERRING to the best method of supporting the roof when retimbering a 500-ft. slope, 8 ft. wide, on a pitch of 20 deg., where the roof has fallen to a considerable height, and the timbers are badly broken because of the soft nature of the soapstone overlying the coal, *Coal Age*, March 1, p. 380, permit me to say, regarding the two methods suggested, that of double timbering has little to recommend its adoption under the conditions named.

The inquiry recalls an instance in my own personal experience where several roadways, under conditions

similar to these, were kept open with great difficulty. During a single weekend, the floor or bottom on these roads heaved so badly that the headroom was reduced from 5 ft. 6 in. on Friday night, to a scant 3 ft. on Monday morning.

The inquirer proposes to open up a longwall mine and haul the coal out through this old slope. From experience in longwall mining, I have always found it a good and safe plan, where the coal is sufficiently strong, to use heavy collarbeams, old rails or I-beams, hitched into the ribs, either in the coal itself or into the stratum overlying the coal.

ADVANTAGES IN USE OF RAILS OR I-BEAMS

Not only does this method afford increased headroom on the road and save the timber required for legs to support the collars; but a still greater advantage gained is the lesser liability to accident by reason of a derailed car or wreck knocking out the legs and causing a heavy fall of roof and much delay, to say nothing of the expense of cleaning up the entry and making the necessary repairs.

Where rails or I-beams are employed these can be readily taken out and used again when a road is abandoned. In my own experience, we have never failed to lose a single steel beam when abandoning a longwall section. If a beam was too tight to be readily loosened a small piece of dynamite, exploded at one end of the beam, quickly overcame the difficulty. The first cost of the steel is soon made up in the saving of labor and timber that would be required for constant renewals, as posts and collarbeams are broken. LONGWALL.

McKeesport, Pa.

PERMIT me to say that my experience in retimbering an old road, under conditions much like those described in the article entitled "Timbering High Falls On Entries," *Coal Age*, May 10, p. 760, has taught me that the safest plan to adopt is to hitch the crossbars into the ribs on either side of the entry, provided the coal is solid enough to support the bars.

In place of wooden bars for that purpose, I have found there is a great saving in the use of railroad iron weighing from 40 to 60 lb. per yd. For an 8-ft. entry, we have used these rails cut into 9-ft. lengths. A 6-in. hitch is cut in the rib on one side of the entry and a slant drivehole is made on the other side to permit the bar to be slipped into place.

ALTERNATE PLAN GIVES GOOD RESULTS

My practice has been to alternate these slant driveholes with the 6-in. square hitches cut in the two ribs, which I believe gives better results in putting up the bars. Should the coal be a little soft immediately under one end of a bar, a hitch can be cut lower down in the coal and a short leg inserted to hold that end of the bar.

Not only will steel crossbars last during the life of the mine, but they are able to withstand a greater side pressure than wood bars. This method of timbering gives a good clear roadway and avoids the risk of timbers being knocked out when cars are derailed.

Sullivan, Ind.

R. J. PICKETT.

IN DESCRIBING the retimbering of an old slope an inquirer some time since stated that the coal was overlaid with a frail soapstone roof that had fallen to a considerable height above the road. The thickness of the soapstone in that instance was not given. Some-

times, where the thickness of such material is not great, it may prove an advantage to take it down up to the solid formation in order to secure a good roof that is safe for the men to work under.

A soapstone roof on a haulage road, moreover, will almost invariably prove a nuisance, as the dropping of the loose material on the roadbed requires constant cleaning of the track and demands care and watchfulness on the part of the driver or triprunner to avoid accidents. In addition to this, there is the expense of the wages paid to timbermen and the cost of the material required to keep the road safe and in condition for haulage.

It is probable that, in the case here mentioned, the thickness of the soapstone is too great to permit of its being taken down and the only thing to be done is to adopt the best and most economical method for the support of the roof. In no case should long legs be used for supporting the crossbars on a main haulage road. Instead, my preference has always been to support the bars in hitches cut into ribs on each side of the entry where the coal is sufficiently hard.

SHORT LEGS HITCHED INTO RIBS SAFE PRACTICE

Every one familiar with mining practice knows that the derailment of cars is a matter of frequent occurrence in the haulage of coal underground; and timbers are almost sure to be knocked out when long legs are used. Even though this may not happen, the breaking of a coupling or cable may let one or more cars run down the slope with the same result. In that case, it is fortunate indeed if several sets of timbers are not torn out.

In many cases, the roof will be left in such a dangerous condition that nothing can be done to replace a derailed car on the track, until the roof is first made safe. In closing, let me say, by all means avoid the use of long legs when timbering a haulage road. Instead, hitch the crossbars into the ribs, as I have stated. At times, a short leg can be used hitched into the coal on one or on both sides of the entry. WILLIAM ALLAN.

Frontier, Wyo.

Mine Cave-in Depicted in a Moving Picture

Mining conditions and scenes not always successfully featured in a moving picture—Such attempts should be made under the supervision of mining men to appear realistic.

A SHORT time ago, through the columns of *Coal Age*, I commented on the incorrect featuring of a gas explosion, which was assumed to have occurred in a bituminous coal mine. In that instance, the picture shown on the screen was called "The Flame of Life," which probably appealed to the producer as an appropriate title for a picture depicting an explosion of gas in a mine.

Only recently another film has been unreel in a somewhat more successful attempt to bring before the popular gaze the scenes of a cave-in at an anthracite mine. This picture is entitled, "The Little Church Around the Corner," perhaps suggested by the fact that the story included a parson who assisted in the work of rescue following the disaster.

It is not my purpose to unnecessarily criticize the featuring of mining scenes and occurrences; but I want to say that these scenes would be far more realistic, if those in charge of the production had enlisted the

advice and assistance of coal mining men familiar with every detail and whose suggestions and assistance would add life to the picture.

In this second attempt to portray life in the mines, the story briefly told is that of a colliery owner who had persistently turned a deaf ear to the entreaties and warnings of the workers employed in the mine. They had protested that parts of the underground workings were unsafe. The development of the story showed that the inevitable happened with the result that a number of men were entrapped by a heavy roof fall that cut off their escape to the surface.

RESCUERS WEAR OLD TYPE OF HELMET

Among the rescuers was a parson, the thought of the producer probably being that his presence lent an added interest to the scene. While the rescuers were very properly equipped with flame safety lamps and carried a caged canary to betray the presence of poisonous gases, they all wore the old type of helmet, which is now no longer used in exploring mine workings.

However, finding that the canary was unaffected by any gas present, the rescuers promptly discarded their helmets and set to work to remove the fall behind which they hoped to find the men still alive. Happily, after much hard work, the rescuers broke through and the entrapped men were saved, though a few of them showed signs of being overcome for lack of air.

As I have intimated, the worst feature of this film production was the wearing of the old type of helmet by the rescuers. Also, the caving in of the underground workings was announced in the picture by a puff of white smoke that came from the mouth of the shaft and was supposed to represent dust; though a dense black cloud would have better described the occurrence. To the credit of the producer, it can be said, however, that the crowd of miners and their people appeared natural and a large coal breaker was filmed continually.

Pittsburgh, Pa.

M. W. VON BERNEWITZ.

Longest Mine-Drainage Tunnel

Cripple Creek drainage tunnel not the longest—Surpassed in length by the Jeddo mine-drainage tunnel and branch, aggregating five miles in length.

REFERRING to the account of the Cripple Creek drainage tunnel, *Coal Age*, June 14, p. 980, given in response to an inquiry asking for the longest tunnel driven for drainage in mining districts and its location, it will be of interest to readers to know that the Jeddo drainage tunnel, in Luzerne County, Pa., is probably the longest tunnel driven for the drainage of mines in this country.

The Jeddo tunnel, known as the A. G. Markle & Co. project, was driven in 1893-1895 and extends from Little Nescopeck Creek to the valley of Big Black Creek, a distance of approximately $3\frac{1}{2}$ miles. From this main tunnel there was driven a lateral tunnel or branch extending $1\frac{1}{2}$ miles to the east. The main tunnel was driven 8x8 ft., in section for a certain distance and the balance of the way the section was changed to 7x11 ft. The length of the Cripple Creek drainage tunnel is stated as about 10,000 ft., or somewhat less than 2 miles, while the Jeddo drainage tunnel, together with its branch, aggregates 5 miles in length. As far as we know, this is the longest mine-drainage tunnel in the country.

C. J. CREVELING, Gen. Supt.,

Blackwood, Va.

Blackwood Coal & Coke Co.

Inquiries Of General Interest

Ascertaining Resistance Due to Bends in Airways

Recent Experiments Show Resistance of
Sharp Bends Is Considerable—Loss in Static
Pressure Measured by Modified Pitot Tube

MUCH has been said, lately, about the amount of the resistance offered by bends and angles in mine airways, and I have wondered how such resistance affects the coefficient of friction. Is the resistance due to a bend in an airway sufficient to have any appreciable effect on the power producing the circulation? Also, is the coefficient of friction the same in an airway having a number of sharp bends as in an airway that is straight, other things being equal? Kindly explain if there is any practical way of finding the amount of resistance offered by a sharp bend or angle, in an airway, and state how this is done.

Marissa, Ill.

GEORGE HOLMAN.

For some time past, the Engineering Department of the University of Illinois, in co-operation with the Federal Bureau of Mines, has been investigating what effect sharp bends and changes in the sectional area of airways, together with the form of timbering and other irregularities, may have on the actual pressure producing the circulation of air in those airways.

It has long been known that such obstructions to the flow of air, as those just mentioned, have more or less effect to increase the pressure required to circulate the air. It is only recently, however, that attempts have been made to measure the effect and determine to what extent the mine resistance is increased.

It will be readily understood that, in order to make these determinations of any value, it was necessary to employ special devices that would enable accurate measurements to be taken of the pressure on the air, before and after the current had passed the bend or other obstructions. The apparatus used for this purpose has been fully described in the issue of *Coal Age* for April 26, 1923, pages 669-674.

As there appears, use was made of small pressure boxes, airtight except for two small holes bored in each of the flat sides of the box for the purpose of registering the static pressure in the airway at the point where the box was placed. An airtight tube connected each pressure box with a special gage by which the pressure could be read to 0.001 inch.

In taking the observations at a sharp bend in the airway, two pressure boxes were placed, one outby and the other inby of the bend, and each box was connected by a rubber tube with the special gage for registering the respective pressures in the boxes. The difference in these pressures showed the loss of pressure due to the bend. When an airway makes a square turn of 90 deg., the theoretical loss in pressure is twice the velocity head, as calculated by the expression v^2/g . On the other hand, if the same turn through 90 deg. is made by a gradual curve the loss is almost inappreciable.

By way of illustration, suppose an air current having a velocity of 1,200 ft. per min., (20 ft. per sec.) strikes a sharp right-angle turn in the airway, the loss in pressure, expressed in inches of water gage, is 0.18 in. Assuming the mine is ventilated under a 2-in. water gage in the fan drift, such a right-angle turn in an air-course would mean a loss of $(0.18 \times 100) \div 2 = 9$ per cent of the pressure or the power producing the circulation. This is a very considerable loss and shows the

importance of avoiding such sharp bends in an air-course.

In regard to its effect on the coefficient of friction for the entire mine, no definite answer can be given to this question, as each obstruction is a debit item separate from the frictional resistance offered by the rubbing surface. For this reason, it cannot be understood to affect the coefficient of friction as that is generally understood.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—If a mine makes 312.5 gal. of water per minute and has a sump that can hold 20 hr. of water, while the steam pump has a capacity that can empty the sump in 15 hr. if the supply is cut off, how long will the pump be in taking out the water, the sump being full and the supply constant? What will be the dimensions of the pump?

ANSWER—The capacity of the sump, in this case, is $20 \times 60 \times 312.5 = 375,000$ gal. A pump that can handle this quantity of water in 15 hr. must have a capacity of $375,000 \div (15 \times 60) = 416\frac{2}{3}$ gal per min. If the supply is constant the sump will be drained at the rate of $416\frac{2}{3} - 312\frac{1}{2} = 104\frac{1}{6}$ gal. per min. The time required to drain the sump, under these conditions, is $375,000 \div 104\frac{1}{6} = 3,600$ min., or 60 hr.

Then, assuming a piston speed of, say 100 ft. per min., the diameter of the water-end of a pump having a capacity of $416\frac{2}{3}$ gal. per min., is found by the formula.

$$d = 5.37 \sqrt{\frac{G}{S}} = 5.37 \sqrt{\frac{416\frac{2}{3}}{100}} = 10.96, \text{ say } 11 \text{ in.}$$

QUESTION—The total pressure on a steam piston is 100 short tons. If the diameter of this piston is 24 in., what is the pressure of steam per square inch?

ANSWER—The sectional area of a 24-in. piston is $0.7854 \times 24^2 = 452.39$ sq.in. For a total steam pressure of 100 short tons (200,000 lb.), the unit pressure of steam on the piston is $200,000 \div 452.39 = 442.1$ lb. per sq.in.

QUESTION—How should a safety lamp be treated when found to be full of flame, as the result of being in an explosive mixture?

ANSWER—Make no quick movement, but slowly and promptly lower the lamp toward the floor or remove it from the body of gas. In withdrawing from the place, screen the lamp as much as possible by hiding it under the coat.

QUESTION—We are using 2-in. pipes leading to nine sumps. We are going to gather our water into one sump and want to use one pipe to do the work. What size of pipe will be necessary to replace the nine 2-in. pipes?

ANSWER—Disregarding the possible unequal lengths of the pipes and assuming an equal head and length in every case, the quantity of flow varies as the square root of the fifth power of the diameter of the pipe. In

other words, for the same head and length of pipe, the diameter ratio is equal to the fifth root of the square of the quantity ratio. But, in this case, the flow in the single larger pipe must be nine times that in a single 2-in. pipe. Then, calling the required diameter x , the quantity ratio being 9, we have

$$x = 2 \sqrt[5]{9} = 2 \times 2.4 = 4.8, \text{ say } 5 \text{ in. } \sqrt[5]{9^2} = 2$$

QUESTION—(a) What are the advantages of high piston speed? (b) What are the disadvantages of high piston speed? (c) What is the effect of high piston speed on the rod packing?

ANSWER—(a) The advantage of high piston speed is the obtaining of greater power with a reduced space occupied by the engine.

(b) The disadvantage of high piston speed is the difficulty to properly balance the engine and avoid the racking strain on the movable parts, particularly the crank connections.

(c) The effect of high piston speed on the rod packing is to produce a greater wear on the packing, which will require more frequent renewals. This is owing to the greater distance of rod travel in the same time, and the packing sweeping over a larger area in that time, than with a lower piston speed.

QUESTION—What in your opinion is the best kind of boiler for use in coal mines, and why?

ANSWER—More recent coal-mining practice is to replace the return tubular boiler, formerly so largely used in coal-mining districts, by the safer and more economical water-tube boilers.

QUESTION—How may the water consumption of a boiler be calculated?

ANSWER—The evaporative power of a boiler depends on a number of things, such as the type of boiler employed, amount of heating surface, area of grate and whether forced or natural draft is used. Knowing the rated horsepower of the boiler, its water consumption may be found by multiplying the rated horsepower by 34.5 and dividing that result by the factor of evaporation, which must be taken from a table of feed-water temperatures and boiler pressures.

QUESTION—How can you prove the correctness of the steam gage and safety valve, on a boiler, by comparing them with each other?

ANSWER—First calculate the pressure on the valve at which the steam will start to blow off. To find this pressure, multiply the weight of the ball by its distance from the fulcrum of the lever and divide that product by the distance of the valve stem from the fulcrum, both of these distances being expressed in inches. The result will be the total pressure of the steam on the valve that will cause it to lift. Then, dividing this total pressure by the sectional area of the valve, expressed in square inches, will give the steam pressure, in pounds per square inch. This pressure should correspond to the reading of the steam gage, if both the gage and the safety valve are in good working order.

Mine Inspectors' Institute Advances Cause of Safety

Wants All Electrical Equipment Better Protected—
Discusses New Guards Against Explosions—Decides
to Revivify—Resents Bureau of Mines Interference

By E. W. DAVIDSON

Withering heat at Pittsburg, Kan., did not prevent the Mine Inspectors' Institute of America from making a little Institute history July 10 to 12. It stuck strictly to business for the entire three days of its fourteenth annual convention, engaged in some spark-striking discussion, developed several safety measures that may save lives and property, asserted itself for state's rights in the face of a Bureau of Mines gesture of domination, and started in vigorously to revive its own self to virility. It elected James Sherwood president and chose Cincinnati, Ohio, for its meeting place next year.

All of this action was taken in spite not only of consuming heat, which is well worth two mentions, but also despite the fact that the attendance was the smallest the institute ever had. The very thinness of the ranks stung the institute to action. "We've got to revive or quit," declared President Robert M. Lambie. The decision was to revive, and do it right away. So the constitution was rewritten to open the membership not only to all coal- and metal-mine inspectors of America but to every man engaged in mine safety work, whether for an insurance company or a mining concern, and to every man who professionally teaches mine safety. It set up a committee to lay out a plan for organizing district chapters to awaken interest and stimulate more safety thought, and will hereafter urge every Governor and every company to send inspectors and safety men to future meetings.

The bars were not lowered too far, however. Men declared with much candor that the institute is not to "degenerate into a thing run by grease and powder salesmen to drum up business." The institute's head is high and its aim is straight at a goal—making mines safe.

Much sound safety talk during the convention is expected to crystallize into safer practices in mines everywhere but the most concrete work of the convention displays itself in the main resolutions, which, summarized, follow:

(1) That every possible effort be made to safeguard the use of electricity in mine operations and to this end we would request the U. S. Bureau of Mines to make every possible effort to discover means whereby electrical equipment in mines will be made as safe as possible and that special attention be given to the proper installation and care of the electrical transmission lines in mines.

(2) That, whereas, in the July 5, 1923, issue of *Coal Age* reference is made to proposed safety inspections of mines by engineers from the mine-rescue cars of the U. S. Bureau of Mines, reports of such mine safety inspections to be made directly to the operator. Be it resolved that it is the sense of this meeting of the Mine Inspectors' Institute of America that such inspections, though undoubtedly made with the best of intentions, will seriously embarrass the state mine inspectors in their work unless the Chief Mine Inspector is notified so that he may arrange to make a joint inspection at the same time.

(3) That the chiefs of the various state departments of mines be requested to join together for the purpose of preparing uniform mining laws and that the governors of the various mining states be requested to send the various chiefs to a meeting called by the president of the Mine Inspectors' Institute of America for the purpose of preparing such uniform laws and to include the necessary funds for such revision in their various budgets.

(4) That the secretary write to all operators' associations at least sixty days before each meeting of the institute requesting them to send their men engaged in safety promotion work and use their influence to get governors to send state inspectors and that similar letters be sent to the officials of liability insurance companies carrying mining risks and to the director of the Bureau of Mines.

(5) That every state should extend safety inspection to cover every hazardous type of mining.

(6) That, since it has been brought to the attention of the institute that in one of the important coal fields, water is being applied by means of a pipe fitted to the cutter heads of mining machines, thereby eliminating the dangers arising from coal dust at the working face, it was resolved that the institute go on record as favoring the application of water wherever practicable possible, and further that "we believe the application of water during the operation of cutting is a safe, practicable method for the elimination of dangers of coal dust at the face of rooms and entries."

The full list of new officers chosen at the wind-up of the convention is: President, James Sherwood, of Kansas; First Vice-President, James Dalrymple, of Colorado; Second Vice-

President, Frank Hillman, of Alabama; Third Vice-President, E. J. Hoey, of Illinois; Secretary, Martin Bolt, of Illinois; Assistant Secretary, J. S. Rogers, of Kansas; Treasurer, Dr. J. J. Rutledge, of Maryland; Editor-in-chief, James T. Beard, of New York.

"A miner can't be a safe miner until he knows how and until the idea of intelligent caution is drilled into him as a second nature," the inspectors agreed. So the various educational movements throughout the country must be supported heartily and they must be expanded to cover the country. President Lambie remarked on this early in the session, saying that education is absolutely essential to safety and ought to be so recognized everywhere. In West Virginia the state classes for miners have already instructed 1,200 men of whom 800 have graduated. Summer school now has 87 getting safety training with technical mining instruction.

"Of course there is opposition among certain miners who fear they will be surpassed by men who take the courses," he said, "but the work should be done in spite of that."

Both Professors Yates and Abernathy, of the mining department at the Kansas State Teachers College, in Pittsburg, told of their own efforts to get more men from around Pittsburg into the special courses for miners and of their desire to expand the service of the school.

Pennsylvania is establishing evening schools for miners and the Department of Mines is taking an active interest in it, according to Joseph J. Walsh, secretary, in a letter to the convention. He said the courses are comprehensive but simple. It is expected that 10,000 mine workers will attend classes during the coming winter months. "These," said Mr. Walsh, "will be a potent factor in the intelligent operation of mines."

EFFORTS FOR SAFETY AND EDUCATION

"The Department is co-operating with anthracite operators and mine workers to devote two weeks to a safety and educational period," he wrote. "During the first week the mine officials will devote a greater part of their time to instructing their employees in everything that pertains to safety, giving particular attention to the new and unskilled miners. The first day probably will be devoted to instruction and advice regarding shaft accidents, the second day to accidents by falls, and so on. The second week will be a sort of general safety week, a program for which will be worked out by the operators. A similar program will be carried out in the bituminous region in a short time."

The inspectors said a good many pointed things about the dangers of electrical machinery in mines.

The old, old question of what to do about dust got wide-awake attention. Martin Bolt said dust always is so dangerous that there is not much use trying to determine how much there must be present to constitute a hazard. After each shot "bug dust" should be carefully loaded out and the place wet down before another shot is fired. Also adjacent places ought to be wet down well. But the trouble is a pile of dust cannot be rendered innocuous by sprinkling casually, for it will ride on top of the water. Loose coal dropped from cars should not merely be shoveled aside in haulageways, he thinks, for it so often rolls back on the tracks or under a mule's hoofs and is ground to dangerous dust.

The plight of the oil-harrassed coal fields around Pittsburg, Kan., was pictured to the convention at its Wednesday morning session by W. L. A. Johnson, commissioner for the Southwestern Interstate Coal Operators' Association. He said the output of Kansas, Oklahoma, Missouri,

Arkansas, Iowa and Texas was 30,000,000 tons a year in war time, but in 1922 it dropped to 5,500,000 tons and this year it would be about the same. He is doubtful whether coal can continue as an industry there unless a separate and lower wage scale can be obtained.

He believes in most careful coal-mine inspection by state inspectors but he hoped such men would not get overzealous to the point of compelling operators in such a stricken field as the Southwest to take extreme and unnecessary safety precautions which are expensive. He urged that they always temper authority with judgment.

Failure of union labor to co-operate with operators to make safety methods and devices successful blocks many commendable efforts by mine inspectors, he said. Then he cited the instance of the mine in which shotfiring devices were put. Miners insisted they be compensated whenever the new method failed to fire. Because a miner who wanted a full day at home with pay could so easily have cut a wire or otherwise caused his place to remain unshot, the operators refused the demand. The men struck six weeks at that mine against the life-saving shotfiring device and finally won. There is no telling how many lives have been wasted since the old method was reinstated.

Operators' efforts have helped materially to reduce accidents in West Virginia, retiring President Lambie told the convention. He cited the safety methods of such companies as the Davis Coal & Coke Co., the Consolidation Coal Co. and the United States Coal & Coke Co., winding up with statistics showing that although 394 men were killed out of 95,883 mining in the state in 1917, in 1920 the ratio was only 346 out of 124,576, which proves that fatal accidents are decreasing steadily. Mr. Lambie's report to the convention will appear later in *Coal Age* in more detail.

LAMBIE DECRIES BUREAU'S SAFETY ADVICE

The solid objection of the inspectors was registered against the recently announced plan of the Bureau of Mines to have its field men make safety recommendations direct to mine operators.

"It's an interference with states' rights," declared President Lambie. "The Bureau was created for research and scientific work and that alone. I have had much aid from it and I intend always to co-operate with it heartily, but this new rule is a first step toward nationalization, and I for one think the time to stop it is right now, before it grows."

Inspector Dalrymple of Colorado and others also took a stand with Mr. Lambie. There was much reminiscing of the days years ago when the bureau antagonized many state inspectors, especially in West Virginia and Colorado. It was suggested that the bureau "family" is not united for it, as evidenced by a statement definitely against it sent to the convention by J. W. Paul, chief engineer of the bureau, the retiring secretary of the institute. The general feeling, after the air had cleared, was that the bureau may be expected soon to recail the new order. However, the resolutions committee brought in a resolution condemning it.

Vigorous discussion followed on the introduction of the question, What effect does accident compensation have on accidents? Most of those present could not see where it had helped to reduce them. Chief Inspector Sherwood, of Kansas, advocated uniform laws in all states and an examination of all would-be miners with certification. Dr. Rutledge in brief sketched the good work done by the Bureau of Mines since its establishment.

Wednesday afternoon the institute motored around the Pittsburgh mining region. That evening at a dinner given by the Chamber of Commerce of Pittsburgh, nearly everybody spoke. C. F. Spender, head of the Pittsburgh & Midway Coal Mining Co., introduced the orators all the way down the line from F. W. Newman, president of the chamber, and President Lambie, of the institute, clear to the end of the table, where sat Frank Hillman, whom Lambie calls the "sheik of Alabam," always prolific of ideas and graceful phrases. Inspector Sullivan, of West Virginia, made a plea for better feeling between operators—"who form associations to protect themselves against each other"—and miners prone to suspect their employers. The two do not understand each other and never will until they honestly try to put friendliness into their business relations, he said.

Others who spoke were Martin Bolt, Dr. Rutledge, Professor Yates of the Pittsburgh Teachers College, and Mr. Ryan.

At the opening of the Thursday session, Acting Secretary Sullivan announced that sixteen new members had been received. J. E. Roberts, chief inspector of Missouri, and Frank G. Fenix, a zinc-mine inspector from that state, spoke briefly. Tolbert Henson, a Missouri lead-mine inspector, precipitated a discussion when he suggested the institute send a resolution to the Governor of Missouri favoring a tonnage tax on iron and sand to support inspection of those operations. A number of inspectors objected to direct taxation or fees for inspection, holding it should be supported by general funds. Mr. Hillman said there would be too much tendency "to give Jones \$2 worth of inspection if he pays that, and Smith \$4 worth if that is his tax." Mr. Dalrymple, however, declared a direct tax is the only way that enough can be raised to properly support inspection. The decision of the institute was that it believed that inspection should be complete in all states wherever men work under hazardous conditions. The feeling was that the institute should not express itself in state matters.

A new discussion of uniformity of mine laws broke loose when the resolutions committee, composed of Dr. J. J. Rutledge, Frank Hillman and Martin Bolt, reported the resolutions previously mentioned. One of the proposed resolutions, favored a drafting of uniform laws for all states, especially for coal mining, by a conference of state chief inspectors. Mr. Dalrymple said it was an impossibly big job besides raising too many delicate questions between states. He was for dropping the matter, at least until the U. S. Coal Commission reports. The Commission has made a considerable study of the matter.

However there was a good deal of insistence that a uniform method of reporting accidents be perfected and that the institute do its best to get such forms adopted. Mr. Sullivan wanted it done so as to aid the Bureau of Mines in compiling statistics and reporting them to the public. Mr. Bolt remarked that the bureau asks from states only the number and causes of accidents and that not much uniformity is needed for that. He doubted whether inspectors' reports to state departments could be made uniform because of the wide variation in conditions between states. Mr. Dalrymple added that it is impossible to draw up this year a uniform blank covering everything that may develop next. Therefore there must always be room for "other conditions," such as is provided in Colorado blanks.

Before the institute passed its resolution urging that electrical equipment in mines be made safer Mr. Dalrymple campaigned to get the inspectors declare they would sanction the use of no electrical equipment whatever that did not bear the Bureau of Mines plate. But Dr. Rutledge, Mr. Hillman and others insisted that such a thing would put so much work on the bureau that it could not be done. The electrical section now approves only machines and switches.

"It can be done," declared Mr. Dalrymple, "and some day it will be done. The sooner we start, the quicker we'll reach that time. I want this institute to show the bureau and the world that it is behind the bureau to the fullest extent, and this would be one way to back it up in a great work."

Mr. Bolt and others counselled that the bureau merely be urged to study and bring out the weaknesses of electrical equipment, believing the manufacturers will voluntarily make many important remedies. Then the resolution, much tempered from the original proposal, was adopted.

Near the close of the convention a message of greeting was sent to J. W. Paul, retiring from the secretaryship after a service of fourteen years from the organization of the institute, conveying to him the institute's good will. Another went to J. T. Beard, Associate Editor of *Coal Age*, whose effort to resign from the editorship of the institute was fruitless.

Then a committee composed of E. J. Hoey (chairman), James Dalrymple and R. M. Lambie was appointed to work out a method of organizing district chapters of the institute and report at the next meeting in Cincinnati, Ohio, the second Tuesday in May, 1924. Points brought out in the discussions will be given in more detail in *Coal Age* next week.

Commerce Commission Orders Investigation Of Anthracite Rates

Apparently the Interstate Commerce Commission is disposed to go to the full limit of its powers to assist in stabilizing the coal industry. This is indicated by the prompt action it took in ordering an investigation of anthracite freight rates. The order was issued the day following the appearance of the report of the U. S. Coal Commission, in which such a recommendation was made.

There are some who believe that the decision in the assigned-car case was expedited by the Commerce Commission before the Coal Commission could have any opportunity to lay the responsibility at its door for the evils growing out of a practice which the Commerce Commission had approved.

The carriers have made formal application to the Commerce Commission for a rehearing in the assigned-car case. This follows a meeting of railroad executives in Washington on July 10, at which it was decided to take that action. If the Commerce Commission does not believe a rehearing justified, it is asked to allow the carriers to present additional arguments. In case that request is not granted, the carriers then suggest that the Commerce Commission give further attention to the situation of carriers purchasing for substantial periods the total output of mines and the situation of carriers owning their own mines and using the output thereof solely for railroad fuel.

This action on the part of the carriers is characterized in some quarters as being puerile. Attorneys for the carriers sat through the hearings, and because they regarded it as good tactics they made no defense of their position. They played poker, as one traffic man puts it; took a chance and lost. They did not expect to lose, so now they come back and want to put into the record what they deliberately left out for strategic reasons.

While all of the carriers will be a party to action on the part of the American Railroad Association, it is understood to have been the attitude of the Pennsylvania company that it would have been better to try out a plan of fueling without resort to the assigned car. Certain of the lines, it is understood, already have promulgated rules in conformity with the assigned-car decision.

Anthracite Wage Conference in Abeyance; 35 Demands Made, Says Warriner

Negotiations at Atlantic City between the anthracite mine workers and operators was suspended this week while the representatives of the miners attend the convention of District No. 1 at Wilkes-Barre and the installation as district president of Rinaldo Cappellini, who defeated William Brennan in the June election.

Several conferences were held last week by the subcommittee of eight that is considering the miners' demands. So far the miners have refused to consider an agreement binding them to remain at work after Sept. 1 if a new contract is not written in the meantime. Miners are forcing to the front their demand for the check-off. On July 10 Mr. Warriner issued the following statement:

"The position of the anthracite operators with regard to the wage negotiations is this:

"Actually the miners have presented thirty-five demands for changes in wages and working conditions, and not eleven, as would at first glance appear. Many of these demands involve the consideration of economic and technical details which will consume considerable time.

"Past experience has demonstrated that an anthracite wage contract cannot be negotiated in a hurry. While there is no disposition on the part of the operators to prolong unduly the negotiations, our action in appointing two alternate members of the subcommittee in order that there may be uninterrupted discussions is an indication of our anxiety to complete the work at the earliest possible moment. We realize that there is a possibility that a new contract may not be completed before the present one expires on Aug. 31. It must be borne in mind that only about seven weeks intervene between now and the end of August.



MINE WORKERS' REPRESENTATIVES ON ANTHRACITE SCALE COMMITTEE

Left to right: Thomas Kennedy, president of District 7, Hazleton; C. J. Golden, president of District 9, Shamokin; William Brennan, retiring president of District 1, Scranton, who was defeated for re-election by Rinaldo Cappellini.

"It was with all of the facts in mind that the operators both in the meeting of the full joint scale committee yesterday and in subcommittee today sought to obtain from the miners an agreement that there should be no suspension of mining operations after Aug. 31 in case the wage negotiations extend beyond that date. We proposed such an agreement for the main purpose of allaying public apprehension of a recurrence of the lamentable conditions of last winter."

The mine workers were somewhat taken back on July 1st when they were cross-examined by the operators on the subcommittee about the working of the check-off. They were asked to state specifically the wording of the contract clause to apply it in the anthracite region and to relate how it worked in the soft-coal fields. The miners replied, it is reported, that they would propose the standard clause that is being used in the soft-coal contracts, which they said had been "eminently satisfactory to both parties."

Adjournment was taken at midnight on June 12 until June 23 at Atlantic City.

Mine Bureau Engineers on Tour by Truck to Test Anthracite from New England Yards

In order to discover the amount of ash in anthracite as actually delivered to the consumer, the U. S. Bureau of Mines has sent into the field two engineers with a truck arranged for reducing coal samples which will be labeled and analyzed at the Pittsburgh testing station of the bureau. Results of these tests will be published by the bureau at the end of the season, which will be when cold weather arrives. Neither the names of the dealers from whom the samples are obtained nor the names of the shipping mines will be published, but the report will make known the towns in which the samples were obtained, the type of coal and the results of the analyses.

This move represents the first effort to obtain definite data regarding the qualities of coal delivered to consumers. Tests have been made, and still are made, of coal, both anthracite and bituminous, delivered to governmental departments in Washington, and last winter, under instructions of the Senate, the Bureau of Mines conducted tests of anthracite from the yards of retail dealers in Washington, but these tests did not afford the opportunity to obtain a cross-section view of the subject such as may be obtained by itinerate sampling.

In all the talk in recent months about "dirty coal" there has been what is described as a "surprising" lack of definite figures either as to the amount of ash that is and to be expected or the amount that is actually contained in coal which is complained of as "too dirty for use."

Officials of the Bureau of Mines long have had in mind plans to send engineers into the field to discover definite information regarding coal quality as the fuel is delivered to the consumers. O. P. Hood, chief mechanical engineer of

the bureau, planned his estimates of expenditures for the fiscal year 1924 to include some work along this line, these estimates were approved by the director and the appropriation passed by Congress last winter included a sum for this purpose which made it possible to start the work when the appropriation became available July 1.

After a special course of training in Washington, the two engineers, Charles W. Jeffers, Jr., and George R. Cooley, left July 9 and drove directly to Boston.

Massachusetts was selected for the first tests some months ago and the fact that the work is being inaugurated there has no connection with the enactment of an "unfit coal" law by the Legislature of that state. The tests will be conducted from the national standpoint and while the co-operation of state and local authorities will be welcomed, there will be no connection between the tests conducted by the Bureau of Mines and any other tests.

The co-operation of local dealers will be essential to the success of the tests in any locality. The tests will be thorough, according to the standards of the Bureau of Mines and of the American Society for Testing Materials. Donation of 1,000 lb. of anthracite will be necessary for each test. Preferably, samples will be taken from coal being loaded for actual delivery. The samples will be crushed in the machine carried in the truck for that purpose, and a quantity of the crushed material will be sealed in a can and sent to the Pittsburgh station for analysis.

If the work in Massachusetts is concluded before cold weather arrives, the engineers will go into Connecticut, and thence, if time permits, into other New England states.

There have been numerous requests to the Bureau of Mines for similar tests of bituminous coal, in other sections of the country, but the appropriation available is so small that only the one truck could be sent out and work in the anthracite-consuming region was decided upon first.

There is no official standard of the percentage of ash permissible in anthracite. By tacit understanding in the industry, product with less than 40 per cent ash is considered coal, that with 40 to 60 per cent ash is described as bone and that with from 60 to 100 per cent ash is described as slate. Tolerances in sizes make it difficult to calculate without a test the exact ash content of a shipment of a given class of anthracite.

Coal Commission Anthracite Report Elicits Little Enthusiasm in Middle West

It cannot be honestly said that the U. S. Coal Commission's anthracite report caused any great satisfaction among Midwestern operators. As a matter of fact it did not even stir up lively interest. There was general approval of the commission's stand against nationalism but the commonest comment was that the report contained "no kick," and that while the Commission's intentions evidently were good, it devoted a good deal of space to things said for political effect and did not bring out much that is new.

In Chicago it is often remarked that the Commission's proposal that costs and profits be made public by some governmental agency may not mean much because it would be so easy for unscrupulous operators to juggle their figures. Also it would be easy for the governmental agency to misrepresent and misconstrue coal statistics. Nobody takes very seriously the suggestion that the President take over mines and operate them in case of impending strikes. They hark back to the parlous days of last year when the President threatened to do that very thing only to recede from his stern position, and wonder by what specific plan the Commission would empower him to do it in the next emergency.

The feeling among St. Louis operators is not different from that in Chicago. There is not enough of practical benefit in the report and too much said for political effect. There are smiles over the proposal that the President operate mines to prevent coal stoppage by strike. The President must have more authority than he has now to do that with any effect. Also there is disapproval of the plan to collect and compile figures on coal costs, not because the average St. Louis operator fears to reveal the truth about the coal industry where such revelations may benefit the indus-

try but because there is too great a likelihood of those statistics falling into unfair and unintelligent hands.

One prominent operator, however, sees, besides the Commission's stand against nationalism of the mines, one other outstanding virtue in the anthracite report. That is the obvious desire on the Commission's part to set the public right on the matter of profits. The report's mention of 12c. on the dollar divided between producer and seller, instead of the "fabulous" profits usually credited to "coal barons" in the public mind, is having a good moral effect, this operator thinks. His belief in the good intention of the Commission on this point is supported, he says, by the Commission's latest request to bituminous operators for exhaustive statistics on revenue and coal profits since 1913. The truth about the lean years between 1913 and the present will prove that in the long run the coal operator makes no great profit. The average investigators are never fair enough to allow so long a view to be taken but make their decision on high years, when the operator is recouping previous losses.

In the Southwest operators have little to say about the anthracite report. The general feeling of hopelessness in that oil-stricken field is that although the Commission's recommendations for anthracite if applied to bituminous would not promise much benefit, yet anything might be better than present conditions.

The keenest interest a Rocky Mountain coal company official took was in the Commission's remarks about labor. Said he: "I certainly hope the Commission soon backs up its belief in labor living up to contracts by proposing something effective to bring this about. Of course, incorporation of unions would help, but probably something else is necessary." He was hopeful that the Commission had a "something else."

Mines of Crow's Nest Pass Work Under Handicaps, Says Coal Company Head

There is more discouragement than usual among the coal operators in the Crow's Nest Pass district of Canada, judging by remarks made by W. R. Wilson, president of the Crow's Nest Pass Coal Co., in his report at the annual company meeting in June. High wages, which were continued for one year after the strike, and "correspondingly high cost of production is creating a new set of adverse and discouraging conditions for this district in particular," said he, "for through the high cost of coal the railroads upon which this company in particular largely depended for the economic continuity, are displacing coal by oil, after patiently waiting for two years to see coal prices return to normal. In addition to this, smelters are prevented from accepting the lower grade ores because of the abnormally high prices of coke due to the high wages.

"When wages are increased in this district, the cost of production becomes magnified over and above the cost in fields operating under more favorable physical conditions, such as greater uniformity of structural coal bedding, better overlapping roof and greater freedom from dangerous gas generation."

Utilities Consume 2,943,242 Tons of Coal in May; Slight Gain in Power Produced

Electric public-utility plants consumed 2,943,242 net tons of coal during May, according to a report just issued by the U. S. Geological Survey. This compares with 2,967,707 tons consumed during April, according to corrected returns.

Fuel oil consumed by public-utility plants in May totaled 999,705 barrels, compared with 980,684 barrels in April. The average daily production of electricity by public-utility power plants during May was 149,400,000 kw.-hr., a slight increase over the rate for April.

The average daily production of electricity for the first five months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent; April, 149,100,000 kw.-hr., 39.9 per cent, and May, 149,400,000 kw.-hr., 41.1 per cent.

Emergency Federal Operation Feature of Anthracite Report Jars Operators and Mine Workers

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

The storm center of the anthracite report of the U. S. Coal Commission is the recommendation that the President be authorized to declare a national emergency in case of a deadlock between operators and mine workers and be empowered to take over operation of the mines and distribution and marketing of the product. The operators fear that this would prove to be nationalization's entering wedge. Labor objects to it because there at least would be the coercion of public opinion brought to bear to make men work against their will. The public, however, seems to regard the measure with favor, not that it is anxious to see the government undertake any business activity but because it believes the industry will avoid any invoking of the emergency powers and with that alternative hanging over them will reach an agreement.

The recommendation of the Coal Commission in regard to emergency powers simply brings to the fore one of the big issues in our national life, it is pointed out. It has been recognized with increasing appreciation that some means must be found to break a deadlock between employer and employee when the continuance of that deadlock seriously affects the public welfare. The fact that the Coal Commission has made a concrete suggestion for the handling of such a situation insures the consideration of that and alternate plans at the forthcoming session of Congress.

The fact that the Commission has endorsed, in effect, a combination of big business interests, under suitable regulation, throws into the congressional arena another highly controverted problem of our industrial life. It has been popular in Congress for many years to lambaste any large business enterprise on the assumption that being big is *prima facie* evidence of its predatory character. Opinion, even in Congress, is changing to the point where the efficiencies of big business and the various benefits to the public of combinations are becoming apparent. It is true that the Coal Commission admits the possibilities of unjustifiable profits on the part of the anthracite combination, but on the whole its report shows that it was not afraid to commend it despite the fact that it is big.

COMMISSION SEES MALICE IN DAUGHERTY CHARGE

The other outstanding feature of the situation is the furor created by the published statement that the Attorney General influenced the report of the Commission. Members of the Coal Commission denounce the statement as having been made out of whole cloth. No one acquainted with the Commission's membership would believe for a minute that they would brook any political interference with their findings. The difficulty is that there is a large number of persons within the coal industry more than anxious to believe the tale. In addition there is a portion of the public always willing to believe a story of sinister motive. It is admitted that the allegation has carried further than most untruthful statements. For that reason it will not be surprising if the Commission should take rather drastic and unusual methods to establish the untruthful and malicious character of this charge.

It just happens that there is clear-cut evidence to show that the Attorney General did not exert the influence attributed to him. To start with, Mr. Daugherty left Washington on June 22 and was not again in the Capital during the period prior to the issuance of the Coal Commission's report. The report itself was not written until July 4. The final revisions were not made until July 6. The cutting of the first stencils, and the only stencils of the report ever cut, was begun at 11 a.m. on July 4. No proofs were read by anyone other than members of the Commission, and then only on July 6. The stencils were completed and read at 10:30 p.m. on July 6. No stencils were destroyed prior to July 6. On that date it was necessary to recut two of

them. In one case it was necessary to correct a bad typographical error and in the other there was a single verbal change which made it desirable to recut the sheet.

In some quarters the report of the Coal Commission is criticised for not having made clearer that there was no intention to reflect upon the integrity of the anthracite-producing companies in their comment on the limited natural monopoly. The fact that the nation's deposits of anthracite are limited is not chargeable to the operators. They would be subject to criticism had they combined to restrict output or to manipulate price, but the report makes no such charges.

Another criticism of the report is that the Commission sidestepped an important point when it stated that the determination of margins and profits is a judicial function. Before any definite conclusions can be drawn, it is contended, as to whether or not there has been profiteering, there must be a determination as to whether the properties are to be valued on their original cost, on the income-tax basis or on present value.

GOVERNMENT SHOULD KNOW WHAT GOES ON

The report reveals that the Commission believes the public is entitled to sit as an observer in the affairs of business. It is something like the position of the administration toward European affairs. Mr. Harding does not believe the nation should accept any of the responsibilities of the reparations commission, but he has a decided opinion that the United States is entitled to know what the Commission is doing. The Coal Commission is determined in its belief that the government should stay out of the coal business, but it believes it should know what is going on in that industry.

There are some engaged in the coal business who believe it would show the proper spirit were the industry to subscribe to some such sentiment as this: "We accept the main idea of the report that the public, through the government, is entitled to know what we are doing. We are gratified to know that the public wants us to continue the conduct of this business. We think we can handle it better than anyone else. We agree with the Commission that we have a responsibility in providing uninterrupted service. We are going to furnish that service to the fullest extent that the United Mine Workers will let us."

The anthracite report brings out with great clearness the change in the public's attitude toward big business. For twenty years the majority apparently has favored the separation of business activities into as small units as possible with the idea of exciting the maximum amount of competition and has acted on the assumption that there is inherent danger in big business. Chief Justice Taft when President, took a determined stand against any such general condemnation. He pointed out that big business has a great capacity for public service. The Taft policy has been accentuated and put into practice by Mr. Hoover in his capacity as Secretary of Commerce.

In the meantime the public has had an opportunity to observe and form some conclusions of its own. Now comes the Coal Commission, believed to reflect the opinion of the majority, with an endorsement of big business provided a certain amount of harness can be used. It is the Commission's plan to call industry in and frankly put large responsibilities on it. Industry has shown that it is responsive to trust to a remarkable degree, whereas, humanly enough, it does not do so well when threatened and treated unfairly. All of the Commission's recommendations for changed conditions are along lines of industry's working out its own way of serving the public. Each time a choice was open to the Commission between accomplishing its purpose by an act of Congress or by voluntary co-operation within the industry, it chose the latter.



Production and the Market



Weekly Review

The mines are grinding out a steady flow of 10,500,000 tons of soft coal with little or no effort and around two million tons of hard coal a week with considerable effort. Buyers of hard coal—that is, the retail dealers and householders—are wondering why all this push and fervor of the “buy-your-coal-now” movement that is coming from Washington, when they can’t get the coal they ordered six weeks ago. What the railroads and the officials at Washington are talking about, however, is soft coal, and what they are endeavoring to do is to get the country to take in during the summer months and put on the ground around their manufacturing plants and railroad yards a part of the soft coal that they will need next winter. The railroads say that they will be so busy hauling farm products next autumn that they will have to shove soft coal off the rails for a while and they do not want the operators to be crying “car shortage” at them as the price goes up. Buying of anthracite for household is ahead of production and this market needs no urging.

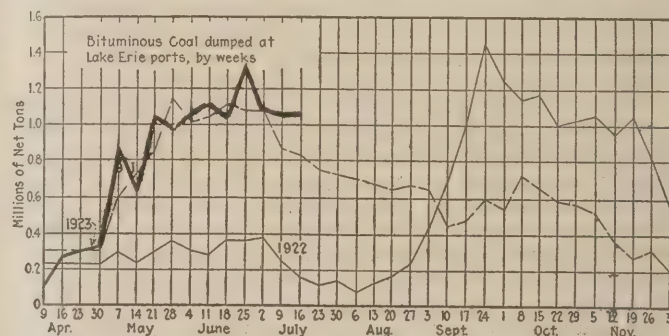
There has been a perceptible decline in soft-coal consumption following the slowing up of operations in iron and steel and textile industries. Railroads, public utilities and industries continue to add to their reserve stocks and there is much quiet buying of spot coal. Prices are fluctuating from week to week but on the average they are maintaining a fairly uniform level. *Coal Age* Index gained one point last week, an increase in the average price of 2c. per ton, raising the index to 198 on July 16. Of fourteen coals entering into this average, eight showed gains of from one to 13c.; and two dropped in price, while the remainder held firm.

PRODUCTION ON REBOUND AFTER HOLIDAYS

Production of bituminous coal during the week ended July 7 was affected by the holiday and the day following to such an extent that for the first time in several weeks it fell below 10,000,000 net tons. Estimates of the Geological Survey place total production for the

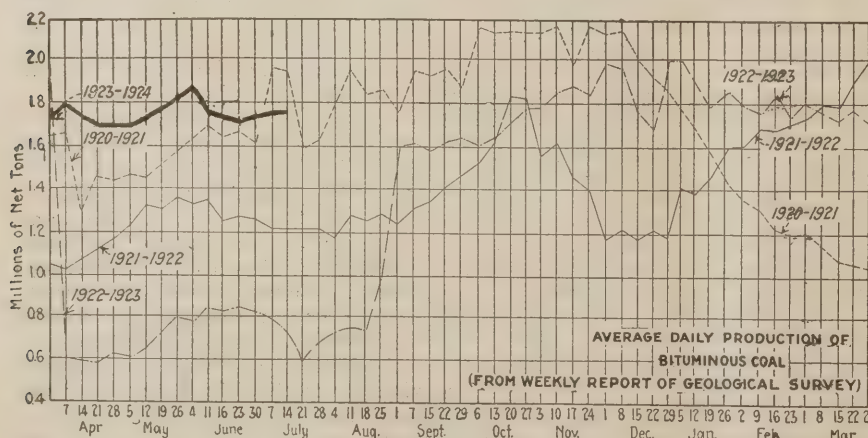
week at 8,763,000 net tons, while early returns on car loadings for the present week indicate that the total output for the week will be in the neighborhood of 10,500,000 net tons. Anthracite production during the same week was about three-quarters of that for recent weeks. Revised estimates show that anthracite output during June was 8,665,000 net tons, which was exceeded only in the corresponding month of 1917 and 1918, which were years of large washery output. The cumulative output for the first six months of 1923 stands at 51,169,000 tons, larger than for any corresponding period of the last eight years.

Trading in the Middle West is slow. There is no demand and “no bills” seem to be the rule at nearly all mines. Along the Atlantic seaboard buying is slow.



There is no demand for spot coal but high-grade coals on contract are moving well. In New England stocks are large as compared with other seasons and buyers are hard to find.

The export market improved slightly last week. There were some inquiries for definite orders, most of the coal going to Dutch ports. A couple of inquiries also were reported from South American points. During the first week in July 60,655 tons of cargo and bunker coal left Baltimore, as compared with 93,846 tons in the last week in June.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
June 23.....	5,363,000	10,422,000
June 30 (b).....	5,226,000	10,458,000
July 7 (a).....	3,678,000	8,763,000
Daily average.....	736,000	1,753,000
Calendar year.....	191,528,000	282,035,000
Daily av. cal. year.....	1,201,000	1,774,000

ANTHRACITE

June 23.....	24,000	2,042,000
June 30.....	25,000	2,105,000
July 7.....	23,000	1,580,000
Calendar year.....	23,348,000	52,749,000

COKE

June 30 (c).....	144,000	399,000
July 7 (a).....	94,000	372,000
Calendar year.....	3,311,000	10,441,000

(a) Subject to revision. (b) Revised from last report

In some sections the movement of domestic sizes of anthracite is easier, but the demand continues strong. Consumers are watching developments in the anthracite situation and are urging deliveries from the retail dealers.

There were dumped for all accounts at Hampton Roads during the week ended July 12, 348,130 net tons of coal, as compared with 333,870 net tons during the previous week.

Chicago Market Is Low

Coal trading in the Chicago market remained low all week. So little domestic coal is moving out of any Illinois or Indiana field, however, that the ever recurrent hope that screenings would stiffen in price because of scarcity continued to be felt. However enough cheap screenings from Kentucky came into the Midwest market to prevent any noticeable price rise.

Stern efforts are being made by several smokeless shippers to prevent the recent 75c. cut made by one company on mine-run from spreading over the whole market. The result is that smokeless mine-run is selling all the way

from \$3 up to an occasional car at \$4, which was the former circular. There is little trading at best.

The movement of domestic sizes in the Carterville field of Williamson and Franklin County has almost stopped. Every mine has "no bills" and there seems to be no immediate prospect of moving them. Prices do not seem to be a factor. There just isn't the demand. There has been a let-up in railroad buying. Somewhat similar conditions prevail in the DuQuoin and east Jackson County field, excepting that the prices are far below those of the association operators in the Carterville district. In the Mt. Olive district things are practically at a standstill. A little railroad coal on contract is moving out, but there is no domestic tonnage moving and no steam sizes to offer.

In the Standard field the only demand is for screenings but this is very light. Railroad tonnage has been good in this district, but is easing up.

Nothing Doing in St. Louis

Hot weather has practically put an end to the delivery of coal except a little hard coal, smokeless and coke. A little apartment coal and some school coal is going in, but that is all. Wagonload steam is quiet and carload is notice-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 17 1922	July 2 1923	July 9 1923	July 16 1923†
Smokeless lump.....	Columbus...		\$3.95	\$5.85	\$5.85	\$5.75@ \$6.25
Smokeless mine run.....	Columbus...		3.75	3.60	3.25	3.00@ 3.50
Smokeless screenings.....	Columbus...		3.45	3.35	3.10	2.75@ 3.10
Smokeless lump.....	Chicago...		4.15	6.10	6.10	6.00@ 6.25
Smokeless mine run.....	Chicago...		4.15	3.75	3.60	3.25@ 4.00
Smokeless lump.....	Cincinnati...		4.40	6.25	6.00	6.00
Smokeless mine run.....	Cincinnati...		3.80	3.35	3.60	3.00@ 3.75
Smokeless screenings.....	Cincinnati...		3.25	3.00	3.35	2.50@ 3.50
*Smokeless mine run.....	Boston...		6.55	5.60	5.35	5.25@ 5.50
Clearfield mine run.....	Boston...		3.40	2.35	2.25	2.00@ 2.75
Cambria mine run.....	Boston...		3.85	2.85	2.85	2.50@ 3.25
Somerset mine run.....	Boston...		3.50	2.60	2.50	2.25@ 3.00
Pool 1 (Navy Standard).....	New York...			3.60	3.50	3.25@ 3.75
Pool 1 (Navy Standard).....	Philadelphia...			3.60	3.55	3.30@ 3.90
Pool 1 (Navy Standard).....	Baltimore...					
Pool 9 (Super. Low Vol.).....	New York...			2.80	2.75	2.35@ 2.75
Pool 9 (Super. Low Vol.).....	Philadelphia...		4.75	2.80	2.70	2.40@ 3.00
Pool 9 (Super. Low Vol.).....	Baltimore...		4.50	2.60	2.60	2.40@ 2.60
Pool 10 (H.Gr.Low Vol.).....	New York...		4.80	2.45	2.35	2.00@ 2.50
Pool 10 (H.Gr.Low Vol.).....	Philadelphia...		4.55	2.20	2.25	2.20@ 2.35
Pool 10 (H.Gr.Low Vol.).....	Baltimore...		4.50	2.25	2.25	2.15@ 2.25
Pool 11 (Low Vol.).....	New York...		4.60	2.05	1.80	1.75@ 2.00
Pool 11 (Low Vol.).....	Philadelphia...		4.40	1.85	1.85	1.75@ 2.00
Pool 11 (Low Vol.).....	Baltimore...		4.30	2.05	2.05	2.00@ 2.10
High-Volatile, Eastern						
Pool 54-64 (Gas and St.).....	New York...		4.70	1.80	1.65	1.60@ 1.80
Pool 54-64 (Gas and St.).....	Philadelphia...		4.40	1.60	1.55	1.40@ 1.80
Pool 54-64 (Gas and St.).....	Baltimore...		4.10	1.75	1.75	1.75
Pittsburgh sec'd gas.....	Pittsburgh...			2.80	2.40	2.60@ 2.75
Pittsburgh mine run (St.).....	Pittsburgh...			2.05	1.95	1.90@ 2.00
Pittsburgh slack (Gas).....	Pittsburgh...			1.50	1.50	1.30@ 1.50
Kanawha lump.....	Columbus...		4.00	3.00	3.00	2.75@ 3.25
Kanawha mine run.....	Columbus...		3.65	1.85	1.85	1.75@ 2.00
Kanawha screenings.....	Cincinnati...		3.40	1.25	1.10	1.00@ 1.20
W. Va. lump.....	Cincinnati...		4.25	3.50	3.25	3.00@ 3.25
W. Va. Gas mine run.....	Cincinnati...		4.25	1.85	1.75	1.50@ 2.25
W. Va. Steam mine run.....	Cincinnati...		4.00	1.85	1.75	1.50@ 2.25
W. Va. screenings.....	Cincinnati...		3.60	1.25	1.05	1.00@ 1.10
Hocking lump.....	Columbus...		3.80	2.75	2.75	2.50@ 3.00
Hocking mine run.....	Columbus...		3.70	1.85	1.85	1.75@ 2.00
Hocking screenings.....	Columbus...		3.40	1.25	1.25	1.20@ 1.30
Pitts. No. 8 lump.....	Cleveland...		4.75	2.55	2.55	2.05@ 3.00
Midwest						
Pitts. No. 8 mine run.....	Cleveland...		\$4.40	\$1.95	\$1.90	\$1.90@ \$2.10
Pitts. No. 8 screenings.....	Cleveland...		4.40	1.25	1.25	1.25@ 1.35
South and Southwest						
Big Seam lump.....	Birmingham...		2.35	3.05	3.25	3.15@ 3.40
Big Seam mine run.....	Birmingham...		2.20	2.05	2.05	1.75@ 2.15
Big Seam (washed).....	Birmingham...		2.40	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago...		4.15	3.25	3.25	2.75@ 3.00
S. E. Ky. mine run.....	Chicago...		4.15	2.35	2.35	2.00@ 2.25
S. E. Ky. lump.....	Louisville...		4.40	3.25	2.75	2.75@ 3.00
S. E. Ky. mine run.....	Louisville...		4.15	2.00	1.85	1.75@ 2.25
S. E. Ky. screenings.....	Louisville...		4.25	1.25	1.05	.90@ 1.25
S. E. Ky. lump.....	Cincinnati...		4.25	3.10	3.25	3.00@ 3.25
S. E. Ky. mine run.....	Cincinnati...		4.00	1.75	1.60	1.50@ 2.25
S. E. Ky. screenings.....	Cincinnati...		3.75	1.00	1.05	.75@ 1.25
Kansas lump.....	Kansas City...		5.00	4.00	4.00	3.50@ 4.50
Kansas mine run.....	Kansas City...		4.75	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City...		4.25	2.60	2.60	2.50@ 2.75

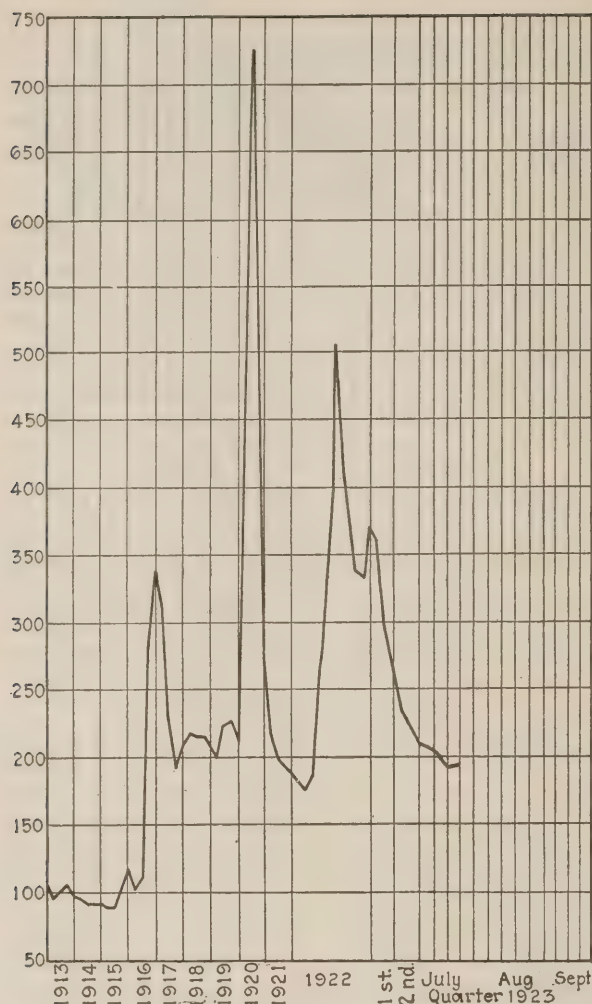
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	July 9, 1923 Independent	July 9, 1923 Company	July 16, 1923† Independent	July 16, 1923† Company
Broken.....	New York...		\$2.34		\$7.60@ \$7.75		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia...		2.39	\$7.00@ \$7.50	7.75@ 7.85		7.00@ 8.10		7.00@ 8.10
Egg.....	New York...		2.34	7.60@ 7.75	7.60@ 7.85	\$8.50@ 12.00	8.00@ 8.35	\$8.50@ 12.00	8.00@ 8.35
Egg.....	Philadelphia...		2.39	7.25@ 7.75	7.75	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago*		5.06	7.50	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York...		2.34	7.90@ 8.20	7.90@ 8.10	8.50@ 12.00	8.00@ 8.35	8.50@ 12.00	8.00@ 8.35
Stove.....	Philadelphia...		2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago*		5.06	7.75	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York...		2.34	7.90@ 8.20	7.90@ 8.20	8.50@ 12.00	8.00@ 8.35	8.50@ 12.00	8.00@ 8.35
Chestnut.....	Philadelphia...		2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago*		5.06	7.75	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York...		2.34				8.30		8.30
Pea.....	New York...		2.22	5.00@ 5.75	5.75@ 6.45	6.75@ 8.00	6.00@ 6.30	6.75@ 8.00	6.00@ 6.30
Pea.....	Philadelphia...		2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago*		4.79	6.00	6.25	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York...		2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia...		2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York...		2.22	2.00@ 2.50	2.50	1.80@ 2.50	2.50	1.80@ 2.50	2.50
Rice.....	Philadelphia...		2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York...		2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia...		2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York...		2.22		2.00@ 2.50		1.60		1.60

* Net tons, f.o.b. mines † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923		1922	
	July 16	July 9	July 2	July 17
Index.....	198	197	203	321
Weighted average price.....	\$2.40	\$2.38	\$2.46	\$3.89

This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

able only occasionally, with a call for screenings. Country domestic business shows a little activity, but it is not general. Country steam has almost dropped off.

Kentucky Ships Some

With all fields open and car supply good, with no strikes or other influences to hold down production or slow up delivery, it must be admitted that there is a lot of coal moving, in spite of the gloomy reports put out by operators and jobbers. Producers are keeping quality up. Both domestic and screenings are moving but mine-run is flat.

The western Kentucky field is moving some coal North and Northwest and into Michigan. Screenings are slightly stiffer than they have been. A better demand is needed in Kentucky and Tennessee, where there appears to be a backward buying feeling. Industrial demand is fair but stocking is light.

Duluth Demand Is Light

Demand for commercial bituminous coal on the Duluth market continues dull with consumers ordering for immediate needs only. Prices are irregular with further cuts being made in screenings in the effort to book business.

Around Minneapolis there is little trading. Both dock

and rail agencies are getting ready for one of the sharpest fights of years when demand finally wakes up. Just now the market is so demoralized it is difficult to name a going price on anything.

In Milwaukee the market is fair considering the season. Dock storage is rapidly filling, but there remains plenty of room for more anthracite. Movement inland is slow. Prices remain unchanged.

The strenuous efforts of Kansas City agencies to push coal storage thus far have produced no results. People will not buy. Perhaps the elaborate advertising campaign of the coal producers has not run long enough to show results. In Colorado, however, storage is picking up a bit following Federal Fuel Distributor Wadleigh's "buy-now" advice.

Reaction for Better in Central Ohio

A slight reaction took place in the central Ohio market during the past week and buying is more active. This is due in part to the tendency shown by some of the larger steam users to come into the market. Distress coal is being cleaned up and buyers are taking in coal to meet current requirements. Household users are not coming into the market as it was expected that they would, with the result that retail dealers are heavily stocked. Buying by railroads and utilities is the best feature. Distress coal has been increasing in volume in the Cincinnati market, and it has been difficult to move good coals, even at the low prices quoted. West Virginia 2-in. lump is quoted at \$2.50@\$2.75, no change from last week, and southeastern Kentucky 2-in. lump at \$2.50 as compared with \$2.50@\$3. The coal trade in and around Cleveland continues dull. Demand for steam coals is at a standstill, the majority of users buying bargain coal as they need it.

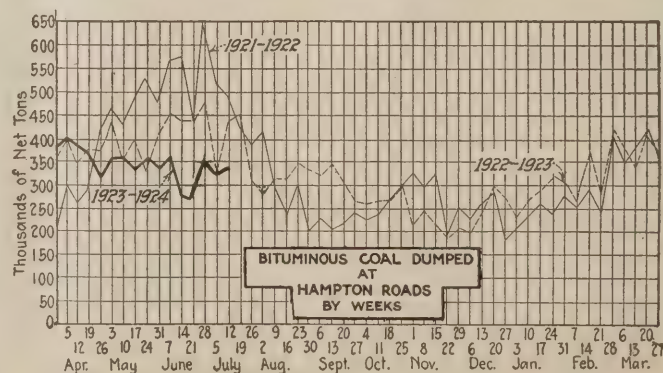
Pittsburgh Steel Mills Curtail Buying

Steel plants in the Pittsburgh district are buying less gas coal, the mills being very conservative in making commitments on any materials, as they are operating at lower rates and may have further declines in operation in the next few weeks. Operators are divided in their opinion of the situation. One batch of operators claim to be doing a good business while another batch say they have given up and are closing their mines, being tired of operating at a loss. The market at Buffalo is flat. Accumulation of coal is large and there are no indications of increased buying in the near future.

Indifference Reigns in New England

The market in New England shows little sign of recovery. Stocks are large as compared with other seasons and buyers are extremely hard to find. There is almost an utter lack of interest on the part of consumers throughout the territory and receipts both all-rail and by water are steadily dwindling. A few market cargoes put in an appearance and it is rumored that some extremely low prices were made to avoid vessel demurrage. Most larger buyers have not been attracted by these, purely because of the large reserves already accumulated, and there seems slight prospect of better inquiry before September.

Coals from the Pennsylvania districts are now less heard from. Prices on cars for Pocahontas and New River rule



so low, relatively, that except in the section west of Worcester there is only a very light tonnage being placed. Even deliveries on contract have been curtailed; the textile mills in particular have had so discouraging a prospect on finished goods that their consumption of fuel is much less than expected. Movement of high volatiles as well as steam coals via Philadelphia and New York for transshipment by water also has fallen off materially. Quotations generally are not any lower, except on distress coal, the operators having apparently in each case fixed upon an irreducible minimum.

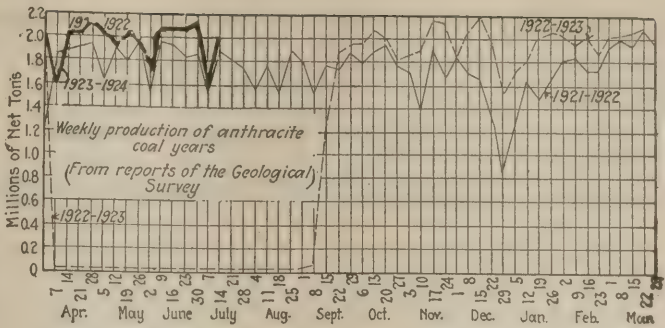
Hampton Roads grades seem to be marking time. Producers of No. 1 navy standard coals have curtailed in the most drastic fashion; to such extent is this true that certain agencies when called upon for spot delivery find themselves in no position to respond.

For delivery inland from Boston, Providence, and Portland prices range from \$6.75@ \$7.25 per gross ton, although the former is more nearly the market level in trade that may be considered at all competitive. A few distributors who felt obliged early in the season to guarantee against a declining market are finding their contractors in a mood to insist upon adjustments in view of insistent soliciting for offers on cargoes either arrived or on passage. Among the market cargoes in process of being forced upon reluctant buyers are those in barges from Philadelphia, where the coal was dumped to avoid heavy car demurrage.

Dullness Pervades Seaboard Market

The market at New York and along the Eastern seaboard is dull with most quotations showing a decline from last week. Distress coal in the New York harbor has been nearly cleaned up, some of it having been let go at extremely low prices. Buyers for the most part are buying from hand to mouth. The bulk of sales in the Philadelphia market are being made at current quotations, with contract coals moving well. Domestic sizes of bituminous coal are being taken in by consumers who have been converted to its use during the last few winters, but this is not a large factor in the trade. Inquiry is increasing in Baltimore, mostly from interests which usually stock up in part or in full during the summer months but who this year have failed to take more than thirty or sixty days' requirements. There is little doing in the Birmingham market. Inquiry is limited and buyers are purchasing for immediate wants only. Orders for bunker coal are scarce. Domestic demand is easy, but the higher grades are moving fairly well. Production for the week ended June 30 was 364,000 tons, an increase over previous weeks.

There were 463,700 tons of anthracite sent out from Buffalo during June, making the Lake dumpings for the season 1,926,729 tons. Bituminous stocks on the docks at Duluth as of July 12 were estimated at 3,185,000 and of anthracite 228,000 tons. At Milwaukee receipts thus far during July have been 65,700 tons of anthracite and 212,559 tons of soft coal, making the total for the present season 357,219 tons of anthracite and 1,307,410 tons of bituminous coal.



During the week ended July 16 1,012,064 net tons of cargo coal and 58,611 net tons of fuel coal was dumped at Lake Erie ports, making the total dumpings for the season 12,361,332 tons.

Anthracite Consumers Urge Deliveries

Consumers of domestic sizes of anthracite continue to watch developments. Heeding the warnings sent out from Washington, they are urging retail dealers for deliveries. Quotations for independent domestic coals continue as high as \$12 in some instances, most of the high-priced coal being taken by inland dealers, while dealers receiving their coal by means of tidewater shipments are not inclined to pay the extremely high prices.

In the New York retail market egg coal is the shortest and some dealers have been able to accumulate small stocks of stove coal. In Philadelphia, as in practically every other district, no retail dealer is willing to admit that he is receiving sufficient coal to meet the demands of his customers. The hard coal situation at Baltimore is far from being comfortable to consumers. Few of the dealers have any stocks on hand and are far behind in deliveries. During June 1,110 cars of anthracite were shipped to Baltimore as compared with 1,455 cars received in May. During the first half of July 264 cars were reported as having been received. Retail dealers in Toronto are kept busy filling orders for anthracite, which has for some time retained its price of \$15.50 a ton. Supplies are fairly plentiful. Anthracite is going into Chicago in fair volume but there is no rush for it on the part of the consumer. Some dealers think the movement into cellars is a shade better than in normal summers.

Production of beehive coke during the week ended July 7 is estimated by the Geological Survey as 372,000 net tons, as compared with 399,000 tons during the previous week.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars		
Week ended June 30, 1923.....	1,021,770	185,757		
Previous week.....	1,002,740	183,350		
Same week in 1922.....	862,845	94,269		

	Surplus Cars			
	All Cars	Coal Cars		
June 30, 1923.....	63,636	3,896		
Same date in 1922.....	239,225	147,558		
June 22, 1923.....	58,671	4,269	11,896	7,976

Bituminous Coal Loaded Into Vessels at Lake Erie Ports
During Season to End of June*

		(In Net Tons)								
Ports	Railroads	1923			1922			1921		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo.....	Hocking Valley.....	1,553,478	45,717	1,599,195	1,179,017	29,241	1,208,258	1,661,310	42,441	1,703,751
	N. Y. C.-Ohio Central Lines.....	642,792	19,653	662,445				452,256	12,487	464,743
Sandusky.....	Baltimore & Ohio.....	723,174	21,577	744,751	1,433,897	31,949	1,465,846	930,561	26,178	956,739
	Pennsylvania.....	835,312	24,321	859,633	768,563	17,986	786,549	505,505	14,594	520,099
Huron.....	Wheeling & Lake Erie.....	504,478	18,071	522,549	7,612	334	7,946	730,318	19,403	749,721
Lorain.....	Baltimore & Ohio.....	968,567	58,641	1,027,208	17,820	9,491	27,311	1,192,473	42,729	1,235,202
Cleveland.....	Pennsylvania.....	641,445	53,040	694,485	43,358	12,114	55,472	993,390	33,531	1,026,921
	Erie.....	358,487	15,176	373,663				236,821	7,460	244,281
Fairport.....	Baltimore & Ohio.....	224,947	20,860	245,807						
Ashtabula.....	New York Central.....	1,372,834	79,608	1,452,442	31,083	9,163	40,246	630,706	24,347	655,053
Conneaut.....	Pennsylvania.....	640,104	26,908	667,012	28,342	6,456	34,798	1,238,816	38,013	1,276,829
	Bessemer & Lake Erie.....	958,390	58,164	1,016,554	42,257	743	43,000	412,201	5,887	418,088
Erie.....	Pennsylvania.....	207,098	26,551	233,649	28,607	13,789	42,396	476,619	21,642	498,261
Totals.....		9,631,106	468,287	10,099,393	3,580,556	131,266	3,711,822	9,460,976	288,712	9,749,688

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

Foreign Market And Export News

Low Prices for British Coal Attract Buyers; Production Declines Slightly

There was a further decline in the output of Great Britain's coal mines, as well as in prices. Production for the week ended June 30 was 5,400,000 tons, says a cable to *Coal Age*, as compared with 5,588,000 tons the previous week, a decrease of 188,000 tons. Quotations on the principal grades for last week show a slight decrease.

The supply of Welsh steam coal is exceeding the demand, while the anthracite industry is strong. European buyers have been attracted by the low prices and the German business has increased. Some substantial orders have been booked for steam coals.

The Newcastle market shows substantial improvement, in spite of the holiday season and the decrease in production. Low prices have resulted in inquiries being received from the Continent and there has been heavy bookings for prompt shipments. The prospects for good business during the next three months have brightened. It is expected that Germany, France and Belgium will be in the market for large tonnages as a result of the Ruhr situation. Present prices hold steadily.

Board of Trade statistics on coal exports for the month of June, compared with the same month last year, are as follows, in tons:

To—	1923.	1922.
Germany	1,165,000	890,000
France	1,632,000	982,000
Italy	620,000	467,000
Other countries	3,172,000	2,455,000
Totals	6,589,000	4,794,000

Conditions at Hampton Roads Improve

There was an improvement in business at Hampton Roads last week, prices were stronger and an increase in both inquiries and in actual coal movement was apparent. Movement of coal to Canada was one of the features of the market, while general export business was good. Coastwise trade picked up somewhat.

Bunker business showed some improvement, on the strength of the improvement in general shipping. The

tone of the market was firm, and the outlook brighter than at any time in thirty days. The seasonable slump in coal trade appeared to have been mitigated to some extent.

Export Clearances, Week Ended July 14, 1923

FROM BALTIMORE		Tons
For Canada:		
Ger. SS. Aladin		4,782
For France:		
Fr. SS. Capitaine Boudouin		7,960
Belg. SS. Andalusier		10,297
For Germany:		
Ger. SS. Porto		5,863
For Greece:		
Br. SS. Anselma de Larrinaga		5,909
For Holland:		
Dut. SS. Stadedijk		10,652
Ital. SS. Savoia		8,529
For Italy:		
Ital. SS. Posillipo		8,824
For Uruguay:		
Nor. SS. Henrik Ibsen		5,591
FROM HAMPTON ROADS		
For Algeria:		
Grk. SS. Tzirapinas, for Algiers...		6,249
For Brazil:		
Br. SS. Penthew, for Rio de Janeiro		6,200
Braz. SS. Ignassu, for Para		5,096
For Cuba:		
Nor. SS. M. N. Kongshavn, for Havana		3,029
Dan. SS. Stal, for Havana		3,969
Nor. SS. Nordhav, for Havana		3,200
For Canada:		
Amer. Schr. Frances L. Taussig, for Hamilton		1,292
For England:		
Amer. SS. Mundale, for Land's End		4,623
For France:		
Br. SS. W. I. Radcliffe, for Marseilles		8,589
Fr. SS. P. L. M. 24, for Marseilles		8,043
For Holland:		
Du. SS. Zosma, for Rotterdam		11,286
Ital. SS. Corso, for Rotterdam		8,569
For Italy:		
Ital. SS. Zovetto, for Porto Ferrajo		6,748
For Uruguay:		
Br. SS. Stokesby, for Montevideo ..		5,693
For West Indies:		
Dan. SS. Brattensborg, for Curacao		4,285
Nor. SS. John Bakke, for Port au Spain		2,600
Swed. SS. Masila, for Kingston		2,516
Nor. SS. Falkefjell, for Port Antonio		829

Difficult for Germans to Buy British Coal

An indication of the unsatisfactory condition of German finances is manifest in the increasing inability of manufacturers in that country to buy British coal. Shortly after the occupation of the Ruhr, British coal was sent to Germany in such quantities as to encourage the operators in that country to expect a very material addition to their market. German industry, however, has continued to go down grade, which coupled with the adverse exchange has made it increasingly difficult for the Germans to buy British coal. The coal stocks which had been built up in some instances are now being rapidly depleted.

French Coal Production Increasing

Demand for all classes of French coals continues active, but shipments from the Nord and Pas-de-Calais collieries suffer intermittingly because of car shortage.

Receipts of Ruhr coke during the first twenty-five days of June amounted to 136,000 metric tons.

Production of French collieries in May in metric tons was: Coal, 3,129,317 tons; coke, 161,943 tons and patent fuel, 213,471 tons. The production in April was: Coal, 2,999,617 tons, coke, 156,035 tons and patent fuel, 214,342 tons. Of the above tonnages the Nord and Pas-de-Calais collieries produced 1,618,445 tons of coal in May and 1,578,009 tons in April; 104,740 tons of coke in May and 101,317 tons in April, and 110,321 tons of patent fuel in May and 117,143 tons in April.

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	July 5	July 12
Cars on hand	1,347	1,346
Tons on hand	91,724	93,069
Tons dumped for week	82,941	109,522
Tonnage waiting	3,550	
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,963	1,917
Tons on hand	109,760	108,120
Tons dumped for week	91,281	108,100
Tonnage waiting	26,400	13,390
C. & O. piers, Newport News:		
Cars on hand	1,752	1,060
Tons on hand	88,645	53,875
Tons dumped for week	123,876	93,208
Tonnage waiting	10,600	9,100

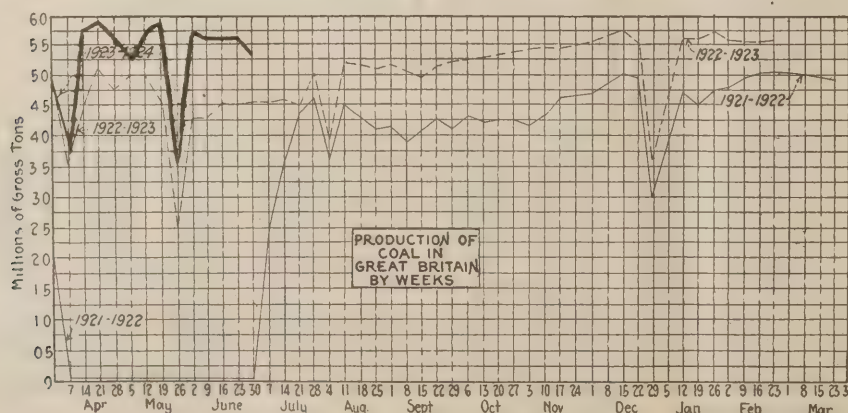
Pier and Bunker Prices, Gross Tons

PIERS		
	July 7	July 14†
Pool 9, New York	\$5.50@ \$6.00	\$5.50@ \$6.00
Pool 10, New York	5.00@ 5.35	5.00@ 5.35
Pool 11, New York	4.50@ 4.85	4.30@ 5.00
Pool 9, Philadelphia	5.35@ 5.75	5.30@ 6.75
Pool 10, Philadelphia	4.45@ 5.25	4.45@ 5.25
Pool 11, Philadelphia	3.70@ 4.35	3.75@ 4.35
Pool 1, Hamp. Roads	5.00@ 5.25	5.75
Pools 5-6-7, Hamp. Rds.	4.25@ 4.50	4.85@ 5.00
Pool 2, Hamp. Roads	5.00	5.25@ 5.50
BUNKERS		
Pool 9, New York	5.80@ 6.30	5.80@ 6.30
Pool 10, New York	5.30@ 5.65	5.30@ 5.65
Pool 11, New York	4.80@ 5.15	4.60@ 5.30
Pool 9, Philadelphia	5.75@ 6.00	5.70@ 6.00
Pool 10, Philadelphia	4.75@ 5.50	4.75@ 5.55
Pool 11, Philadelphia	3.90@ 4.65	3.90@ 4.65
Pool 1, Hamp. Roads	5.00@ 5.25	5.75
Pool 2, Hamp. Roads	5.00	5.25@ 5.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to <i>Coal Age</i>		
	July 7	July 14†
Admiralty, large	31s. @ 32s. 6d.	30s. @ 31s.
Steam smalls	22s. 6d. @ 25s.	18s. @ 22s. 6d.
Newcastle:		
Best steams	26s. @ 27s.	26s. 6d. @ 27s.
Best gas	30s.	28s. @ 30s.
Best bunkers	28s. @ 29s.	26s. @ 29s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

The fifth annual field meet for the demonstration of first-aid and mine-rescue work will be held in Woodrow Wilson Park, Birmingham, July 21, under the auspices of the Alabama Mining Bureau and the U. S. Bureau of Mines. A large number of teams from coal mines and industrial plants have entered the contest for the cup and other prizes.

William M. Cook, 55, secretary and treasurer of the Black Creek Coal Co., of Nauvoo, a mining town 70 miles northeast of Birmingham, was shot and killed by T. L. Sharp, 65, president of the company, July 7. Cook and Sharp had been partners for many years and owned other mining properties jointly in eastern Kentucky, where they operated under the name of Sharp & Cook.

The State Board of Examiners will hold a session July 23, 24, 25, 26, at Birmingham, to pass on applications for certificates as first and second class mine foremen and fire boss to work in Alabama coal mines. The examination will be held under the direction of Chairman C. H. Nesbitt, chief mine inspector.

COLORADO

The third annual week-end conference on "Human Relations in Industry" will be held on the Y. M. C. A. Conference Grounds at Eastes Park on July 27-29. The sessions will open at 8 o'clock, Friday evening and the closing sessions will be on Sunday afternoon. Among those on the committee are: E. S. Brooks, vice-president and general manager of the Union Pacific Coal Co., Rock Springs, Wyo., Moroni Heiner, vice-president, United States Fuel Co., Salt Lake City, and E. H. Weitzel, vice-president and general manager, the Colorado Fuel & Iron Co., Pueblo.

The Denver & Rio Grande Western spent \$7,700,000 in upbuilding the system and service since the receivership under Joseph Young began in July, 1922, and expects to put that much more into the system during 1923, though the receiver has resigned and another operating head is to be chosen. The road has added 10 new Mallet freight locomotives and 700 70-ton coal gondolas. It expects to facilitate car distribution through the Utah mines it serves by installing soon a telephone system out of Soldier Summit.

ILLINOIS

And now comes the minority report of the legislative committee which investigated the Herrin massacre aftermath to see whether the officials of the state did their duty. Two members of the committee, Representatives Curran and Pierce, find that adjutant General Carlos Black and his aide, Colonel Sam Hunter did all that any two officers could do, failing to get troops to the scene in time to prevent the massacre because nobody could foresee what was going to happen. The two committeemen also absolve Governor Len Small from all responsibility. Representative Pierce was one of the men indicted for jury fixing in the trial of Governor Small for misappropriation of state funds. The majority report condemned all officials for non-performance of duty.

INDIANA

Production of coal at shipping mines in Indiana for the years 1917 to 1922, classified by counties, railroads and beds of coal, is the subject of a statistical report just published by Jonas Waffle, secretary of the Indiana Coal Traffic Bureau, Terre Haute. The report shows that production from the Fifth Vein in each of these years except 1918 represented more than half the state total and that production from the Fourth Vein was more than 30 per cent in each of these six years except 1920. The C. & E. I. RR., is the largest originator of coal in Indiana, with the Milwaukee and the Pennsylvania the next largest roads.

KENTUCKY

The U. S. Engineer's office at Louisville will receive bids until July 23 for furnishing 60 carloads of mine-run f.o.b. Addison.

That the Lake embargoes are playing havoc with coal operators is shown in reports reaching Louisville from the Harlan field, which states that one operator who took a 200-car order recently later received an embargo, and some twenty cars which had been loaded and pulled, had to be set back on his tippie siding.

According to coal men and traffic men of Louisville the embargo situation on coal moving to Lakes has aided eastern Kentucky operators steadily since the season opened. Movement has been heavy and bottoms scarce, as some ore boats have been going back empty to save time in transportation of ore, which it is said is more needed than the revenue from transporting coal. Some of the connecting lines have from time to time placed and later lifted embargoes, but congestion has now reached a point where the producing lines are being forced to embargo, as they can't move coal from their own systems to connections. The present embargo on the L. & N. lines may have a marked effect if it lasts any length of time.

MINNESOTA

The hearing by the Federal Trade Commission in St. Paul was suspended for the last few days of June, due to the exhaustion of funds. It was resumed July 2, when the new year's funds became available. The testimony is much of a repetition, with endless letters and circulars issued by the dock association or some of its members, touching upon an agreement or understanding either as to prices or methods of handling public contracts.

A tour of inspection of the Pittsburgh Company's docks at Duluth has been made by John A. Donaldson, vice-president of the company, and the following directors: T. F. Gillespie, E. M. Love, Peter Reiss, George Taylor and W. G. Worden. They were accompanied by W. H. Roehl, of Minneapolis, and J. A. Ferguson, of Duluth. The latter is sales agent. It is expected that the Pittsburgh will soon decide upon and announce a new selling policy. It is claimed that the dock companies here are gaining headway over Illinois coal.

MISSOURI

The Missouri Pacific has discontinued the office of fuel agent at St. Louis but H. W. Salmon is retained under the title of fuel purchasing officer.

NEW YORK

The U. S. Shipping Board on July 7 opened bids for furnishing and delivering alongside vessels, New York harbor, 2,000 gross tons classified Pool 9 coal. The prices ranged from \$5.38 to \$5.97 per gross ton or on a basis of about \$2.10 to \$2.63 per net f.o.b. mine. The contract was awarded to O. Jackson Meyer, Inc., of Philadelphia, at \$5.38 per gross ton alongside, or about \$2.10 per net ton f.o.b. mine. Other bidders and prices submitted were: Gauley Coal Mining Co., \$5.97; Seiler Coal Co., \$5.53; Shawnee Fuel Co., \$5.75; W. A. Marshall & Co., \$5.76; Steamship Fuel Co., \$5.43; W. H. Bradford & Co., \$5.67; E. Russell Norton, \$5.83; Hartmann Coal Co., \$5.60; H. B. W. Haff, \$5.80, and Majestic Coal Co., \$5.93.

Bids were opened on July 9 by the Board of Education of New York City for furnishing and delivering to school houses in Greater New York 26,500 net tons of broken coal, 3,900 tons egg coal, 2,730 tons stove coal, 4,370 tons pea coal, 66,600 tons No. 1 buckwheat coal and 3,900 tons semi-bituminous coal. The Steamship Fuel Corporation was awarded the contract for furnishing the coal requirements in Manhattan, Bronx and Richmond boroughs at prices ranging from \$12.54 to \$14.94 for broken coal, \$13.19 to \$15.24 for egg and stove, \$9.74 to \$12.94 for pea coal, \$6.12 to \$6.74 for No. 1 buckwheat and \$6.64 to \$7.24 for semi-bituminous coal. Three other bidders on the contracts for Manhattan and Bronx submitted prices ranging from \$13.20 to \$13.73 for broken coal, \$13.20 to \$15.29 for egg and stove, \$10.20 to \$11 for pea coal, \$7.14 to \$7.70 for No. 1 buckwheat and \$7.77 to \$8.79 for semi-bituminous coal. The Wyoming Valley

Coal Co. obtained the following contracts: Brooklyn—Broken and egg sizes, \$12.54; stove, \$12.94; pea, \$9.54; No. 1 buckwheat, \$6.08, and soft coal, \$6.62. Queens—Broken and egg sizes, \$12.74; stove, \$13.14; pea coal, \$9.74; No. 1 buckwheat \$6.28, and soft coal, \$6.62. Parental School, Queens—Broken coal, \$6.34. For furnishing and delivering coal to the schools buildings at Rockaway Jameson & Bond Co. was awarded the contract at \$14.44 for broken, egg and stove sizes and \$12 for pea coal.

NORTH DAKOTA

The Northern Lignite Coal Co. has been incorporated in Fargo with a capital stock of \$100,000 by Thomas Buchanan, of Fargo, and Clarence O. Stee, of Dazey.

OHIO

E. L. Greever, attorney, of Tazewell, Va., representing southern West Virginia operators, speaking at the monthly luncheon of the Cincinnati Coal Exchange, held July 12 at the Old Colony Club rooms, said that the United Mine Workers were intent upon creating a labor monopoly and that in the end they would be able to dictate where coal should be shipped and what price it should command. He held that the solution to the whole of the coal "problem" was in preventing strikes.

Among problems taken up at a recent meeting in Cincinnati of the heads of the sales and mining departments of the Blue Diamond Coal interests was the development of the company's coal lands in Lee County, Virginia, and the proposition of bringing coal over a mile down the sides of Little Black Mountain. These developments have been under way for the past six months and it is hoped to have the coal moving from there before Sept. 1. The interests of the company now are in Perry and Harlan Counties, Kentucky, and the Jellico district of Tennessee. According to those interested, so much benefit was derived from the sessions that it was concluded to hold them every six months in Cincinnati.

The North-East Coal Co., with a capital of \$500, has been incorporated by interests connected with the Pennsylvania-Ohio Power & Light Co., to take over between 8,000 and 10,000 acres of coal lands in Jefferson County, Ohio, along the Ohio River in connection with the Ohio River Edison Co. power development there.

OKLAHOMA

The Buck Creek Coal Mine Co., of Panama, has let a contract to electrify its mine on the Bedwell No. 2 lease and will install pumps, fans and coal cutters.

PENNSYLVANIA

Negotiations for the sale of the Langcliffe mine of the Suffolk Coal Co. at Avoca to the Suffolk-Anthractite Collieries Co. were concluded in Philadelphia July 11. The consideration is said to be in excess of \$1,000,000. The new company, headed by J. E. Crasse, Jr., took possession of the property July 12.

Shipments of anthracite during June, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,634,787 gross tons, as compared with 6,564,285 tons during the preceding month of May, an increase of 70,502, or a little more than 1 per cent. Shipments during the month of June this year show an increase over the corresponding month of 1921 of 602,850 tons, of nearly 10 per cent. The average monthly shipments for the first quarter of the current coal year amounted to 6,457,615 tons, an increase over the average for the first quarter of the coal year 1921-22 of 8.9 per cent., and over the same period in 1920-21 of 12.04 per cent. Shipments by originating carriers were as follows:

	June 1923	May 1923
Phila. & Reading.	1,165,468	1,152,026
Lehigh Valley.	1,138,497	1,150,037
Central RR., of N. J.	563,304	538,386
Del., Lack. & Western.	1,009,505	985,035
Delaware & Hudson.	961,703	892,471
Pennsylvania.	556,291	618,096
Erie.	690,172	721,756
N. Y., Ont. & Western.	162,353	159,043
Lehigh & New England.	337,494	347,435

Totals: 6,634,787 6,564,285

Jack Ronkie and John Benelli were injured on July 7 when they were caught in a delayed explosion in the mines of the Sunnyside Coal Co., Jessup. Ronkie died in the afternoon. Benelli, although suffering from severe injuries to his eyes, cuts and bruises of the face, head, arms and

hands is expected to recover. According to information, when the men had prepared the blast the charge failed to go off and they came back to see what was wrong. They had just reached the chamber when the explosion occurred, sending a shower of rocks and coal in all directions.

John C. Brydon, of Somerset, president of the Somerset County Coal Operators' Association, who was recently elected president of the National Coal Association of the United States, was the guest of honor at a reception and banquet at the Somerset Country Club July 3. The affair was attended by prominent coal operators and friends of Mr. Brydon. Talks were given by Judge Francis J. Kooser, of Somerset; Congressmen S. A. Kendall, of Myersdale, and Congressman Rhodes, of Missouri, chairman of the House Mining Committee.

A deal has been closed whereby the Pennsylvania Coal & Coke Corporation has become the owner of a valuable tract of land near Ebensburg, where the corporation will sink a shaft. It is said the company intends laying out a town in the near future. The company owns thousands of acres in the vicinity of the proposed new town, which will be located several miles north of Ebensburg.

The Madeira-Hill Coal Mining Co., plans the sinking of a shaft at Morann, near Houtzdale, to tap the lower coal veins. According to unofficial reports, the project will cost in the neighborhood of half a million dollars. The shaft will be 200 ft. deep and the operation is to be equipped with every known convenience of mining and shipping of coal on a vast scale. One hundred houses are to be erected at Morann to accommodate the miners. According to the plans, double railroad tracks will be laid to the tipples so that two cars may be loaded at the same time. A third track will be used to convey the empty cars to the shaft, the cars to be switched to the loading tracks as needed. The new tracks will connect with the Whiteside branch, the coal thus reaching its destination over the Pennsylvania lines. Another project which the Madeira-Hill company has in mind is the sinking of a second shaft between Houtzdale and Morann, to reach other coal deposits which the company has in that vicinity.

The homes of four miners were dynamited at Pittston July 13, among them that of Alex Campbell, who is a member of the scale committee which is negotiating with the coal operators at Atlantic City. The front portions of the houses were blown out and the occupants tossed from their beds, but no one was hurt. The first blast occurred at the home of Campbell and other blasts followed at the homes of Charles Alba, Michael Dezalvo and Joseph Martinetta. Campbell had returned from Atlantic City in an effort to aid in the adjustment of a strike at No. 6 and No. 9 collieries of the Pennsylvania Coal Co. He is chairman of the General Grievance Committee of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co. and presided at a meeting of strikers July 12. The dynamiting occurred three or four hours after the meeting.

City officials of Philadelphia profiting by past experience, are laying in next winter's coal supply at the rate of 150 tons a day, exclusive of another large quantity in car-load lots. In 1922 the Municipal Anthracite consumption was 249,800 tons.

John B. Gallagher and Claude Zerbey, of Wilkes-Barre, have been notified of their reappointment as auditors for the United Mine Workers. Their terms have been extended to April 1, 1924. Rinaldo Cappelini, newly elected district president, had declared he would remove all members of the old administration, but it is said that he has no authority over the auditors because of their connection with the international organization.

The Philadelphia & Reading Ry., it has been announced, will spend about \$500,000 on the erection of a large coaling station at Rutherford, on the Lebanon Valley division. This consists in the erection of a 2,000-ton capacity coaling bin with coal crushing machinery plant. Rutherford is just east of Harrisburg, and at this point locomotives for Philadelphia and other eastern points are recoaled and watered. There is a big freight yard there, and the change includes rearrangements of tracks and construction of deep-water and inspection pits.

The Lehigh & Wilkes-Barre Coal Co. declared a dividend of 8 per cent, payable on June 26. This is the same as was paid in December of last year. During 1921 the company paid two special dividends, one of \$75 a share on March 5 and another of \$35 a share on Nov. 29.

The following coal companies were incorporated at the State Department recently: **L. J. Pentzler Coal Co., Inc.**, mining, buying, selling and dealing in coal and coal lands, Philadelphia; capital stock, \$50,000; treasurer, John T. Dwyer, 871 North 43d street, Philadelphia, who with L. J. Pontzler, Collingswood, N. J., and M. E. Strock, Collingswood, N. J., incorporated the company. **The Star Fuel Co.**, Perryopolis, mining coal and manufacturing coke and other products; capital, \$25,000; treasurer, J. W. Flanagan, Perryopolis; incorporators, R. M. Pollock, Perryopolis; John G. Pollock, Star Junction, and Scott Dunham, Star Junction. **Colonial Coal & Coke Co.**, of Pittsburgh; mining, buying, selling and preparing coal for the market; capital, \$100,000; incorporators, E. A. Morris, 2032 Wendover street, Pittsburgh, treasurer; R. M. Carpenter and T. B. Humphries, Pittsburgh. **The Sam-Hill Coal Co.**, Euclid, mining, shipping and preparing coal for the market; capital, \$5,000; incorporators, Hyman Witten, Tyler, treasurer; A. D. Carpin, Euclid, and Sam Golumbic, Tyler.

The Wills Coal Co. has been organized at Uniontown with a capital of \$50,000 by T. J. McLernan, Harold W. Semans and W. Clark McLernan.

During a heavy rain and electrical storm July 4 night the large power house at the John O. Ream mine, near Berlin, was struck by a bolt of lightning and the building, generators, motors and all electrical equipment in the plant were destroyed by fire, which followed the crash. The total loss is estimated at about \$20,000, which is partly covered by insurance.

The Reading Company, the Reading Railway and the Reading Coal Co. will soon call special meetings of stockholders to act on the execution of the segregation plan filed and accepted by the District Court. Under the Pennsylvania law sixty days' notice is required for such meetings, which probably will be held about Oct. 1. Counsel for the companies is drawing up two new mortgages to be executed by the Reading Company and the Reading Coal Co. Under the order of the District Court the new coal company which is to be formed to acquire the Reading Company's interest may ultimately be dissolved and the stock of the Reading Coal Co. distributed pro rata to the stockholders of the new coal company. The order provides that at any time after the general mortgage shall have been satisfied and discharged as against the coal company, or the several liabilities of the coal company on the unexchanged general mortgage bonds shall have been satisfied, the new coal company may distribute the stock of the Reading Coal Co. to its own stockholders and thereupon dissolve.

The Barnes-Quemahoning Coal Co. at Listie was taken over on July 1 at trustees' sale by the Listie-Quemahoning Coal Co., a corporation formed by a group of men including Connellsville and Scottsdale residents. The plant has a capacity of 600 to 800 tons of coal daily but is not operating at that strength just now. Those in the new organization are the Joseph R. Stauffer trust estate, J. L. Kendall and J. L. Kendall, Jr., of Pittsburgh; Walter F. John M. and D. Reid Stauffer and F. L. Brown, all of Scottsdale; Andrew Keiser, of Philadelphia, and E. T. Norton, of Connellsville.

UTAH

George W. Hahn, of the United States Fuel Co., has been appointed chairman of the entertainment committee for the summer meeting of the Rocky Mountain Coal Mining Institute in Sale Lake City, Aug. 27-29. The Institute delegates expect to spend Aug. 26 in Rock Springs, Wyo., as the guests of the coal companies there.

VIRGINIA

The City of Norfolk has closed a contract with the Chesapeake & Virginia Coal Co. Lynchburg, for from 8,000 to 10,000 tons of Pocahontas and New River steam coal to be delivered during the ensuing year at \$3.20 at the mines. This is the only contract reported in two weeks.

WEST VIRGINIA

Coal loadings on the Chesapeake & Ohio Ry. system for the month of June exceeded the loadings for May by 34,025 tons, according to the monthly report, issued July 2 at Huntington. Total loadings for the month were 3,069,300 tons, or 61,386 cars. During May loadings were 3,035,275 tons, or 60,705 cars. The figures for June were slightly below those of June, 1922.

Twenty-nine tracts of coal in the Richland district, north of Wheeling, with a total acreage of 3,354 have been purchased by the **Ohio County Fuel Co.** for \$839,000. The purchase, it is reported, was made to supply fuel for the American Gas and Electric company, and West Penn's power plant at Beech Bottom.

Announcement has been made by R. M. Lambie, chief of the State Department of Mines, that the dates for annual examination of candidates for certificates as mine foremen have been fixed as follows: Morgantown, University Building, on July 20; Clarksburg, Tower School Building, Aug. 23; Wheeling, High School building, on Aug. 20. The above are for examinations in northern West Virginia only.

The West Virginia Great Lakes Coal Corporation, which was recently organized with a capital stock of \$2,500,000 and which has acquired the interests of the Fairmont-Pittsburgh Coal & Coke Co., plans to establish yards in Erie, Buffalo, Cleveland, Fairmont and other points and to sell coal direct to the consumer through such retail yards. General offices of the company are to be established in the Odd Fellows Building at Fairmont. Officers of this corporation are: J. Edwin Gaskill, president; J. S. Lemasters, vice president; G. J. Brunkman, of Pittsburgh, Pa., treasurer, and H. M. Hill, secretary.

WASHINGTON

The new mine of the Cherry Creek Coal Co., west of Castle Rock, is now producing and its output is reaching Kelso by truck.

Bids are to be received until 10 A. M. July 25, at Fort Mason, San Francisco, or the Seattle Quartermaster, Intermediate Depot, Seattle, for furnishing and delivering coal required by the army stations on or near the Pacific coast. The amounts required are 22,534 net tons bituminous nut coal over 2-in. screen, 19,403 net tons run of mine coal, 10,507 net tons bituminous coal, nut over 1½-in. and through 3-in. screens, and 1,467 cords of wood. All quantities of coal specified will be subject to a 50 per cent increase if the government so desires. Bidders are required to give an analysis of coal upon which prices are submitted, as well as price per net ton f.o.b. mine and price per net ton f.o.b. cars at place of destination.

WISCONSIN

William C. Frye, for seven years president of the Chain Belt Co., Milwaukee, has retired from active participation in its affairs and has been succeeded by **C. R. Messinger**, vice-president and general manager since 1917. Mr. Frye is retiring after an active association with the company for 28 years, during which time he occupied practically all the important executive positions in the company. Mr. Messinger, who succeeds Mr. Frye, became associated with the company in 1917 after eight years as general manager of the Sivy Steel Casting Co. He also is president of the Interstate Drop Forge Co., vice-president of the Sivy Steel Casting Co., vice-president of the Federal Malleable Co., all of Milwaukee, and a director in the Nugent Steel Castings Co., of Chicago, and the First Wisconsin National Bank of Milwaukee.

WASHINGTON, D. C.

Substantial progress is being made by the railroads in their program to store by Sept. 1, their fuel coal for this winter. **Forty-four railroads, representing 75 per cent of the total mileage of the Class stored 1,821,412 tons of coal during June.** These 44 railroads on July 1 had a total of 6,638,812 tons of coal in storage.

Transfers and promotions of the personnel of the research branch of the Bureau of Mines have been made public by the Department of the Interior as a result of the resignation of Dr. R. B. Moore, former chief chemist, effective July 1. With the advancement of **Dr. S. C. Lind**, formerly superintendent of the rare and precious metals experiment station at Reno, Nev., to the post of Chief Chemist and chief of the division of mineral technology to succeed Dr. Moore, other changes in posts throughout the country were made. During the past year G. St. J. Perrott and S. P. Kinney have conducted an intensive study of the combustibility of coke in blast furnaces. **This work will hereafter be conducted by Mr. Kinney** in connection with the operation of the experimental blast furnace at the North Central Experiment

Station, Minneapolis, and at commercial furnaces in South Chicago, Ill., and Youngstown, Ohio. **John Bizard**, who has had charge of the Bureau's fuel work at its Pittsburgh Station, has resigned to accept a position with a commercial concern in New York City, where he will be engaged on the design of super-heaters and heat transfer apparatus. **C. C. Mather**, of Pennsylvania, has been appointed as a mining engineer aid in the minerals and coal-leasing section of the Bureau, at Denver. **John F. Barkley** has been appointed as an assistant fuel engineer and will have charge of the conducting of tests for the fuel efficiency survey.

A total of 1,502,208 tons of coal has been mined from public domain leased by the Department of the Interior since the General Leasing Law went into effect, according to information given out July 12 by the General Land Office. Upon these leases the government has received an average of royalty of 10c. per ton. Most of these leases have been issued on public land in Utah, Colorado, and Wyoming although several other states are represented and they call for a minimum total annual production of 2,895,325 tons of coal and a required investment of \$4,012,800 at the end of the three-year period allowed for the full installation of mining machinery. A considerable number of leases have been made for small mines intended to supply local needs only where the production will not exceed 1,000 tons a year. Prospecting permits have been issued for a total of 378,685 acres of public lands.

CANADA

A bill has passed the Dominion House of Commons, permitting the **Calgary & Fernie Ry.** to build a line from Calgary to the headwaters of the **Elk River**. The construction of this line forms part of an agreement between the Calgary & Fernie Railway Co. and an English syndicate that is taking over the coal mines owned by the company.

The final report of the committee of the Dominion Senate, appointed to investigate Canada's coal supply, suggests the feasibility of a branch line from the Canadian National system into the Peace River region for the purpose of opening up extensive deposits of anthracite and semi-anthracite that are known to exist in that part of Alberta and British Columbia. The committee further recommends that the Dominion Fuel Board co-operate with the transportation companies with a view to reducing freight rates from the West to Ontario points, thereby increasing the use of Canadian coal in Canada. Some large deposits of anthracite and semi-anthracite have been proved in the Smoky River district of Alberta and high-grade semi-anthracite and bituminous coals have been developed west of Hudson's Hope, in British Columbia. It is assumed that it is these deposits that the committee of the Senate had in view when it made the foregoing recommendations.

The annual employees' picnics are much enjoyed and keenly anticipated events by the coal miners of the Canadian Collieries (D), Ltd., and the Western Fuel Corporation of Canada. The Western Fuel Corporation's employees held their picnic on June 30 at Newcastle Island and the outing of the Canadian Collieries (D), Ltd., will be held July 21.

Coal production in British Columbia fell off materially in the month of May as compared with April, the difference being some 28,242 tons. Vancouver Island collieries are responsible, to a large extent, for the drop, their output in April being 115,628 tons and in May 97,367 tons. In the Nicola-Princeton field the chief producer, Coalmont Collieries, mined about the same tonnage in May as in April and in the Crow's Nest Pass Coal Field there was a slight drop, about 7,415 tons. An improvement for June is certain.

It is announced that boring tests carried on by the Canadian Collieries (D), Ltd., in the Sable River district near Nahaimo, Vancouver Island, have demonstrated that the coal bodies of that region are capable of a production of 3,000 tons a day for 300 years.

The annual meeting of the Crow's Nest Pass Coal Co., Ltd., elected directors as follows: W. R. Wilson, H. B. McGivern, W. H. Robinson, E. P. Earle, A. H. McNeill, J. T. Maher, F. F. Edgar, L. C. Gilman, and Dr. G. W. Howland. Officers elected were: President, W. R. Wilson; Vice-Presidents, H. B. McGivern and W. H.

Robinson; Treasurer, A. Klauer; Comptroller, G. H. Hess Jr.; Secretary, J. S. Irvine. The company's net profits from all sources for the year 1922 totalled \$213,959, though the directors paid four dividends of 1 1/2 per cent each, making a total of 6 per cent for the year, amounting in all to \$372,690. The company spent last year \$35,293.80 on improvements and the coal mined totalled 569,339.14 tons as against 774,847 tons in 1921. The coke produced was 46,368 tons as compared to 66,569 tons in 1921.

An important coal property situated on the south shore of Wabamun Lake, northern Alberta, is being developed by the British Canadian Collieries, Ltd. The leased rights obtained from the Canadian government and the Canadian Pacific Ry. include some 2,200 acres. The coal seam shows on the lake front for the length of a mile and its existence has been known for some time. Development has been retarded because it is on the opposite side of the lake from the railway, making the transportation problem serious. The company has obtained a charter for a branch railway eight miles long connecting with the Grand Trunk Pacific. A seam has been demonstrated 24 ft. in thickness throughout. It is estimated that there is 30,000 tons of first-class coal to the acre. On 1,200 acres the coal carries an overburden of from 20 to 28 ft. The average depth is 30 ft. It is the intention to strip this.

The British Empire Steel Corporation reports coal output in June of 514,604 tons as compared with 382,982 tons in June, 1922, and a total production of coal for six months ending June 30 of 2,822,801 gross tons, compared with a production of 1,763,780 tons during the same period last year. This shows an increase in six months of 1,059,021 tons.

The Dominion Government is asking for tenders for bituminous and anthracite coal supplies for various public institutions throughout the country.

MEXICO

It is stated that the American Smelting & Refining Co. will spend more than \$4,000,000 in developing the Rosita coal field near Sabinas, State of Coahuila, Mexico, which it purchased some time ago. Coke ovens will be constructed and other improvements will be made. According to the statements of engineers who have been exploring the coal field there are approximately 100,000,000 tons available for conversion into high-grade coke. The output of the ovens will go to supply the smelters of the company at Monterey, Asarco, Chihuahua and Aguas Calientes.

Association Activities

Virtually all the producing coal companies and selling agencies with offices in Huntington are represented in the newly organized **Huntington Coal Exchange**, which is to be affiliated with the Huntington Chamber of Commerce. The Exchange has been organized with a view to helping the consumer of West Virginia and eastern Kentucky coals solve his problems and to insure closer co-operation between producer and seller. Meetings will be held every Tuesday at noon. One of the first things to be undertaken by the exchange will be to see that Huntington is given wider publicity as "headquarters for quality coal," it being pointed out that within the last few years the city has become an important trading center owing to its proximity to the Logan, Kanawha and northeast Kentucky fields and owing to the large number of producing companies and selling companies having offices there. The exchange elected as its first president I. F. Vass and named as vice-president T. H. Hooper and as secretary-treasurer, J. J. Lewis. The personnel of the various committees is as follows: Transportation and Communication, F. L. Poindexter, G. J. Beidenmiller, H. A. Smith; Trade Rules, Roy Cunningham, Fred Schoew, Walter Neekamp; Membership, M. M. Tyree, S. J. Hyman and Vandyk Clark; Entertainment, H. R. Freeman, G. D. Alexander, Gerald O'Connor; Publicity, O. A. Doob, John A. Kelly and J. Barrett.

About 350 operators from the district attended the annual meeting of the **Central Pennsylvania Coal Producers' Association** and the **Association of Bituminous Operators of Central Pennsylvania** held on July

11 at Camp While-Away, near Indiana, while there were a number of invited guests, including prominent men from the Pittsburgh district and the Connellsville coke region. Speakers of the day were: Superintendent John J. Johnston of the Tyrone division of the Pennsylvania R.R., Prof. C. R. Anderson of the forestry extension department of State College and Attorney A. M. Liveright of Clearfield. Superintendent Johnston predicted a heavy volume of traffic this fall and winter and invoked the co-operation of the shippers. Forestation of coal lands was presented by Professor Anderson, who spoke of the advisability of using idle lands in the coal fields to produce timber for commercial use and for mine props. As a result of the discussion application will be made to the Department of Forestry for half a million seedlings. Operators and visitors were guests at a dinner at the club at noon. The following directors were elected for the Central Pennsylvania Coal Producers' association: G. Dawson Coleman, Philadelphia; Rembrandt Peale and Charles A. Owen, New York; J. William Wetter, Philipsburg; James B. Neale, Minersville; S. T. Brown and B. M. Clark, Indiana; James H. Allport, Barnesboro; R. H. Sommerville, Winburne; M. J. Bracken and H. J. Meehan, Johnstown; J. S. Sommerville, Robertsdale; Fred B. Kerr and G. W. Shillingford, Clearfield; J. R. Caseley, Du Bois; C. B. Maxwell, Morrisdale; W. S. Balisdale, Punxsutawney; Harry Boulton, Clearfield; W. R. Craig, St. Mary's; D. T. Price, Windber, and E. W. Robertson, Du Bois. The Association of Bituminous Operators elected these directors: Messrs Clark, Peale, Caseley, Robertson; H. B. Scott, of Philipsburg; Brown, Wetter, Shillingford, J. S. Sommerville, Thomas F. Kelly of Coalport, William Lamont of Elmora, I. A. Boucher, of Beaverdale, and Boulton and Bracken. Officers of both boards will be elected at a later meeting.

Obituary

F. W. Walker, formerly a coal retailer of Xenia, Ohio, during the past four years a traveling salesman for the Columbus office of the Elk River Coal & Lumber Co., died at St. Vincent's Hospital, Indianapolis, recently following an operation.

Hugh Moren aged 74, a director of the Duquesne National Bank, the Pittsburgh Steel Foundry Co., the Consolidated Ice Co. and a pioneer in river and coal development in the Pittsburgh district, died July 10 at his home, following an illness of several weeks. Mr. Moren was born at Freemans Landing, W. Va. His first business enterprise was the founding in 1881, with his brothers, of the Advance Coal Company. They sold the company in 1899 to the Monongahela River Consolidated Coal & Coke Co., with which concern Mr. Moren became master of transportation, in charge of a fleet of steamboats operated by the company. Mr. Moren leaves two brothers, Thomas Moren and James Moren.

Herbert M. Matthews, coal traffic manager of the Baltimore & Ohio R.R., for the past eight years, died Tuesday, July 10, of pneumonia at his country residence on the Bush River, near Aberdeen, Md. Mr. Matthews was born Oct. 11, 1860, at South Bend, Ind. He entered railway service Nov. 21, 1881, as clerk in the general freight office of the Chicago, Burlington & Quincy R.R., at Chicago, being promoted to general agent of that company at Pittsburgh, Oct. 15, 1886, where in April 1897, he first became identified with the Baltimore & Ohio as commercial freight agent. Six months later Mr. Matthews was advanced to division freight agent and on Feb. 1, 1904, in addition was made coal and coke agent at Pittsburgh. Mr. Matthews first went to Baltimore in July, 1905, when the Baltimore & Ohio made him general coal and coke agent, and in July, 1915, he became coal traffic manager of the system. During Federal control of the railroad he was a member of the committee in charge of coal and coke traffic in Trunk Line and New England territory and when the committees were reorganized after the return of the roads to private ownership and management, March 1, 1920, Mr. Matthews was for a year chairman of the Coal and Coke Committee, Trunk Line territory, and a member of that committee until his death. The funeral will be from the residence of his brother-in-law, R. C. Crawford, 210 Hutchinson Avenue, Edgewood, near Pittsburgh. Mr. Matthews was unmarried.

Recent Patents

Detachable Bit for Coal Augers. F. McLaughlin, Canton, Ill.; 1,445,097. Feb. 13, 1923. Filed July 5, 1922; serial No. 572,390.

Power Shovel. E. J. Armstrong, Erie, Pa., assignor to the Ball Engine Co., Erie, Pa.; 1,447,332. March 6, 1923. Original application filed Oct. 30, 1919; serial No. 334,515. Divided and this application filed Oct. 24, 1921; serial No. 505,946.

Automatic Rotary Dump. Erskine Ramsay, Birmingham, Ala.; 1,447,428. March 6, 1923. Filed Oct. 31, 1921; serial No. 511,656.

Mine Car. Samuel A. Worcester, James L. Bruce and Leroy S. Farnham, Butte, Mont.; 1,448,103. March 13, 1923. Filed May 15, 1922; serial No. 561,003.

Car-Hauling Mechanism. Merritt Hut-ton, St. Benedict, Pa., assignor to Rembrandt Peale, New York, N. Y.; 1,448,119. March 13, 1923. Original application filed Aug. 24, 1920; serial No. 405,699. Divided and this application filed Sept. 24, 1921; serial No. 502,879.

Apparatus for Burning Pulverized Fuel. Charles P. Crawford, Salt Lake City, Utah; 1,448,390. March 13, 1923. Filed Aug. 25, 1919; serial No. 319,531.

Coal Jig. M. P. Lewellen and H. S. Arnold, Camden, N. J.; 1,448,668. March 13, 1923. Filed Oct. 10, 1921; serial No. 506,921.

Coal-Elevating and Conveying Apparatus. Roderick MacEachen, Washington, D. C.; 1,448,756. March 20, 1923. Filed Dec. 18, 1920; serial No. 431,708.

Coal-Loading Machine. Patrick H. Burrell, Rock Springs, Wyo.; 1,448,088. March 20, 1923. Filed May 23, 1921; serial No. 471,748.

Apparatus for Producing, Separating and Feeding Powdered Coal. Ernst H. Elzemeyer and Paul S. Knittel, St. Louis, Mo.; 1,449,169. March 20, 1923. Filed Aug. 1, 1921; serial No. 488,900.

Miner's Cap and Lamp Connection. Charles H. Meister, Bellaire, Ohio; 1,449,867. March 27, 1923. Filed Feb. 16, 1922; serial No. 537,091.

Traffic News

Loading of coal by the Lehigh Valley R.R., in June last amounted to 1,224,063 tons of anthracite, the largest total in fifteen months. Last year loadings were very small because of the miners' strike, while in 1921 the tonnage was 1,098,786. The Lackawanna R.R. reported anthracite loadings in June of 911,637 tons.

The New York Central R.R. Co. has been authorized by the Interstate Commerce Commission to issue not exceeding \$100,000,000 of capital stock in exchange for a like amount of its outstanding 20 year 6 per cent convertible gold debenture bonds.

Rates on soft coal from Manitowoc and other Lake Michigan points to Minneapolis and St. Paul were found not unreasonable or unlawful by the I. C. C. in dismissing the case of the Northwestern Traffic Service Bureau, Inc., against the Central Wisconsin Ry.

The Interstate Commerce Commission in a tentative decision in the case of the Lincoln Gas Coal Co. and others vs. the Baltimore & Ohio R.R. and others, held rates on bituminous coal to be reasonable from mines near Washington and Vienna, Pa., to Eastern destinations.

In a tentative report submitted to the Interstate Commerce Commission July 12, Examiner J. F. Eshelmann recommends that the commission find that the rates on bituminous coal, in carloads, from mines in southwestern Pennsylvania to West Virginia destinations are unreasonable. A new scale of rates is prescribed by the examiner.

During June, 2,727,737 net tons of bituminous coal and 296,138 net tons of anthracite passed through the canals at Sault Ste. Marie. Of this tonnage 2,705,037 tons of soft coal passed through the United States canal and 22,700 tons through the Canadian canal. All of the anthracite tonnage passed through the United States canal.

The Erie R.R. Co. has ordered new equipment to cost \$6,500,000. Contracts also have been awarded, it was said, for the reconstruction of 4,459 box cars, 1,000 gondolas and 100 refrigerator cars. Part of the equipment will be delivered and all

the cars will be rebuilt in time to handle the heavy freight shipments expected for this fall.

The Coal and Coke Committee, Trunk Line Territory, announces hearings at 143 Liberty St., New York City, beginning at 10:15 a. m., July 24, and continuing July 25, relative to adjustment of rates on anthracite, bituminous coal and coke from mines to numerous points on the D. & H. Central Vermont Ry., B. & A., B. & M., C. N. E. Ry., Rutland Ry., P. & L. E. R.R., N. Y. S. & W. R.R., B. R. & P., Erie, N. Y. O. & W., B. & O., Pennsylvania and other lines, as well as to consider revision of rules and charges covering weighing and reweighing of cars containing coal and coke.

Railroads of the United States on July 1 had 190,411, or 8.4 per cent of the freight cars on line, in need of repair. This is the smallest number in need of repair since December, 1920. The total on July 1 was a reduction of 10,373 cars compared with the number of freight cars in need of repair on June 15, at which time there were 200,784, or 8.9 per cent. Under the program unanimously adopted by the carriers in New York last April, the number of such cars are to be reduced to 5 per cent by Oct. 1 next.

When the Morgantown & Wheeling R.R. was sold at Morgantown under a decree of the Circuit Court of Monongalia County the Monongahela Ry. became the purchaser although the property was bid in by the newly organized Scott's Run Ry., which is a holding company. The bid of the purchaser was \$521,929.91 but there are other obligations to be assumed which will bring the total up to about \$1,000,000. There has been such rapid coal development on the Morgantown & Wheeling in the last six or seven years that the property, serving as it does the Scott's Run field, has become extremely valuable, especially as a feeder of the Monongahela Ry., with which it connects at Maidsville. More than 7,300 cars of coal were loaded on the M. & W. in June. Colonel H. C. Nutt, president of the Monongahela Ry., says that extensive improvements will be made and that the purchasing company will make provision for a much better system of operation. Among other things the remaining leg of the "Y" at the mouth of Scott's Run will be constructed, so that more traffic can be handled.

Alleging that the present rates on bituminous coal from the Pittsburgh district of Pennsylvania to ports on Lake Erie are unjust and unreasonable as compared with the rates from mines in other districts in Pennsylvania, Ohio, Maryland, West Virginia, Virginia, Kentucky and Tennessee to the same points, the Pittsburgh Coal Producers' Association and approximately thirty other coal operators in the Pittsburgh district filed a formal complaint with the Interstate Commerce Commission asking for the establishment of lower rates. The complaint states that the operators in the Pittsburgh district produce upward of 25,000,000 tons of bituminous coal yearly. In brief it alleges that the rates from the Pittsburgh district to the Ports of Erie, Erie docks, Conneaut Harbor, Ashtabula Harbor, Fairport Harbor, Cleveland, Cleveland pier, Lorain, Huron, Sandusky and Sandusky dock are "intrinsically unjust and unreasonable in that they are unreasonably high and are likewise unjust as compared with the rates from mines in competing districts."

The net railway operating income of the Class 1 railroads of the United States in May amounted to \$89,999,600, which represented a return on an annual basis of 6.33 per cent on their tentative valuation. The net operating income for the carriers in the Eastern district was at the annual rate of return of 7.72 per cent; the Southern district, 6.72 per cent, and the Western district, 4.43 per cent. The same carriers in May last year had a net operating income of \$62,069,000 or 4.46 per cent. In April this year it was \$83,197,800 or 6½ per cent. Operating revenues of the carriers in May totaled \$547,282,500, an increase of 21.3 per cent over the same month last year, while their operating expenses amounted to \$420,656,000, or an increase of 18.4 per cent over May last year.

The increase in earnings over May last year was largely due to a stimulation in freight traffic which, according to incomplete reports, was the greatest, measured in net ton miles, for any May in the history of the railroads, amounting approximately to 39,000,000,000 net-ton miles. This was not only an increase of more than 42 per cent, over May last year but was an increase of more than 3 per cent over May, 1917, which had marked the previous rec-

ord for that month. Freight traffic in May this year not only exceeded the preceding month, but was the heaviest for any month so far this year. Class 1 railroads during the first five months this year had a net operating income of \$356,966,900, which would be at the annual rate of return of 5.69 per cent, compared with \$273,215,000 or 4.45 per cent, during the corresponding period last year. Operating revenues for the five months' period totaled \$2,553,856,600, an increase of 19.4 per cent over the same period last year, while operating expenses totaled \$2,026,163,600, or an increase of 18.2 per cent.

Coal mines owned and operated by the Chesapeake & Ohio Ry., should not come within the scope of the assigned-car decision, in the opinion of W. S. Bronson, the general attorney of the railroad, in a petition filed July 12 with the Interstate Commerce Commission. These railroad mines "manned by its own employees, digging its own coal," Mr. Bronson contends, "could not by any stretch of imagination be held to be commercial mines. These mines never ship coal in commerce. All the coal mined merely is moved by the railway company in its own cars for its own private purposes, a necessary function to the operation of its railroad." Continuing, Mr. Bronson concludes "that the assigned-car decision does not apply to mines which do not ship coal," and that company mines "are not subject to the decision and the order in this proceeding. Any other interpretation necessarily must be based upon the finding that the C. & O. mines are commercial mines—an absurdity." The opinion is expressed in traffic circles that Mr. Bronson, in filing such a contention, has overlooked the decision of the U. S. Supreme Court in the case of the Interstate Commerce Commission versus the Illinois Central, in which any such doctrine is characterized as being unsound. "It may not be doubted," says the Supreme Court's opinion, "that the equipment of the railroad company engaged in interstate commerce, included in which are its coal cars, are instruments of such commerce."

Coming Meetings

The tenth annual Tennessee First-Aid Contest and Miners' Field Day will be held at Knoxville, Tenn., Aug. 4, in the Knox County Court Yard, under the auspices of the Tennessee coal operators, state mine inspectors and the U. S. Bureau of Mines, R. E. Howe, secretary of the Southern Appalachian Coal Operators Association, secretary-treasurer. J. M. Webb, of the U. S. Bureau of Mines, is instructing the first-aid teams.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the International Safety and First-Aid Meet. Secretary, Benedict Shubart, Denver, Colo.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, JULY 26, 1923

Number 4

Relativity

SOME time ago we pointed out that if the U. S. Coal Commission failed to make comparisons between coal and other industries it might create a wrong impression on the mind of the public, for most people have obsessions which can be shaken from their minds only by the use of actual data. They have, in short, a grievously defective yardstick and cannot measure anything correctly.

Some men, for instance, who have been reading with diligence about the bricklayers and plasterers in big cities have brought themselves to believe that wages in general are much higher than they really are and those whose contact with life brings them in touch with farm laborers and iron-mine workers of Pennsylvania and New Jersey are prone to set the average day wage too low. Similarly those who have steady jobs themselves do not realize in how many industries the men do not know from day to day whether there will be work tomorrow. All our judgments are comparative, and it is necessary for a true judgment that comparisons be broad and that they be chosen so as to illustrate similar conditions.

The U. S. Coal Commission has realized that without comparing coal mines with other industries no adequate presentation of facts in any one industry can be made, but where is the information and where could they obtain funds for such an inquiry into other industries? The funds were not provided nor could they be obtained. The Commission realized that it had a job already too large for the time and force available without any extension of any sort into adjacent fields. What information was available was not used. It was left for each reader to furnish his own yardstick, his own table of wages, of profits, of hours, of turnover and of stability of operation and so forth.

But there was one exception. The Commission in its anthracite report allowed itself to say, using terms of comparison: "Thus in ten years both the retail and the wholesale prices of stove coal have practically doubled. This is in line with the general advance in commodity prices, except that while the wholesale price of metals reached its peak in 1917, of chemicals in 1918, of farm products in 1919, and of other commodities in 1920—all with subsequent declines, usually large—the price of anthracite has continued steadily upward."

All of this is unquestionably true, but nevertheless it is highly misleading. The wholesale price of metals was excessively high in 1917, almost three times the pre-war price; the price today is inadequate. This is admitted by everybody. Furthermore, it is low today because wages are lower than during the war, and taking a table prepared by the *Engineering and Mining Journal-Press* and striking an average of wages it will be found that the increase since 1914 has been only 29 per cent on day laborers above and below ground alike.

In that same period conditions were markedly differ-

ent in the anthracite industry. The wages have been raised more than 29 per cent, no new cheapening process like flotation has been introduced, and there has been no narrow market to make it obligatory, as in some parts of the metal industry, to operate at a steady loss or entirely close down. Consequently the trend of the anthracite market has not been like that of metals—copper, for instance. The copper industry closed down for months and since it has resumed has been wondering if it did well to start up again. Whereas wages in the metal-mining industry declined after the war, those in the coal industry increased, and by the Commission's own showing the wages of contract miners are now 76 per cent higher than in 1914. The wages of company miners since that time have risen 138 per cent and of outside labor 181 per cent.

It must be confessed that the Commission has fallen on a comparison that is unfortunate. We trust its future comparisons, if made at all, will be more explanatory and more diligently elaborated or, at least, more carefully chosen.

The Sacred Contract

JOHN L. LEWIS' strident denunciation of the Nova Scotia local of the United Mine Workers that will not do his bidding is striking proof of the everlasting sanctity of the contract once that organization has put its name to it. The papers ring with praise for the union that thus holds to its word. These "red" mine workers in the far-off corner of Canada have struck when their contract has not expired, when all they have as an excuse is sympathy for union workers in another place who are on strike. They are unceremoniously fired out of the holy of holies and a provisional president is sent from the head office to teach them what discipline means.

Fine! But what about the broken contracts that John L. Lewis will not see? Every district has them—Indiana, Kansas, Illinois in particular. They are the commonest things there are in those fields, so common that they are numbered by the hundred every year, so common they seem to have become commonplace. A constant source of annoyance to the operator, disrupting discipline, breeding discontent and destroying confidence in any contract, these local strikes are in violation of the same contract the breaking of which in Nova Scotia is so mercilessly scored. Nothing is done about them.

When the operators last January met with Lewis in New York to negotiate and sign a new contract for the remnants of the Central Competitive Field, they urged one little concession. They wanted Lewis to concede that he would condescend to recognize these troublesome local strikes and to sit as judge over their settlement. The operators were willing to have the president of the United Mine Workers arbitrate the disputes at these mines when they should have passed

beyond the point of local settlement. The operators wanted action and not delay and disturbance. But Mr. Lewis told them that he could have nothing to do with such trivial matters. Should he have agreed to take jurisdiction, and it was and is entirely a matter of his option, he would have had to compel observance of contract; he might have had to discipline some local presidents and higher officials. His popularity is not too great in those areas and it would have been needlessly stirring up a hornets' nest.

So now with a blare of trumpets and the proper amount of press agenting, he picks on little Nova Scotia, which does not matter much anyway, and tells the world that the United Mine Workers always keep their sacred contracts.

Planning a Nation's Transportation

WHEN the railroads in April agreed on a "program to provide adequate transportation" they set the peg higher than most observers outside the railroad field considered necessary. They were the real optimists on the season's prosperity. Yet each month since then the business that has been offered to the carriers and handled with little or no difficulty has exceeded their estimate. For instance, the anticipated loadings of all freight for the first six months of the year were some 23,500,000 cars, whereas the actual loadings in that period were slightly over 24,000,000 cars. Not only has the total for a six months' period set a new high record but in the last week of June a new high weekly record of 1,021,770 cars was registered.

In other respects have the railroads justified the assertion of C. F. Carter in an address in New York last week that the roads "have come back." In new equipment put in service the figures are large, and incidentally explain a large part of the activity of the iron and steel industry, which in turn has reacted to make more business for the roads. In but two months of the past six have the new locomotives placed in service numbered less than 300 and of new freight cars less than 12,000. Coal cars to the number of 31,744 have entered road service in these six months and some 39,000 are yet on order. On July 1 the number of all freight cars and locomotives awaiting repairs was the lowest in more than two years. Since February the number of tons of freight per car has been above the best record of 1921 and the reports of average miles per car per day is consistently above previous records. Freight is moving freely; with all the heavy traffic there is little or no congestion.

On top of all this the steam roads have added some 4,000,000 net tons of coal to their reserve piles in the six months ended with June. The engine coal in stockpiles has steadily grown from less than 4,500,000 tons on Jan. 1 to more than 8,000,000 tons on July 1. More than 2,000,000 tons above current requirements was taken by the railroads in June.

Here we have a modern exhibition of what can be done by intelligent planning on a national scale. The railroads have not accomplished these things alone and unaided. They have had the backing of the government at Washington and of industry generally. Almost driven to the wall by the loud and insistent demands of the "railroad baiters" that since private management had fallen down the government must take over their operation, the men who run the roads have shown

of what they are made, bringing back their time-honored prestige for accomplishment. The coal industry is being ruthlessly pushed into the same branding stall that once held the railroads. It, too, is an industry that can do things and there are ample signs that the National Coal Association is doing that kind of forward looking that is bringing the railroads out of the hole.

New Methods Need New Public Viewpoint

JUST as everyone is saying "Do it by machine. Eliminate labor. Relieve the workman from grinding toil," comes the inquiry, What is the labor cost of production? How much does labor get out of the selling price?" also "What is the relation between net cost and market price?" The public is anxious to see machinery introduced, is desirous of economies from that source, but still insists that there shall be a minimum margin between labor cost and selling price, suspiciously questioning and bitterly resenting any growth in that differential.

This attitude is not encouraging to the producer whose industry is tainted by public interest. The public begrudges paying him interest on capital invested and on money borrowed, yet at the same time the elimination of labor in industry can be accomplished only by the introduction of machinery, and when much machinery is used the difference between labor cost and selling price should increase. The railroads and mines have boasted that 70 per cent of all costs are for labor. Is that a credit or a debit? Should not our endeavor be to create such automatons in our industry that the labor quota is a much smaller factor than 70 per cent? When it is done the public, it may be supposed, will still insist that the installation of machinery and the return on the capital shall not be considered in the setting of costs, but if the public should take that view there will be an end to progress.

Young communities are the aggressive ones. The channel of commerce with the older nations is blocked by inhibitions till the current grows sluggish. Fortunately, the U. S. Coal Commission is somewhat more considerate and has taken the view that the increase in anthracite revenue may rightly mirror the greater investment on mining equipment, and thinks that if that is so or if prices before the war were too low no exception can be taken by the public. These statements exhibit the cold sanity of the Commission, but the public cannot see the investment even though a funded charge on production—unless it has itself invested, and so investment lags, and with investment the introduction of machinery.

Shall we listen to public clamor and so hedge in coal production with unfavorable rulings that operators will no longer say "Do it with machinery" but "Do it with labor, for only labor charges will be allowed"?

Confusing Publicity

BLOOMFIELD'S Labor Digest, "The Personal Service for Executives," published by Meyer Bloomfield and Daniel Bloomfield, was recently sent us for review. In the issue of July 7, 1923, under a 24-pt. caption "The Coming Coal Strike" we read: "Unless the situation changes very much between now and the first of September, strikes may be looked for both in the anthracite and bituminous coal fields."



Storage Battery Charging Station, Ridgewood Mines, Traders' Coal Co.

Advantages and Reasons for Increased Application Of Storage-Battery Locomotives to Mining

Mining Conditions Create a Demand for Storage-Battery Locomotives—Economy in Mining Realized by Their Use—Storage Battery the Power Plant—Quick and Simple Calculations for Determining Battery Capacity

BY EDGAR J. GEALY

Electrical Engineer; Associate Editor, *Coal Age*

IN ALL industries in which the electric industrial locomotive has been adapted it has played an important part in the solution of material-handling and haulage problems.

The outstanding advantages of the electric locomotive may be summed up as follows:

- (1) Consumes power only when in actual operation.
- (2) Can be run by one man without special training.
- (3) Is ready at all times for immediate use.
- (4) Has large momentary overload capacity.
- (5) Has simple and easily operated control.
- (6) Has low maintenance cost due to small number of wearing parts.
- (7) Requires attention only when in use.
- (8) Can be run in places where smoke and fire risk of a steam locomotive would forbid its use.

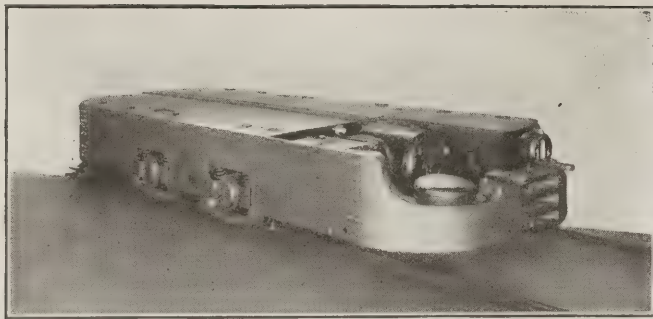
During the last few years the storage-battery locomotive has won a lasting place in the coal-mining industry. It is particularly adaptable to gathering service and all underground service where there are difficulties in erecting and maintaining trolley wires and in bonding the rails, or where wooden rails are used. It also is suited for roustabout haulage when mines are first opened or when the mines are idle and construction and inspection work must go on.

Besides the more general advantages of electric haulage, the storage-battery locomotive has several addi-

tional advantages peculiar to itself. These may be briefly enumerated as follows:

- (1) It eliminates the need of trolley lines and of bonds on any track over which it runs.
- (2) In thin coal it is unnecessary to brush the top or take up bottom to make room for mules.
- (3) No time is lost in making cable connections with the trolley line on entering rooms or in splicing the reel cable when it is cut.
- (4) Wherever used it eliminates the danger of personal contact with the trolley line.
- (5) In a gassy mine, away from the headings, there is no danger of spark at the wheels or at the trolley.
- (6) It is independent of either substation or power plant, so that it may be used when other operations have ceased.
- (7) The speed and haulage capacity of the locomotive will enable it to displace from five to eight mules and eliminate the cost of three to five drivers.

In this connection it has been found that a storage-battery locomotive may originally be placed to eliminate from six to ten mules but in a few months if one were to ask how many mules would it take to replace the locomotive the answer probably would be ten to sixteen; due to the fact that the operations usually expand quite rapidly as soon as the storage-battery locomotive has become understood and properly handled.



EXTREMELY LOW TYPE BATTERY LOCOMOTIVE

Wherever the veins are thin, the storage-battery locomotive has a marked advantage over any other type of haulage device. This locomotive is only 25 in. high.

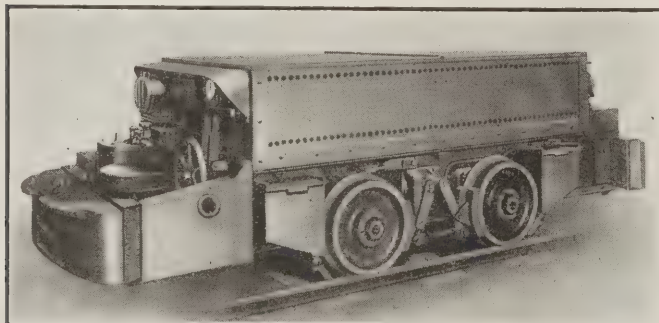
The mining type storage-battery locomotive should be simple in construction, accessible, rugged and, above all, efficient. All storage-battery equipment should be so designed as to draw as little energy from the battery as possible for a given amount of work. This must be true at all times and under all conditions so as to conserve the battery energy. Sparkless commutation, great overload capacity, and a maximum torque per ampere also are important factors in the motor design.

Mechanically, the motor must have great strength and durability combined with accessibility and careful elimination of excess weight. The control equipment should be devised with a view to reducing to a minimum the rheostatic losses. To obtain this end combinations of series and parallel groupings of the motors and motor fields should be used. Such economies as may be obtained will permit either the use of a smaller battery or the hauling of more cars per day. In either case there is a lower investment for a given output.

The storage battery is the most important part of the locomotive; it is the power plant of the system and therefore must be properly proportioned for the work to be done. Like the main power plant of any electrical system it represents a problem of capacity and maintenance.

Therefore the storage battery should have sufficient capacity to properly perform its duty cycle and must not have so great an abundance of overcapacity that it may be said that the locomotive is continually carrying around tomorrow's battery. If additional weight is required it may better be in the locomotive frame, where it will add more strength to the locomotive and consist of material far cheaper than battery weight, which must be replaced whenever the battery has run its life.

The conditions under which a storage battery has to operate when used on a locomotive in mining service are different in many respects from those experienced in any other class of work and therefore require that



LOCOMOTIVE WITH WHEELS ON TAPERED AXLE

To facilitate the removal of wheels this locomotive is equipped with wheels on a tapered axle held in position by a locked nut.

the battery be chosen and installed with special reference to these conditions.

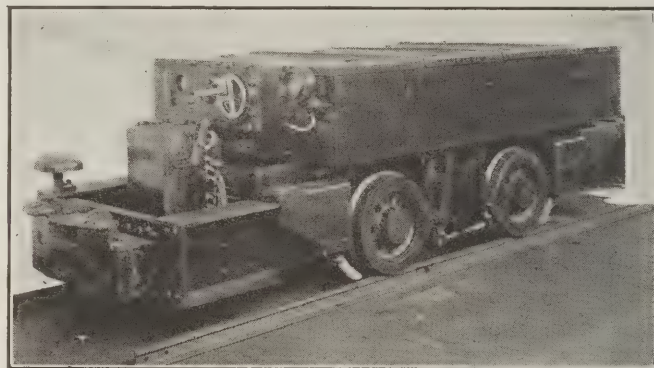
It has been suggested that the cells of a storage battery be so mounted on the locomotive that the flat of the plate comes against the direction of motion. The plates being assembled in the jar in this direction no opportunity is afforded for displacement; the inertia of the plates during a violent bump is transmitted through the cushioning effect of the electrolyte against the flat of the plate.

The claim is made that if mounted with the edge of the plates against the direction of motion, the cushioning effect of the electrolyte is lost, the shock is first transmitted to the jar through the connecting post and cell cover, and this may be followed by a hammer blow between the edges of one or more plates and the side of the jar, with resulting broken covers and broken jars. This point doubtless becomes of more importance as the ratio of battery weight to total locomotive weight increases.

The trays in which the cells are mounted should be provided with sufficient partitions so that the cells at the ends of rows will not be subjected to the inertia of cells behind them.

Furthermore, the trays should be thoroughly insulated from the frame of the locomotive, which is accomplished by the use of rugged insulators.

Holes should be provided in the bottom of the battery compartment in order to permit drainage and the break-



PERMISSIBLE STORAGE-BATTERY LOCOMOTIVE

May be used in gaseous mines. Access to the motors and gearing is made easy by rotating the battery box while mounted on the locomotive.

ing loose of any foundations between the tray and the iron of the locomotive, as such formations create leaks which tend greatly to reduce the capacity of the battery available for work.

The determination of the battery capacity represents the most important problem that the mining man must solve before selecting a storage-battery locomotive. This, in fact, is perhaps his only problem after he has determined the advisability of obtaining a storage-battery locomotive for a given work, because the locomotive details of all reputable manufacturers have now become quite generally established along definite lines which assure the many desirable features being incorporated.

The duties of a proposed storage-battery locomotive cannot always be definitely outlined. One of the reasons for this is that the electrical engineer rarely has control over the output of a given section of the mine in which the locomotive is to operate. Another reason is that it frequently happens that mining conditions change materially during the development of a section and even between the time the battery estimate is made

and the locomotive placed in operation. It occasionally happens that when the locomotive is received it is put into an altogether different section of the mine than that considered in the original battery estimate.

Nevertheless it is always necessary to make at least a rough estimate of the duty of the locomotive. In this event if the work divides itself into one definite cycle of operations repeated several times during the day, the calculation of the battery is simplified; but even when the work does not so divide itself a fairly close estimate may be made if the work to be done during the day can be outlined.

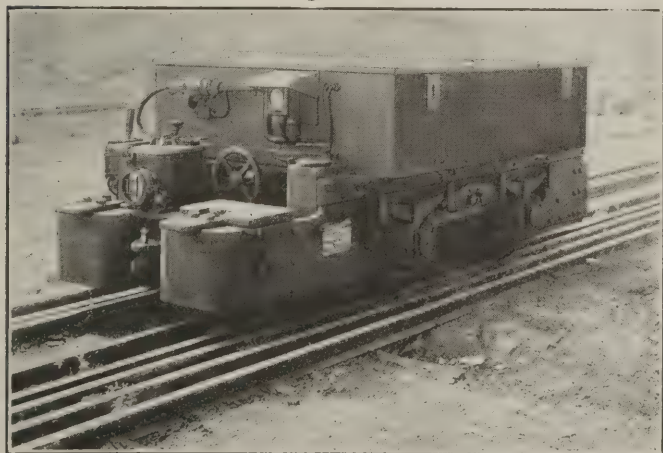
In the preliminary estimate of a battery for a storage-battery locomotive it is well to remember certain well-established limits which must be considered. Storage-battery locomotives as a class are designed for speeds about one-half those used on trolley locomotives. A 4-, 5- or 8-ton locomotive runs at about $3\frac{1}{2}$ miles per hour at rated drawbar pull; a 10-ton at $4\frac{1}{2}$, a 15-ton at 5 and a 30-ton at 5 miles per hour at rated drawbar pull. The usual storage-battery locomotive is rated at 80 volts but is usually equipped with a battery of somewhere near 48 cells of the lead type or about 80 cells of the nickel-iron type.

The average tractive effort which must be exerted at the wheels of a storage-battery locomotive to overcome the total resistance of various forms of friction which are present in mine haulage on either level or graded track is 30 lb. per ton of 2,000 lb. In addition to this the tractive effort for each per cent of grade is 20 lb. per ton.

Therefore each section of the haulage system must be separated with respect to the grades encountered and the tractive effort per ton on each section determined. If the load must be taken upgrade the tractive effort for the grade is added to that for friction. If the load is to be taken downgrade the tractive effort for the grade is subtracted from that for friction.

Obviously if a downgrade greater than $1\frac{1}{2}$ per cent is encountered it would permit the load to coast down the grade without the use of power. Since but little of the surplus tractive effort above that required to overcome friction on a heavy grade is available in the next section no allowance is made for this surplus energy. Long trains tend to act as levelers of gradients but in the battery calculations the load is assumed to travel over the system as a concentrated weight.

The tractive effort for the train—locomotive included



BUILT ALONG APPROVED LINES

Much of the standard trolley locomotive equipment has been used in this compact storage-battery locomotive. This is a feature of great importance where capital in repair parts must be kept at a minimum.



ELIMINATES TROLLEY, FEEDER AND BONDING MATERIALS

This storage-battery locomotive works in a large section of a mine where the expense of trolley, feeder and bonding equipment would have been enormous.

—is obtained by multiplying the tractive effort per ton in each section by the weight of the train in tons. Multiplying the tractive effort for the train in each section by the distance traversed in the section gives the foot-pounds of work done by the locomotive in the section.

The energy at the wheels of a storage-battery locomotive is assumed to be $66\frac{2}{3}$ of that taken out of the battery, therefore to determine the foot-pounds of work done by the battery we must multiply the foot-pounds of work done at the wheels by 1.5.

$$\begin{aligned} 1 \text{ hp.} &= 33,000 \text{ ft.-lb. per min.} \\ 1 \text{ hp.-hr.} &= 33,000 \times 60 \text{ ft.-lb.} \\ 1 \text{ watt-hr.} &= 33,000 \times 60 \text{ ft.-lb.} \end{aligned}$$

$$\begin{aligned} &746 \\ &= 2,652 \text{ ft.-lb.} \end{aligned}$$

Therefore dividing the total foot-pounds required from the battery for each section by 2,652 ft.-lb. gives the watt-hour output of the battery for that section. Obviously the sum of the battery outputs per section gives the total capacity required from the battery for a cycle, from which the total daily capacity may readily be determined.

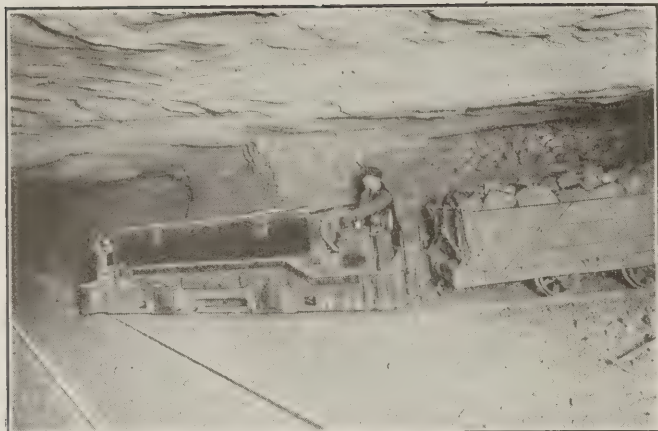
Dividing the total watt-hours by the voltage of the battery (the number of cells multiplied by 2 for a lead cell and the number of cells by 1.2 for the nickel-iron cell) gives the total ampere-hour capacity of the battery.

The watt-hour capacity of all cells can be obtained from any storage-battery manufacturer and the selection of the battery can thus be made to meet the requirements of the locomotive.

Dividing the ampere-hour capacity of the battery required by the ampere-hour capacity per positive and negative couple in the particular type of cell under consideration will indicate the number of positive plates in the cell to be used. The number of positive plates times 2 plus 1 gives the total number of plates in the cell.

The ampere-hour capacity per couple for any type cell easily may be obtained by dividing the ampere-hour capacity of a 21-plate cell by 10. For example, a 21-plate cell of 350 amp.-hr. capacity has a couple capacity of 35 amp.-hr. To compare different types of cells it is necessary first to put each type of cells on the same hour discharge basis. To illustrate the simplicity of this method of calculating the necessary battery capacity for a storage-battery locomotive let us assume the following problem:

A haulage system consists of 900 ft. of level track



GATHERING WORK IS DONE QUICKLY

Dependability is of prime importance to the mine operator. Placing the cars quickly maintains a high morale among the miners.

and 1,200 ft. of 1.4-per cent grade against the loaded train. The locomotive weighs 5 tons, the loaded trailing weight is 18 tons and the empty trailing weight is 7 tons; 25 round trips per day.

The complete cycle may thus be divided into four parts:

First section—23 tons on level for 900 ft.

Second section—23 tons on upgrade for 1,200 ft.

Third section—12 tons on level for 1,200 ft.

Fourth section—12 tons on downgrade for 900 ft.

The tractive efforts are as follows:

First section—30 lb. per ton.

Second section— $30 + (20 \times 1.4) = 58$ lb. per ton.

Third section— $30 - (20 \times 1.4) = 2$ lb. per ton.

Fourth section—30 lb. per ton.

Total ft.-lb. at the wheels:

First Section— $30 \times 23 \text{ tons} \times 900 \text{ ft.} = 621,000$

Second section— $58 \times 23 \text{ tons} \times 1,200 \text{ ft.} = 1,601,000$

Third section— $2 \times 12 \text{ tons} \times 1,200 \text{ ft.} = 29,000$

Fourth section— $30 \times 12 \text{ tons} \times 900 \text{ ft.} = 324,000$

Total ft.-lb. at the wheels per cycle 2,575,000

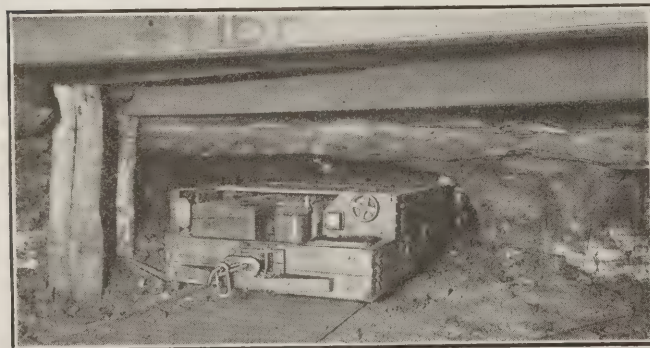
$2,575,000 \times 1.5 = 3,862,500$ ft.-lb. battery output.

$3,862,500 \div 2,652 = 1,458$ watt-hours or cycles.

$1,458 \times 25 = 36,450$, total watt-hour output of the battery per day of 25 round trips or cycles.

Assuming a battery voltage of 96 then the ampere-hour capacity of the battery will have to be 370.

If the ampere-hour capacity per couple (consisting



LOW TYPE LOCOMOTIVE BECOMING MORE NECESSARY

The mining of thin veins is increasing daily. More efficient and safer methods of mining are attained wherever the storage-battery locomotive is properly applied.

of a positive and a negative plate) is 34, then the number of couples must be 11, or 23 plates per cell.

If the ampere-hour capacity per couple is 37, then the number of couples must be 10, or 21 plates per cell.

This simplified method of the battery calculation may be readily used to determine the practicability of a storage battery locomotive for any given amount of work and should eliminate the uncertainty that often exists in the mind of the manager because the calculations may be easily understood and verified.

Further Light on the Use of Carbon Dioxide in Fighting Mine Fires

Difficult to Check Fire When Rock Is Hot—Clay for Surface Cracks—Cement and Paint for Stoppings

IN THE discussion of the paper by Charles L. Jones, of the Mellon Institute of Industrial Research, Pittsburgh, Pa., delivered at the West Virginia Coal Mining Institute at Clarksburg, W. Va., June 12, and printed in *Coal Age* of July 5, the author said that carbon dioxide might not always be effective in the fighting of mine fires, especially where the fire has burned for years in a mine having thick cover.

Heat is conducted from mine fires through the adjoining strata, and it is to this conductivity, however slow in action it may be, that the dissipation of heat in the early stages of a mine fire is due. Where, however, a fire has burned for years a heat gradient is developed in the rocks above and below the coal seam, and the high temperature of the rocks for a considerable distance from the fire will limit the rate of heat transfer, for the rocks will be insulators rather than conductors.

Consequently in such a case the cooling effect of the agents used to fight the fire will have to be relied on to lower the temperature in the fire zone. As none of the agents from a fire of this character can pass outward we can have little hope of extinguishing the fire with carbon monoxide or any other agent yet known wherever these severe conditions must be confronted.

Assuming that no further heat is generated by the fire after sealing, the rate at which the rocks will cool will be exceedingly slow. As proof of this statement Mr. Jones cited the conditions which prevail in the pumping of deep deposits of sulphur by means of the injection of steam. In some instances prolonged working of these deposits by this method has so extensively established the heat gradient that upon cessation of operation years would be required to cool the rocks to their original temperature.

On the other hand, where the overburden is comparatively light and yet solid, a fire may be extinguished even though it has burned for years, providing, of course, it can be sealed off properly. The overburden was light above the Bitner mine of the H. C. Frick Coke Co., of Pennsylvania. No doubt this factor was instrumental in shortening the time in which the carbon dioxide extinguished the fire. Though these conditions thus proved favorable to carbon-dioxide extinguishment they were not propitious for the fighting of the fire with water, little progress being made till carbon dioxide was introduced.

On being asked by W. E. Fohl how surface breaks were sealed, Mr. Jones replied that the plastic clay



MINE FIRE AT RED ASH COAL CO. MINE NEAR WILKES-BARRE

A fire in a shallow seam, that indeed outcrops in places and has partly been stripped, is now burning over a large area and extending its ravages rapidly. It has been burning so long that the roof rocks are in places white hot and metamorphosed as a result. Bad crevices have opened in every direction, letting in air. Unfortunately the ground is so hot that in places the surface cracks could not successfully be mudded tight. The fire has all the conditions that make extinction difficult.

forming the surface soil was tamped into the cracks that appeared on the surface. These were not systematically and thoroughly closed until after introduction of gas had been commenced, and it was stated that attention to this point might have prevented the loss of some of the carbon dioxide which was fed to the fire. The labor required is small when it is compared with that required in the direct method of fighting the fire. Forty men working five days completely closed off surface breaks by the tamping process.

Mr. Fohl said that he knew of a case in Ohio where gas lines were endangered by a fire in outcrop coal. This fire was successfully smothered by sealing the crevices with tamped clay.

LIKE SHIPS, MINES MAY KEEP GAS ON HAND

Reference being made in the reading of the paper to the fact that the steel cylinders for holding carbon dioxide cost approximately six times the value of their contents, Mr. Fohl asked, What is the life of the cylinders? Mr. Jones replied that the life is limited only by the corrosion that occurs on the exterior of these containers.

The demand for carbon dioxide for soft drinks is 90 per cent of the total production, and as this demand is seasonal, much of the manufacturer's capital is tied up in these cylinders and they return to the factory only slowly. The Interstate Commerce Commission requires that these containers be tested periodically. Ships which keep liquefied carbon dioxide in readiness to fight fires in their holds buy the cylinders outright. It may be possible in the future that isolated mines in seams susceptible to frequent outbreaks of fire will be provided with liquefied carbon dioxide in cylinders, the coal companies buying these containers outright.

In answer to a query by Mr. Fohl as to the cost of fighting the fire with carbon dioxide, Mr. Jones stated that 230,000 lb. of inert gas was used at the Bitner mine at an expenditure of about \$15,000, that being the cost of the gas alone. This is approximately one-tenth of the whole cost of fighting the fire, for much money was expended in the direct method prior to the use of carbon dioxide.

With the knowledge now on hand, derived from experiences in fighting the fire in the Bitner mine, that expenditure undoubtedly could be cut considerably.

This cost is remarkably low in view of the fact that the void in the fire zone had a volume of about 2,000,000 cu.ft.; that 200 men previously were employed to fight the fire by the direct method; and that about 2,000,000 gallons of water was pumped into the fire zone each day. Once the fire is sealed off, few men are required to administer carbon dioxide to the atmosphere in the fire zone.

At the Bitner mine the carbon dioxide was fed through four boreholes. J. B. Hanford asked if the gas could be fed directly through stoppings. To this Mr. Jones replied that it was inconvenient to transport the cylinders underground. One plan suggested was to feed the gas through a water line which already was in place; but because ideally located boreholes were already drilled it was decided to administer the carbon dioxide through them.

Someone in the audience suggested that this scheme would not be practicable where the overburden was thick, but Mr. Jones pointed out that it was entirely practical to introduce the gas through any sort of pipe whether used for air or water, thus relieving the situation.

Frank Haas wondered what becomes of the heat generated by the fire. If the temperature is high enough, even though there is no fire, when the fire zone is opened up (even though after a rest period of ten months or more), the inrush of air is sufficient to cause the heated coal to burst again into flame.

In answering his question Mr. Jones asserted that few men realize the value of the conductivity of adjoining strata as a means of dissipating heat in the early stages of a mine fire. The continuance of heat under conditions described by Frank Haas, for periods of ten months or more, he said, was due to just enough air leaking in to support the fire, which in reality was never entirely extinguished. Instead of breathing air the fire should be made to breathe carbon dioxide during the rest period before the stoppings are torn out.

Due weight should be given to the ability of water to lower temperature, Mr. Haas remarked, adding that he believed this property of water of more value than the conductivity of adjoining strata. Mr. Jones admitted that water lowered the temperature more quickly than the adjacent measures, but he believed that as the cooling action of carbon dioxide is inconsiderable and as water found its way to only 25 per cent of the area



ANOTHER VIEW AT THE GREAT RED ASH FIRE

In this mine fire the heat gradient is broken by the fact that the knife blades of coal in the superincumbent rock are burning. The rock shown is in places white hot, though unfortunately the illustration cannot bear witness to that fact. The rock becomes, like shale tile, strongly resistant to the passage of heat.

of the fire in the Bitner mine it was not reasonable to discount the heat conductivity of adjacent strata as a means of lowering the temperature of the fire zone, for its effect must have been appreciable.

During the discussion Mr. Jones made mention of the fact that a solid brick wall is not impermeable to air. Prof. A. C. Callen wanted to know what quantity of air would travel through such a wall in a given time when only a slight difference in pressure existed inside and out. Mr. Jones said tests have been made which show that a small chamber closed by solid brick walls which are plastered on the inside may change atmospheres in three hours. He suggests that if a coating of tar paint were applied to the brick stopping it might lower the volume of the air thus transpired. Incidentally, the Consolidation Coal Co. uses gunite for this purpose.

It is interesting to learn that liquefied carbon dioxide is now being used by the National Mining Co. to fight a fire in a refuse pile at one of its mines. Smoke from this fire is a nuisance to the nearby mining town, and the slate pile is fairly close to crop coal. Consequently an experiment is being conducted to attempt to put out the fire by the use of carbon dioxide. The same theory is recognized in this case as is honored underground, namely, that the heat conducted away from the pile must equal the heat generated if the fire is to be put out. Therefore carbon dioxide may be administered to the seat of the flame in quantities sufficient to disturb the heat balance. Results achieved thus far point to abatement of smoke and lowering of temperature.

In conclusion it may be said that there are wonderful possibilities in the use of carbon dioxide in the combatting of fires in stored coal. Apparently the ground has only been scratched in making the first successful application at the Bitner mine. If carbon dioxide is successful in fighting a fire in a mine-refuse pile, it will be equally as effective in fighting fires in our stockpiles of soft coal. We may later learn that it can be used periodically, and at no great expense, to check temporarily the oxidation of coal for periods sufficiently long to establish outside temperatures in the middle of a stockpile. This, if not too expensive, would solve one of our greatest coal problems, namely, industrial coal storage.

Why Not Scrap the Davy "Safety" Lamp?*

BY J. W. PAUL AND A. B. HOOKER†

THERE was a time when any suggestion that the Davy flame (safety) lamp be discarded would have evoked unlimited criticism. That time, however, is past. Investigations both here and abroad have shown conclusively that the Davy lamp does not have the necessary factor of safety against ignitions of mine gas, and Great Britain, the last stronghold of the Davy lamp in Europe, has eliminated this lamp and substituted safer types. In the United States there are companies which still use the Davy lamp in spite of all that has been said and published as to the dangers connected with its use.

Recently the purchasing agent of an anthracite company requested the Bureau of Mines to pass upon the safety of some brass gauzes for use in a shielded Davy lamp. This is an ordinary Davy safety lamp equipped with a circular brass shield that is attached to the lamp posts. This shield extends about one-half way around the gauze and one-half of the gauze height. The main purpose of the shield is to prevent the extinguishment of the lamp by a sudden increase in the velocity of the air.

BUREAU TRIED BOTH BRASS AND STEEL GAUZES

The brass gauzes submitted for this test represented two grades of brass—one yellow and one red. The analyses of these brasses were not determined. Two shielded Davy lamps that were submitted for the tests each had a steel gauze. These steel gauzes also were tested. Tests were made in horizontally moving mixtures of Pittsburgh natural gas and air at velocities of 400 to 1,000 ft. per minute. The gas percentages used were 7, 8.6 and 11. Tests were made with the lamp shield in two positions relative to the lamp and to the direction of flow of the gas-and-air mixture. In one position the shield was between the gauze and the flow, as normally used. In the other position the shield was on the downstream side of the lamp. The tests were continued until one or more failures or gas explosions had been obtained with each of the six gauzes. The results of these tests may be summarized as in Table I.

TABLE I—PERFORMANCE OF DAVY LAMPS
IN GAS AND AIR

Total number of tests	24
Number of tests in which ignition occurred.....	14
Number of tests in which rupture, or melting, of the gauze occurred	2
Lowest velocity (feet per minute) of air mixture at which ignition occurred	800
Highest velocity (feet per minute) of air mixture at which no ignition occurred.....	900

The Davy lamp failed in velocities of 800 to 1,000 ft. per minute. The highest velocity in which the lamp did not fail was 900 ft. per minute and under the following conditions: (1) Lamp equipped with a red brass gauze in not more than 7 per cent gas mixture; (2) Lamp equipped with an old, considerably oxidized red brass gauze in not more than 8.6 per cent gas mixture and the shield in its normal position between the lamp gauze and the air current. No ignition of the external mixture occurred in velocities below 800 ft. per minute.

The brass gauzes that failed by rupture failed at velocities of from 100 to 200 ft. per minute lower than the steel gauzes which failed without rupture. This,

*From Reports of Investigations, U. S. Bureau of Mines.

†Chief of coal-mine investigations and assistant electrical engineer, respectively, U. S. Bureau of Mines.

however, was not true with the red brass gauzes, which failed at practically the same velocities as the steel gauzes and without rupture. Gauzes became heated to redness in velocities as low as 400 ft. per minute. Though normally this might not be considered dangerous, conditions might easily arise that would greatly increase the danger, as for example—there might be some foreign substance such as oil on the gauze, or the lamp flame might strike the gauze so that the heat would be localized over a small area; also there might be contact with clothing or dry brattice cloth, which would ignite external gas.

Some tests conducted in Great Britain and confirmed by early tests of the Bureau of Mines, have shown that a sudden concussion wave in the air produced by blasting coal or rock will often cause the flame of the burning gas within the Davy lamp to pass through the gauze and ignite external gas, and this danger is accentuated when the gauze is heated.

The location of the heated gauze area through which ignition occurred seemed to depend upon the position of the shield, the action of the wick flame, the quantity of oil (fuel) that was distilling from the burner and the distribution of the flow of gas through the gauze. If the shield was between the gauze and the current, the gauze usually was quite evenly heated on the downstream side, yet sometimes, due to the playing of the wick flame against the gauze and to burning oil around the burner,

the gauze would become heated over a small area at the lower downstream side of the gauze. If the shield was on the downstream side, the failure occurred on the downstream side of the gauze at a point just above the shield and below the gauze cap.

A comparison of the behavior of the shielded Davy lamp with that of an unshielded lamp tested during a previous investigation showed that the shield offers some protection to the gauze. However, the test results as a whole show that any type of Davy lamp is an unsafe lamp for use wherever gas is likely to be encountered. The Bureau of Mines does not approve a flame safety lamp as permissible for use in gaseous mines unless it is equipped with double gauzes, a bonnet and a magnetic lock and has been proved by tests to be safe in velocities up to 2,500 ft. per minute. Great Britain, the country in which the Davy lamp was first used, recognized the danger connected with its use and has substituted safer types. The report of the British Department of Mines for 1918 shows that of 590,185 flame safety lamps then in use in the United Kingdom, only four were Davy lamps. The Department of the Interior learns from reliable sources that there are still about 8,000 Davy lamps in use in the anthracite mines of Pennsylvania. It is believed that every Davy lamp in use represents a possible hazard to life and property and that all of these lamps should be scrapped in favor of safer types.

Motive Power Makes Traveling Car Dump Operate Successfully

NO NEW IDEA is the traveling car-dump carriage. It has been found for many years on rock dumps. As usually made, it looks highly serviceable, yet it performs abominably. Either three or four men operate it with some celerity or two men strain at it almost in vain and get less done than with an ordinary gallows dump. The difficulty is to push the heavy carriage and car over a track that cannot be kept up to grade or in alignment because the dump on which the track rests always is moving. Another problem is to keep the track on the deck and that at the deck at such a steady vertical interval that it will be easy to load cars on the carriage and take them off, and even when they are right in this relation it may be difficult to push the carriage round to just such an angle as will permit of docking.

Though few seem as yet to have realized it, almost all this clever device needed was *power* to fill all its various functions, each of which it was well designed to perform. It needed power for embarking, transporting, and disembarking, and given this its operation would be easy. Especially did it need power for transporting for as soon as it is provided with locomotive power, it is easy and permissible to make it heavy enough and thus have the dump so mechanically constructed that its revolving will be easy. When locomotive powers are afforded to the carriage, moreover, it is a matter of small concern if the dock is placed sufficiently far back that it will rest on a piece of dump that has settled or even on solid ground so that the embarking and disembarking will be certain and accomplished without strain. As for the dumping, that is readily performed if gravity is allowed to help. Returning the car to the horizontal, however, in that case is more difficult, but the energy of transportation can be made to do this, as will be seen later.

The Bloomsburg Locomotive Works, of Bloomsburg, Pa., provides a car-dump carriage with a motor equal to propelling the sturdy vehicle and car along an uneven track at five miles per hour over a grade of 4 or 5 per cent against the load. A sag from a level grade of only about 3 or 4 in. in 6½ ft. makes a grade of that size, but that depth of sag is not likely to be exceeded in a 6½ ft. distance. The wheelbase of the carriage is 6 ft. 5¼ in., giving the car reach enough so that it does not make too much of little sags in the road. The carriage has good journal bearings with an oil cellar and eight coil springs—two for each journal. The gage, of course, varies according to need and may be 36 in. or less.

In the straight-ahead dumping car, of course, no revolving mechanism is provided. When the controller is thrown the carriage goes forward under its own power,



FIG. 1—STRAIGHT-AWAY CARRIAGE DUMP IN OPERATION

Proceeding under its own power this carriage-dumping platform takes the car from the wharf or pier to the end of the rock dump, where it is allowed to tip up and discharge its load, the gallows frame lifting the endgate. The ability to move itself over adverse grades of 4 per cent makes practicable what is a somewhat difficult method of dumping when attempted by the brawn of a gang of day laborers, unaided by electric power.

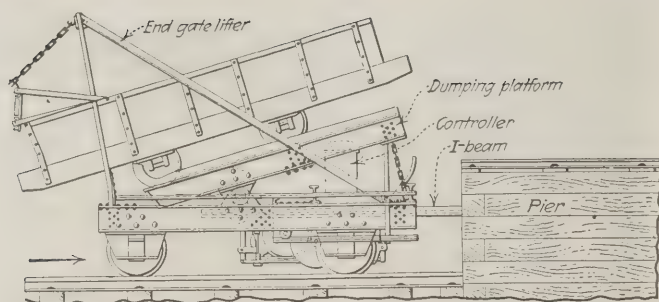


FIG. 2—ROCK DISCHARGES, DUMP RETURNS TO PIER

When the platform tips it causes an I-beam in the rear of the car to project. The platform remains tilted until it reaches the wharf which drives in the I-beam, brings the platform back to the horizontal and in doing so kicks back the car, which runs on to the pier as a result.

up or down hill, to the end of the dump. Here the platform is released. It tips up and in doing so thrusts back an I-beam, which it thus causes to project 3 ft. behind the carriage. When as a result of the tip the car is discharged the platform does not drop back into place but remains tilted until the carriage has under its own power been returned to the dock. In going to the pier the I-beam strikes first, rights the platform, allowing the car to kick back and so pass from the carriage to the dock.

As the gradient on this dock inclines toward the carriage it is easy to load the car onto the locomotive truck by gravity. It has been noted that it is unloaded by the same simple means. One of these straight-ahead car-dump carriages can be seen in daily service at the mines of the Wyoming Anthracite Co., Shickshinny, Pa. It is asserted that one man can handle the carriage, though its weight is 6,850 lb., and it will carry 18,000 lb. A revolving car-dump carriage also is made whereby rock can be dumped in all directions with equal facility. By changes in the old car-dump carriage, which bring it into line with our modern power-driven machinery, and by some adjustments well adapted to its new characteristics, it has been so greatly improved that instead of two to four men being needed to operate it, one is enough and he does the work rapidly and without strain.

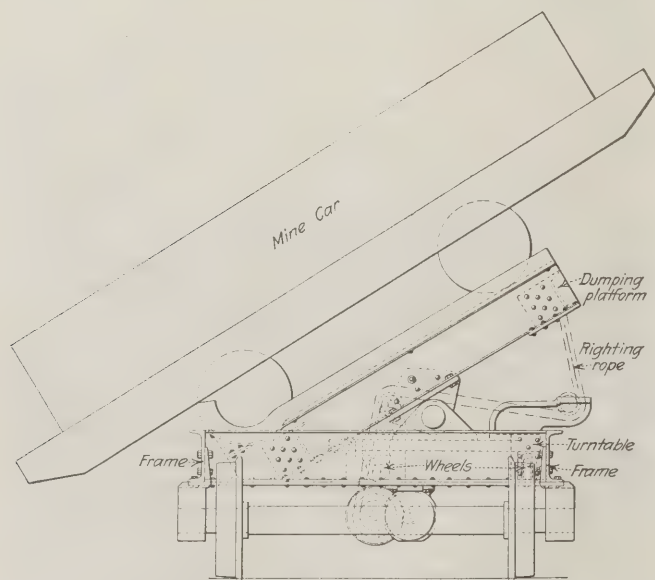


FIG. 3—REVOLVING DUMPING CARRIAGE

Here the platform has been revolved a full right angle. The whole top of the carriage does not revolve, only the front part. The propulsive machinery remains in the normal position on the truck prior to, during and after dumping.

Lightening Labor of Upraising Shaft

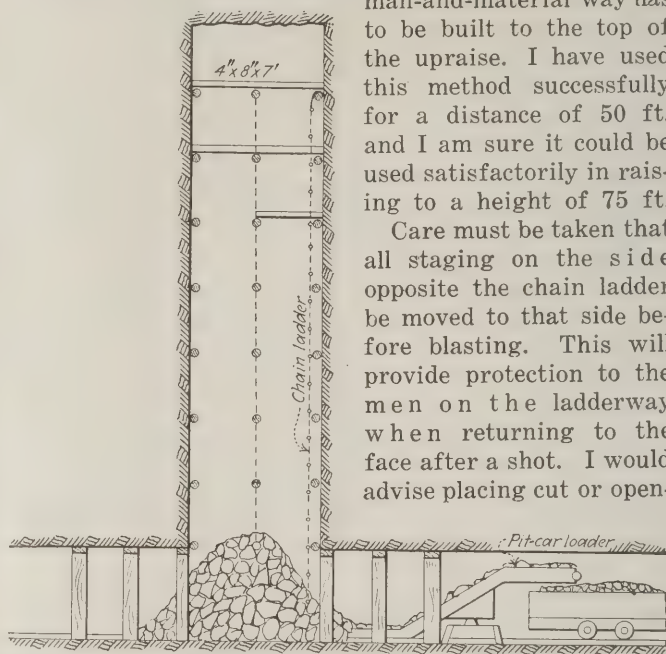
By J. W. POWELL

Shaft Contractor, Charleston, W. Va.

IF A SHAFT is excavated as shown in the illustration not only is time and material saved but some of the danger of this class of work also. All the material is loaded out as the shaft is driven upward and staging or platforms are provided on which the men work. No

man-and-material way has to be built to the top of the upraise. I have used this method successfully for a distance of 50 ft. and I am sure it could be used satisfactorily in raising to a height of 75 ft.

Care must be taken that all staging on the side opposite the chain ladder be moved to that side before blasting. This will provide protection to the men on the ladderway when returning to the face after a shot. I would advise placing cut or open-



ROCK REMOVED AS FAST AS BLASTED FROM UPRaise

Care is taken to shoot rock so that it has a free fall on a side of the shaft remote from the chain ladder. The working platform is moved to the right side when blasting.

ing-up shots on the left rib and that care be taken to see that this cut is out clean before blasting the rest of the round. By using this method of drilling and blasting all material on the right rib is blown toward the left rib. This reduces the chance of blowing out the timbers below, which is likely to happen where the wedge cut is blown in the center of the raise, for the whole force of such a shot is exerted downward.

THE UNITED STATES is one of the largest coal-land owners in the world, according to information collated by the Department of the Interior. The government also owns immense tracts of oil shale besides important deposits of phosphate, potash and other salts. At the present time the Interior Department supervises between 30,000,000 and 40,000,000 acres of public coal lands through fifteen states and while mining on private coal lands overshadows mining on public lands there is every probability that in the future the situation will be reversed. Coal is now being produced from government lands in eight states and there are more than one hundred mines. In addition the government has one phosphate lease, one oil-shale lease and four potash leases on public lands.

ADDED FUNCTIONS SHOULD BE MULTIPLIED.—In a letter, W. A. Neff, of M. A. Hanna & Co., calls attention to the printer's error on page 1005 of the issue of *Coal Age* of June 21. The formula should be

$$G = \frac{(W_L \times R_L) - (W_E \times R_E)}{20(W_E + W_L + 2M)}$$



Old-Time Ohio River Coal Traffic Is Revived

Fuel Fleets from Kentucky and West Virginia Fields Grow as All Freightage Increases After Worst River Year in History—9-Ft. Stage Near—Machinery Replaces Shufflin' Coal Passer

BY A. W. WILLIAMS
Louisville, Ky.

ONCE more the black smoke of coal traffic is beginning to float over the valley of the Ohio. River coal shipping of the "good old days" from Pittsburgh to New Orleans may in great measure revive. While the tremendous volumes of Pittsburgh coal that once moved by inland waterways may not be equalled in 1923, yet there is a distinct movement of West Virginia, eastern Kentucky and western Kentucky coal toward the Ohio and its tributaries. Big coal consumers are becoming more numerous along the rivers, boat building is reviving, coal producers are acquiring considerable fleets, and great tows of coal such as have not been seen since 1914 are beginning to move.

The whole freight traffic of the Ohio is swelling as a result of the improvements the government has made in the river in recent years. Today enthusiasts for Ohio River traffic are morally certain that the government is going to provide by Jan. 1, 1925, the long-heralded "9-ft. stage" which, by means of locks and dams yet to be built around the falls and shallows near Louisville, Ky., will guarantee sufficient depth for year-round heavy shipping. Recent dispatches from Washington indicate that a considerable portion of the 1923 congressional appropriation of \$56,000,000 for rivers and harbors will be used on the Ohio. If \$15,000,000 is devoted to the "9-ft. stage," they say, coal, oil and steel movement by water will be unthrottled at last. The immediate development of the "9-ft. stage" will be on the Ohio down to Louisville, thus making that city a great transfer point. The stage is to be extended southwest to the Mississippi later.

Washington on March 27 announced plans for the creation of government barge lines operating on the Ohio, Monongahela and Mississippi rivers. Secretary Weeks said that the ultimate aim was for an inland service connecting at New Orleans with coastwise service. Incidentally the government has recently taken up its river equipment which had been operated by the Edward F. Goltra interests, of St. Louis.

Until the past year or two rotting steamboats and barges were to be had for a song on the Ohio River, but today the old equipment has been pulled from the mud flats and is being reconditioned as rapidly as possible. Shipyards are all rushed, and turning out principally steel boats and barges. Some houses would like to purchase steel barges, but can't get deliveries, and are taking the less desired wooden boats once so familiar in the coal trade but which have fought a losing battle with bigger steel barges.

In all this activity coal shippers are taking a keen interest. While it is easy for them to hark back in memory not so many years when the coal traffic was in its heyday, it is easier still to look at the statistics of recent years and realize that coal traffic through Louisville, for instance, has amounted to little and has been getting less and less. Since the war, coal movement through Louisville dropped from 89,000 tons in 1918 to 39,534 tons in 1922, according to that city's Board of Trade figures, with a steadily descending curve through those years relieved only by a 65,000-ton "peak" in 1920.

The season just past was the worst that the inland transportation companies on the Ohio River have ever experienced, as the river was lower than at any other time in twenty years. For months only the smallest of gasoline packets were able to operate, and these spent much of their time on sand bars. In the upper Ohio

NOTE—The headpiece depicts a coal-handling plant on the Kentucky River. The digger boat in the center background is unloading a coal barge into cable cars on an incline track running up the bank to a coal elevator behind the trees. Kentucky River equipment on the average is smaller than that on the Ohio.



COAL INCLINE FROM RIVER TO ELEVATOR

The crane on the floating "digger" lifts coal from barge to hopper from which it drops into 1-ton steel cable cars which transport it up the incline to a dump in the elevator.

River, coal from the Kanawha River section of West Virginia was brought to Cincinnati for transfer to rail and for local demand. Considerable tonnage was moved by manipulation of locks and dams, but ten tows were aground at one time when the river ran out from under them. The Kanawha fleet had plenty of trouble in reaching Cincinnati, while from Cincinnati to Louisville it was impossible to move much tonnage.

It is difficult to get accurate figures on the shipping of the "good old days," but the movement through the "port of Louisville" was many times larger than that of any other recent year. Captain M. J. Sebolt, for twenty years with the old Monongahela River Consolidated Coal & Coke Co., which operated a number of towboats and hundreds of barges, with digger boats for unloading and pump boats for rescue work at many points, says he put 1,400 coal boats of 1,000 tons each and 600 barges through the canal or over the falls at Louisville in a single year. All of this went south, some of it reaching New Orleans.

That company's equipment all bore "R. C." in great letters. The "R. C." stood for "river coal," but as the Monongahela was in practically complete control of the river movement of coal, the company became known as the "Combine" and the letters stood, in most minds, for "River Combine."

A few years ago the old "Combine" took some great tows south. Louisville was a vital point, due to the Falls of the Ohio and three bridges, one of which spanned the rapids, leaving a relatively narrow passageway for handling big tows. At high water there is not much fall to the river, and tows were taken over the falls, while at lower water they were broken above

Louisville and locked through the canal, to be made up again below. Generally all large tows were broken and taken over the falls in smaller units.

Frequently in handling a large tow over the falls a powerful small tug would be lashed across the head barges, to aid the big pusher or towboat get through the bridges. Some of the largest towboats seldom came above the locks or falls. Smaller boats brought fifteen- or thirty-piece tows to Louisville, loading fifty pieces on the Sprague, below that city. The Sprague was by far the largest and finest towboat on inland rivers. At Cairo, Ill., where the Ohio joins the Mississippi, the Sprague would pick up fifteen to twenty additional pieces, and go south with 65,000 to 70,000 tons of coal besides a couple of fuel boats containing her own needs.

There were numerous other big boats which carried thirty or forty pieces. The Raymond Horner, the W. W. O'Neil, the Duquesne, the Oakland, Iron Age, Alice Brown, Harry Brown, Sam Brown, John A. Wood, J. B. Finley, Joe B. Williams, F. M. Wallace and the Gleaner were among the big boats which brought coal to Louisville and carried it south. The Williams, Finley, Sprague and Wallace were among the big fellows that were loaded up below Louisville for the heavy trips. Many of these boats were burned or dismantled years ago. Some are still in operation. The Sprague is towing ore on the Red River of the South.

What has become of the great river traffic in coal? is sometimes asked by the man who has no knowledge of the subject. First of all, the railroads made competition keen, but could not hurt the companies that were hauling their own coal. Rail competition did cut down profits, however. Then the war came along and demand for fuel in the Pittsburgh district became so heavy that Pittsburgh coal was all needed at home, and there wasn't much available for movement elsewhere. The "Combine" began selling its boats and equipment, dropping out of the "coal by river" business.

Handling coal by river could be done profitably when everything went well. There have been spells, however, when luck was against the coal transportation business. Low water in summer and ice in winter are bad. Then there are the falls at Louisville, bridges at various points, and in the lower Mississippi tropical storms during which the wind reaches a high velocity sweeping the flat country. In high water a boat occa-



PARALLEL INCLINE UNLOADING PLANT

Standard railroad cars can be run alongside the barges so that the "digger" transfers coal by clamshell, direct from boat to trains thus eliminating one or more handlings in the transfer of fuel from river to rail.



THE C. F. RICHARDSON, PRIDE OF THE LOWER OHIO RIVER

This \$350,000 towboat, built a year ago for the West Kentucky Coal Co., is designed to handle immense tows of thirty or more 1,000-ton coal barges, or enough coal to fill at least ten trains of sixty cars each. Tremendous power boats like this put river coal traffic on a scale so big that great economy is secured.

sionally has gone aground while trying to keep out of the heavy current. Sometimes, in high water, they stuck in the mud of nearby fields and stayed there high and dry until the next flood floated them or they fell apart.

The big operators of the early days figured that the only way to make money in moving coal was to handle enormous units. In the upper river great units were troublesome because of the narrower river and lower bridges. After they brought coal several hundred miles to Louisville, however, the big boats were given as many pieces as they could carry for the long trip south.

A coal barge is well constructed and can stand a good deal, but it cannot stand being jammed against a bridge pier or into the bank. A wooden coal boat was a flimsy sort of creation, short-lived at best, and easily wrecked. In the old-fashioned boats it was necessary to keep steam syphons going day and night to prevent sinkage. The sinkage of one barge or coal boat sometimes meant that before lines could be cut a number of other pieces would be pulled under.

It is reported that the famous old Sprague on one occasion lost her entire tow of some fifty pieces. Due to the size of her tows the Sprague used a steel line and a very intricate system of putting her tow together. If a barge sank it was impossible to cut loose the steel lines, but if a hemp rope had been used on such huge tows the strain of flanking a tow around the bends might easily have broken the rope. The Sprague was an unfortunate boat and her operation costs were high. Her losses through wrecked boats and barges and coal sunk in the river ran into enormous sums. In the lower Mississippi with a good stage of water she was ideal, but in flood stages or when a tropical storm broke she needed a lot of luck.

Bad luck in handling big tows along with the fact that the "Combine" lost its desire to sell coal to the Southern markets resulted in river movements slowing up. Then came the great winter of 1917-1918, when heavy ice broke loose throughout the valley of the Ohio. The great jams wrecked boats, barges, towboats, pump boats and packets until there was little equipment left on the river. The finest of the river boats were wrecked. Ice at Cincinnati crushed the City of Louisville and the City of Cincinnati, to two fine "white collar line" mail, passenger and freight packets of the Louisville & Cincinnati Packet Co. Equipment was swept out

of the mouths of various smaller streams, where it had been placed in winter harbor for safety. The entire Ohio valley was strewn with wreckage of river equipment. Hundreds of pieces of equipment were destroyed.

That checked river operations for the time being, but capital once more sees the opportunity in river transportation. River workers are not organized or unionized, and freight rates can always be held at well under the rail rates of transportation, which promises to stay high for years as a result of the rail-labor situation. This means that river transportation cannot be throttled easily by rate cutting on the part of the rail carriers, while at the same time the river carriers help to prevent advances in rail rates.

With river shipping coming back it is natural to see big organizations developing river-freight and coal-handling facilities. One of these is the Inland Waterways Co., a two million dollar corporation of Louisville, Ky. Included in its directorate are found James P. Barnes, of the Louisville Railway Co. and Louisville & Interurban R.R. and also Harry Reid, of the Interstate Public Service Co., the great Insull organization, operating interurban lines from Louisville north to Indianapolis and over a wide stretch of country.

The Louisville-Interurban lines can distribute coal in cars to many suburban towns and plants as well as to plants in Louisville. Between the steam and electric lines the company figures to be able to distribute river coal after it reaches Louisville to all industries there, and will also operate a big retail elevator, and perhaps two, to handle less than carload deliveries.

The company also owns 2,000 acres of coal on the Kentucky River at Beattyville, Ky., far across the state in the southeastern coal fields. It has developed one mine, with one drift opening from which coal is moved on an incline to a river tippie. This mine has a maximum capacity of 450 tons a day and averages 300 tons, but it is to be enlarged as soon as the market warrants.

River men constantly point to the cheapness of river shipping over railroad transportation. Patrick Calhoun, Sr., president of the Inland company, stated that his concern has handled 53,000 tons of general cargo from Beattyville on the Kentucky River to Louisville within the past few months, at an actual cost to the company of 94c. a ton, as compared with a freight rate of \$1.76 a ton average on the same hauls by rail. The 94c. does not include interest and depreciation, however.

The coal tow from Beattyville to Louisville is 320 miles, including 260 miles to the Ohio and 60 miles to Louisville. From Louisville to the Kanawha River in West Virginia is a distance of 337 miles. Movement in the Kentucky River is slow due to the large number of locks, while Ohio River movement is faster due to a wider stream and larger locks. Neither of these hauls is much shorter than the former haul to Louisville from Pittsburgh of 604 miles. The total haul from Pittsburgh actually was 634 miles, for the tows were picked up about thirty miles above Pittsburgh.

This means that coal can be brought into Louisville from either the Kentucky River or the West Virginia (Kanawha) district at much less cost than from the Pittsburgh district. The Kentucky mines are young and productive and the West Virginia district is tremendous. In each case there is no large local consuming market to interfere with big-scale shipping down the river.

Another company which is making history in river transportation is the West Kentucky Coal Co., Paducah and Sturgis, Ky., of which Charles F. Richardson is the active head. This company during the last few years has been handling a great deal of its coal by river and is steadily enlarging its river movement. Today it is handling from 300,000 to 400,000 tons of coal annually from its mines in western Kentucky, near the mouth of the Ohio River, to Memphis, St. Louis and other points.

The company can get a daily output of 7,500 tons from its string of mines. A good deal of this is borne to market by water. In the Sturgis territory four mines in Union County are five miles from the river loading tipple at Caseyville. Six mines in Webster County are 14 miles from the river. Three 100-ton locomotives and 150 drop-bottom coal cars are in service between the mines and the river tipple, which has a capacity of 100 tons an hour. The river haul from Caseyville down to Memphis, a great distributing point for river-and-rail coal, is 350 miles.

Just how much the company saves by shipping coal in its own boats to Memphis is not revealed. Says President Richardson, smiling: "There are some things we are not telling. That is one of them. However, it stands to reason that we are making a fair margin over all-rail haul or we would not keep on investing so heavily in river equipment. River haul saves us money and

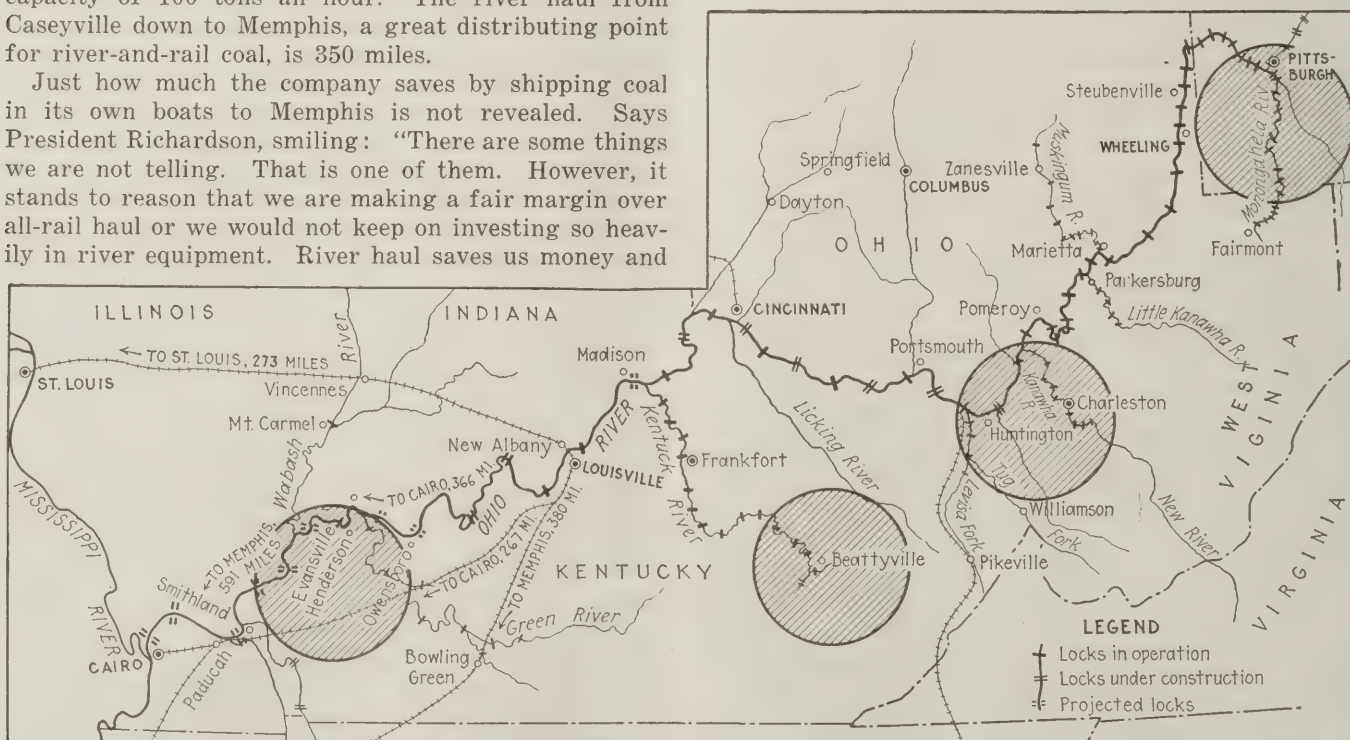
it sometimes gets us a market we could not otherwise reach."

The company handles coal as far South as Natchez, Miss., and plans later to go to New Orleans, as it increases its river market and its equipment for handling. The company formerly towed to Donaldsonville, La., but when the Texas Pacific R.R. decided to burn oil instead of coal in its locomotives the Donaldsonville haul was abandoned.

In its river equipment this company has 175 barges and is building twenty more, of which fifteen will be of wood and five of steel. It has twelve pump boats to keep barges free of water and four steam coal diggers at unloading and transfer terminals such as Memphis, Paducah and Rose Clare, Ill. The company has thirty flats and is adding three. It operates three large steam towboats, two steel hull steam tugs and one wooden-hull steam tug. The Gleaner, one of the company's big boats, is out of commission getting a new steel hull. The Reaper, another big boat of old-time fame, was sold after the purchase of the Charles F. Richardson, one of the largest and finest towboats on the river.

The Richardson is handling thirty-piece tows composed of 600-ton barges to Memphis, also carrying one fuel barge for her own use. She can carry 30,000 tons at a clip, but the company has been short of empties and hasn't been giving the big steamer a full load.

This company operates its own barge-building plant at Paducah and makes most of its own repairs to river equipment. The new steel barges which it is having built by the American Bridge Co. for autumn delivery will be 26 x 175 ft., 11 ft. deep, and will hold 1,000 tons each. The coal company is building the fifteen new wooden barges in its own plant. These will be 26 x 135 ft., 8½ ft. deep, known as the standard 600-ton Mississippi River barge. It also recently built a new



MAP OF THE OHIO RIVER AND ITS COAL SHIPPING TRIBUTARIES

The four circles roughly indicate the mining fields where most river coal originates. The lower three fields just now are displaying especially lively interest in the reviving

river trade. From the western Kentucky field coal goes as far south as Memphis for transfer to rails but may once more penetrate further south. Coal from the field

centering at Beattyville, Ky., is moved by river to Louisville for little more than half the rail rate in spite of the time needed in passing the many locks in that river.

hull for a steam digger at Memphis. The company is using 2-yd. clamshell buckets of the Williams make on its diggers.

Its big steam all-steel towboat, the C. F. Richardson, placed in service about a year ago and costing approximately \$350,000, is a floating testimonial of what the West Kentucky company thinks of the future of river transportation.

The problem of loading coal into barges is simple for those mines near the headwaters whose tipples are directly on the river bank. Many properties that are back from the river distances up to half a mile use conveyors. In the case of one of the Frick mines near Connellsville, Pa., a conveyor five miles long is now under construction. But in the case of many mines in West Virginia and in the Kentucky fields, short rail hauls in company equipment connect mine tipples with river-loading tipples, where coal is chuted from drop-bottom cars through a pocket under the track directly to barges in the river below. At some loading points the loading is by crane.

Unloading at points of destination usually is accomplished with "digger boats" or steam cranes mounted on boats and operating 1½-yd. or 2-yd. clamshell buckets. Where great volumes of coal are handled regularly, usually the unloading is by clamshell into hoppers which load 1-ton cable cars on an incline running up to a coal-storage plant. Where the coal is being reloaded for rail haul and where the river bank is low, usually the unloading is direct from barge into railroad car by "digger."

If the river bank is high, the standard-gage railroad track paralleling the river may be built on an incline of 1½ or 2 per cent running down into the water. Thus it can be used at any river stage. Some unfortunate experiences with tracks floating off such inclines during high water have led to the use of steel ties and track-anchoring schemes.

The cost of unloading by "digger" boats varies. Some small riverside coal companies that do not own their own "digger" boats get service from the water coal companies when they purchase river coal. The average charge for such unloading service is 50c.

a ton because it is sometimes necessary to move the "digger" boat several miles to the unloading point. However, the Pittsburgh Fuel Co., Louisville, estimates that under normal conditions the cost is only 5c. or 6c. a ton for digging coal and handling it into the elevator or to yard piles.

In unloading the old wooden barges it was found that seven-eighths of the coal could be taken from a barge in about the same time as the final eighth, as cleaning up the barge bottom is slow hand work. The clamshell can't clean up barge bottoms on the old-style single-skin wooden barge. The new steel barges, however, have inside wooden "skins" with sloping sides which deliver the coal toward the center, making clamshell unloading more nearly complete. Also the new barges have fewer cross members to interfere with the bucket's operation.



THIS STRONG-BACK-AND-WEAK-MIND JOB IS PASSING

These huskies are coaling a river steamer from a barge, which is a method once used to unload barges at destinations in the days before mechanical unloading machinery came into general use.

Whereas once upon a time river coal was handled on and off of barges by long lines of singing, shuffling negroes with two-bushel baskets and two-man boxes, today steam and electricity do the job with a great deal more speed and a great deal less perspiration. Every year sees more economy and more mechanism. This is expected to be especially noticeable during the present summer and next autumn, as the river coal fleets grow in number and in unit capacity.

That work will progress more rapidly on the Ohio River to completion of the 9-ft. stage is shown in reports that \$5,000,000 has been appropriated for Ohio River lock and dam work, and \$375,000 for channel work, of the \$56,000,000 appropriation of Congress for river and harbor work, which action was taken over the protest of the Budget Bureau. The money for Ohio River work has already been allotted by Secretary Weeks. Large sums also have been allotted for work on the Monongahela, Tennessee and Cumberland rivers, all tributaries of the Ohio.

Upper Ohio River districts report some shipments of coal and oil, while movement into Louisville from the Kentucky River and Kanawha River continues good. Some of the local retailers who have not handled river coal for the past several seasons will stock it this year.

A Coal Gas Mainly Consisting of Hydrogen

A NEW method of making coal gas has been investigated by C. B. Tully, an engineer of Newark-on-Trent, Nottinghamshire, according to report received by the Department of Commerce from Vice Consul Herbert C. Biar at Nottingham. After three years of experimentation he has succeeded in considerably reducing the quantity of carbon monoxide in household gas from the 12 per cent which it usually contains. The experimental work is said to have definitely passed the research stage.

The inventor claims that not only is this invention valuable from the standpoint of health and safety but also for other reasons, such as the possibility of making a gas containing from 87 to 90 per cent of hydrogen for use in the manufacture of synthetic ammonia or for filling the gas bags of balloons and dirigibles.

The importance of the invention is said to be definitely proved by its adoption by new plants in various parts of the United Kingdom, and the London representative of a Japanese firm is reported to have arranged for an installation at Kobe, Japan.



TRACK LAYOUT ON
A ELEVATOR
INCLINE

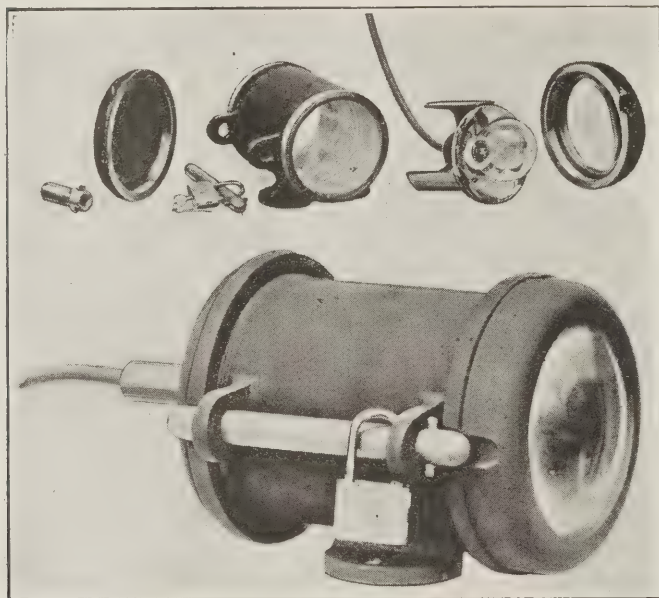
Some inclines are double tracked clear down to the water's edge, where a double loading hopper is used. In this case the hopper is single and the pair of balanced cars both load at the same point.

New Equipment

Permissible Headlight for Gaseous Mines

IN THE further development of permissible equipment the Mancha Storage Battery Locomotive Co. of St. Louis has recently placed upon the market a headlight suitable for use on storage-battery locomotives or any other type of machine, such as a coal cutter, used in gaseous mines.

The headlight is very simple in construction, being made of a few parts. It is nearly a round barrel threaded at each end to receive a cap after the insertion of the spider which carries the light socket, which



EXPLODED AND ASSEMBLED VIEW OF FLAME-PROOF PERMISSIBLE HEADLIGHT

Simplicity of construction, few parts and ruggedness are big features of this headlight. It is built to withstand the hard usage frequently experienced on haulage and coal-cutting equipment.

in turn is equipped with a railroad-type concentrated filament standard base lamp and reflector. Provision is made for locking the entire outfit in order to guard against tampering in the mine.

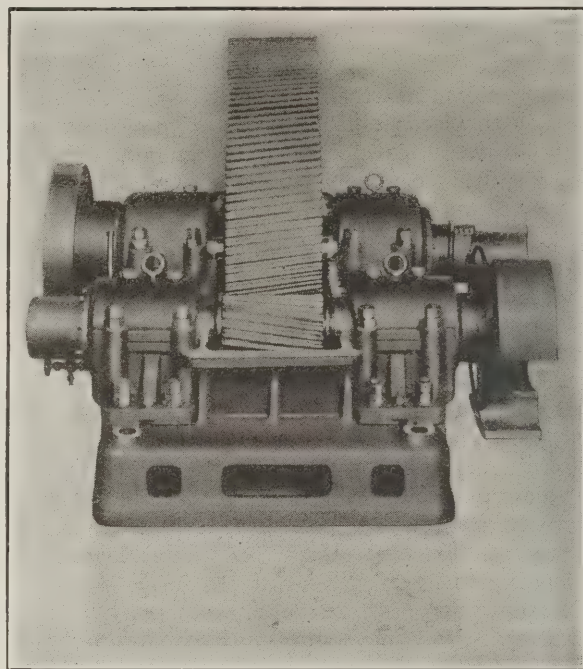
This headlight has received the approval of the U. S. Bureau of Mines at Pittsburgh, Pa., for use as flame-proof permissible equipment, having successfully met all requirements and withstood the necessary tests.

Helical Reduction Gear Unit

VARIOUS means have been adopted for reducing speeds of motors to drive slow-moving machinery and equipment around the mine, but a helical reduction gear unit, made by the R. D. Nuttall Co. of Pittsburgh, Pa., embodies the advantages of the helical gear.

The unit is made up of a gear and pinion meshed together and held in position by heavy bearings. The complete unit includes a casing which makes the gearing safe, free from dirt or falling bodies and provides a space for returning the lubricant. When the cover is over the gears, aside from giving complete protection it prevents spillage of the lubricant and permits a clean installation to be made in any place.

The slight angle of the teeth on the gear and pinion



SPEED-REDUCING UNIT

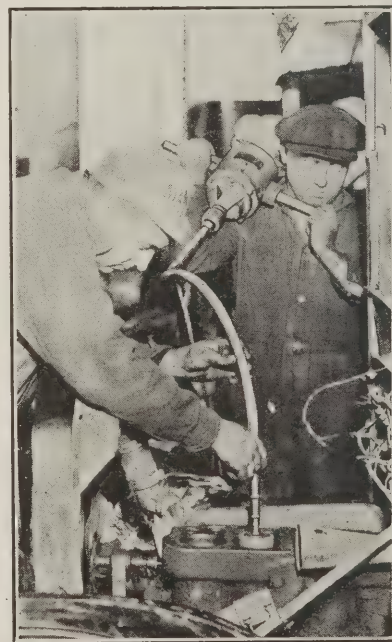
Helical gears result in smooth running. This unit economizes space and makes possible a safe installation that needs little attention or maintenance.

provides a condition which results in quiet running and no impact, insuring long life and even wear.

Its main field of application probably will be for screen, shaker, jig and fan drives. In these cases its application will permit the installation of the motor near the driven machine and result in economy of space and greater safety.

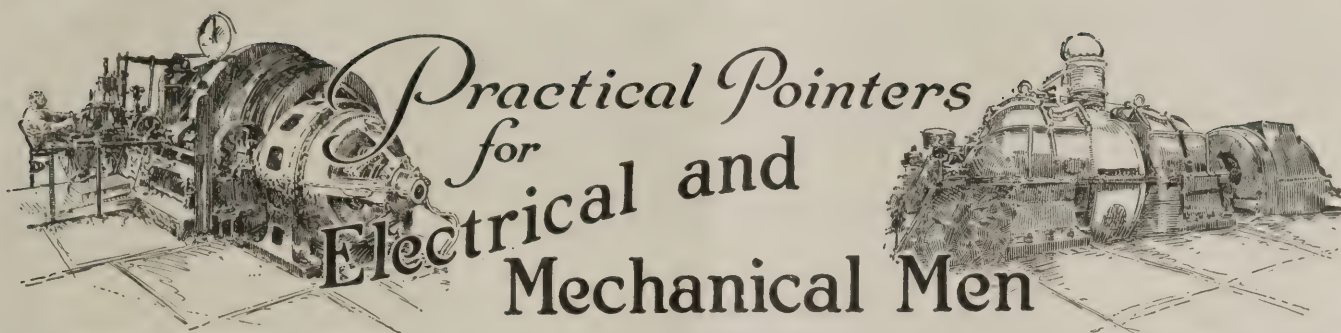
Flexible Drive Shafting

THE increased use of small electric motor-driven appliances has created a demand for flexible drive shafts and tubes. To meet this demand, the Stow Mfg. Co., of Binghamton, N. Y., have completed a line of sizes of flexible shafting which they are applying to a large variety of drives. Portable drills, tapping, reaming, wood-boring, grinding, and buffing machines, probably will be used more extensively around coal mines and in machine shops in the future, as the economy of carrying the tool to the job instead of the job to the machine is realized. The advantage of having the driver remote from the tool in confined places favors the use of flexible shafting, and it is in such applications that the shafting will have its greatest use.



OPERATING A PORTABLE GRINDER

The flexible shaft permits the application of electrical energy to repair processes that heretofore have been almost invariably done by hand.



Important Considerations in Making Insulation Tests

ELECTRICAL equipment employed at a coal mine is called upon to operate under conditions that make it essential to maintain close supervision not only in order to detect or avert mechanical damage but also deterioration of the insulation. The atmospheric conditions often vary between one portion of the mine and another. In the intake airways the temperature is normal and the moisture content of the air is unlikely to cause insulation damage as quickly as in the return airways, where moisture in the air often is excessive.

Regardless of the situation in which apparatus may have to work, however, it is essential, in order to avoid unexpected breakdowns, to make insulation tests regularly and record the results so that any falling off in resistance may be detected and the proper steps taken to prevent a breakdown.

For ascertaining insulation resistance the equipment usually employed consists of a magneto and an ohmmeter. These devices may or may not be combined in a single unit for the sake of portability. In any case the apparatus has two terminals, one of which is sometimes marked "line" and the other "earth." The terminal marked "line" should be connected during a trial to the winding of the apparatus to be tested, but the terminal marked "earth" should not be joined merely to some object that is grounded, for this procedure may lead to unreliable results and give a false indication. Provided each piece of apparatus has a ground wire attached to its frame it makes no difference whether the "earth" terminal of the testing set is connected to the frame or some other grounded object some yards away. There is always a possibility, however, of a ground connection being broken. The results of an insulation test in such a case might be misleading unless the earth terminal is connected direct to the frame of the apparatus being tested.

Thus equipment that is mounted on a dry concrete foundation may be completely insulated from the earth. The same applies to equipment set on a wood foundation, assuming in both instances that no ground exists. Obviously, in either of these cases, if, when making an insulation test, the "line" wire from the testing set is connected to the apparatus while the "earth" terminal is fastened to some grounded metal work remote from the frame of the machine itself, a break exists in the circuit a comparatively high insulation resistance will be indicated even though the insulation of the apparatus may be actually low, permitting leakage to the frame.

In view of such a possibility the safest way to test all apparatus underground where illumination is poor and broken ground connections may escape detection is to make insulation tests by habitually connecting one

wire to the machine windings and the other to the framework of the apparatus itself. Similar precautions should be taken in all kinds of testing. Unnecessary emphasis may seem to be laid on this detail, but experience has shown that an intelligent use of a testing set is not always the rule.

Effect of Low Lagging Power-Factor

WILL you kindly give in your columns a discussion on the subject of low lagging power-factor and how it affects the operation of transformers and generators. I am interested to have shown how it affects regulation and efficiency, also how it affects the load which the equipment can carry.

ELECTRICIAN.

Transformers are rated in kva. output; a 100-kva. transformer is supposed to deliver 100 kw. at unity power-factor at normal voltage and at normal temperatures; but if the power-factor should be lagging 60 per cent, the energy output of the transformer would be only 60 kw. and yet the current, and consequently the heating, would be approximately the same as when delivering 100 kw. at unity power-factor.

The regulation of transformers is inherently good, being for small lighting transformers about 1½ to 3 per cent for a load of unity power-factor and about 3 to 5 per cent at 70 per cent power-factor. Large transformers with a regulation of 1½ per cent at unity power-factor load would have about 6 to 8 per cent voltage regulation at 70 per cent power-factor.

Alternating-current generators also are rated in kva., usually at any value of power-factor between unity and 80 per cent. The deleterious effects of low-power-factor loads on alternating-current generators are even more marked than on transformers. They are decreased kw. capacity, decreased efficiency, impaired voltage regulation as well as the necessity for increased exciter capacity.

Assume the case of a generator designed for 80-per cent power-factor supplying a circuit whose power-factor is 60 per cent. It is probable that normal voltage at the rated ampere output could be obtained only with difficulty, even though at this power-factor the generator would only be delivering 75 per cent of its rated kilowatt load. The field losses and, therefore, the field heating of the alternator, when delivering rated voltage and current are greater at lagging power-factor than at unity. Increased losses and decreased energy output both cause a reduction in efficiency. The regulation of modern alternating-current generators usually is about 15 per cent at unity and about 30 per cent at 80 per cent power-factor lagging. The operation of transmission lines and cables at a low power-factor also results in lower kilowatt carrying capacity, lower efficiency and increased voltage drop.

Hence, low lagging power-factor on a system generally will mean greatly reduced capacity of generators, and, therefore, limited output of prime movers, greatly reduced capacity of transformers and lines, as well as increased energy loss and poor voltage regulation.

Importance of Demand Charge on Power Bill

NEARLY all power contracts made up and used by the electric power companies have a clause which deals with the subject of maximum demand. From various electric-supply catalogs which I have I find that there are such things as 5-, 10-, 15- and 30-minute maximum demands, yet there is not sufficient information in the catalogs to give a clear idea of just what is meant by maximum demand.

For years our company has been buying power on a contract which has in it a clause on maximum demand, yet I have been unable to find anyone around the colliery who can explain what it means and how it is obtained. The bills are paid each month and it is a sure thing that the maximum demand greatly influences the amount of the power bill. I have noticed at times that the actual power consumption is sometimes lower than at other times, and yet the power bill is higher. I am told that this is due to some effect produced by the maximum demand.

The situation is that here is an important factor in the power bill which costs real money in its effect on the power bill and yet it is not understood, and, consequently, not being understood, nothing can be done to keep the power bill down.

This is so strange a situation that I believe an explanation in your columns would be most interesting. At present it appears as if we are paying for something we are not getting and this is a means for holding the power bill at a high charge when the power consumption is low and therefore the bill ought to be low.

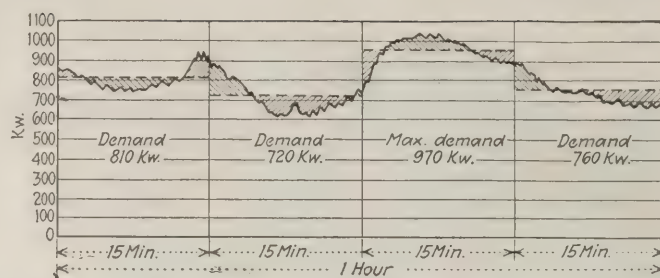
ELECTRICIAN.

Maximum demand, in electrical language, means the greatest average use of power during a certain agreed interval of time, 15 minutes being the period usually chosen. For example, the figure shows a curve indicating the irregular use of power during a one-hour period of operation of a coal mine. For the first 15-minute period the demand meter shows a maximum demand of 810 kw. Note that the maximum instantaneous peak is about 950 and the lowest point is 720 kw. What the demand meter does is to average all the instantaneous loads during the 15-minute period, or in other words integrates the load during that period.

Another way of visualizing what the maximum demand meter does is that it balances the oppositely cross-hatched areas and registers the location or value of the line which balances these two areas. The maximum 15-minute demand during the one-hour period shown in the figure obviously is during the third 15-minute period and its amount is 970 kw.

When the demand is on a 5-, 10-, 15- or 30-minute basis this means that the meter establishes an average over every 5-, 10-, 15- or 30-minute period during the whole period that the meter is installed.

Obviously, if a load is constant the maximum demand would be the same whether measured on a 5- or 30-minute basis, but when the load is irregular, the shorter the time interval the greater will be the maximum demand because there will be less opportunity for low



SECTION OF LOAD CURVE SHOWING
15-MINUTE DEMANDS

Maximum demand is the average 15-minute maximum load established during the metering period, it being an average of all the instantaneous demands during any 15-minute period.

instantaneous points to average down the high peaks which occur. When the time interval over which the maximum demand is obtained is long, there are more low points on the irregular load curve to help average down the high load points. This being the case, it is more desirable for a purchaser of electric power to have his demand established over a 15-minute period than over a 10-minute period.

For the power company to supply its customers it must have a certain generator capacity in its power house, and one purpose of the demand meter is to determine how much generating capacity is needed for each customer; and each customer is then charged an amount which in part is proportional to the generating capacity installed in the power house for his particular load.

A high maximum demand when once established usually is held by the power company as being the maximum demand for billing for several months due to the fact that if once established by the consumer it is necessary for the power company to be ready at all times for this load and necessarily it must keep in reserve the capacity required for carrying this load again.

Usually the power bill is made up of two separate charges, one being the demand charge and the other the energy charge. If the demand is relatively low the demand charge is low regardless of the energy consumption and energy charge. If the demand is high the demand charge will be high. For this reason it may occur that a high demand may be established during a certain month when the energy consumption is low and the preponderance of the demand charge will make the power bill higher than in another month when demand is relatively low and energy consumption high.

In most power schedules the charge per kilowatt of demand is at least about \$1.50. From this it is apparent that a continuous load of 100 kw. such as a pump will cost the consumer a demand charge of \$150 a month to run if it is run at a period when the other power-consuming apparatus is establishing its maximum. An important consideration at this point is that the cost to run this pump will be at least \$150 if the pump is run for as short an interval as only the 15-minute maximum demand period. The proper thing to do is to operate such equipment during the night if possible or at some time when the load on the other equipment is low.

For abnormal peak loads established during some accident, such as a ground on the system, most power companies make due allowance which the consumer should take advantage of by properly identifying the period during which this accidental demand was established.



Problems of Operating Men

Edited by
James T. Beard



Working Two Steeply Pitching Seams of Coal

General Outline of Conditions—Seams Reached by Double-Track Tunnel—Gangway Levels and Counters with Headings Driven to Rise

REFERRING to the inquiry of L. L. Travis, *Coal Age*, June 7, p. 942, allow me to suggest a plan that will apply to the working of steeply pitching seams such as he has described, assuming that both seams are gaseous, under the conditions prevailing in the locality from which he writes (Utah).

The five- and six-foot seams of coal mentioned are said to have an inclination of 45 deg. and to be separated by 125 ft. of solid strata, the hangingwall and footwall being each massive sandstone 20 ft. in thickness. As stated by the editor, it would have been helpful to know the exact physical conditions affecting the situation; but I will assume the proposition corresponds to the profile he has shown on page 942.

In addition to what has been said in the reply to this inquiry, allow me to suggest that this property should be opened and developed by two crosscut tunnels, one 7 ft. high and 16 ft. wide, to be used as the main haulage road and equipped with two tracks having an ample clearance on each side and between them.

PROVIDING FOR LARGE FUTURE TONNAGES

The road should have a grade of 8 in. per 100 ft., in favor of the loaded cars, and be well drained by a good ditch. This will make ample provision for an output of from 3,000 to 5,000 tons of coal per day when both seams have been fully developed.

The other tunnel, which will be used as a gangway and intake air-course for the ventilation of the mine should be driven 8 ft. 4 in. high, in the clear, and 12 ft. wide, giving a sectional area of 100 sq.ft. This opening also should be ditched on one side for drainage. In my opinion, it would not be good mining practice to open this property with a single tunnel, with an airway or manway bratticed off on one side, which would be hard to make air-tight.

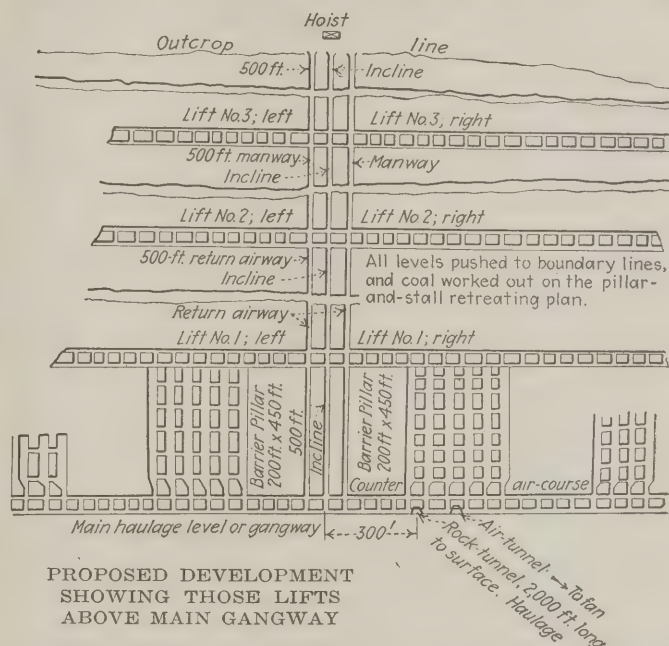
Assuming, as stated, the cross-tunnel is driven at a 2,000-ft. level, it would be necessary to drive two tunnels as I have suggested, in order to comply with the state mining law in respect to providing a second opening. The state law of Utah (Sec. 1513) forbids the employment of any person or persons as workmen in a mine, unless there are provided two distinct openings for each seam of coal worked. These openings must be separated by not less than 150 ft. of solid strata, at the surface, and not less than 30 ft., at any point where they are available in the mine.

An experience of 30 years in the working of pitching seams has taught me that where these are properly developed, they are capable of very large production.

In the present case, when the cross-tunnel has reached the lower seam, gangways or levels should be turned to the right and left in that seam and counter levels driven 50 ft. above, as measured on the pitch of the seam.

The main entry should be 7x12 ft., in section, and the counter levels or air-courses 7x10 ft., in section. Owing to the massive sandstone hangingwall, these entries will require very little timber. It should only be necessary to set posts, about 5 ft. apart, along the high side of the entry where the coal has to be lagged to keep it from falling on the track or floor of the opening.

In order to provide some immediate return on the large sum of money expended in the development thus far, in driving 2,000 ft. of double rock tunnel, the



lower lift of 500 ft. should be opened up in the under seam at once, by driving rooms 25 ft. wide, with 40-ft. pillars between them, and connected with crosscuts every 60 ft., measured on the full pitch of the seam, as I have indicated in the accompanying figure.

Again, while this necessary work is going on to supply needed coal, three raises should be started at a point 300 ft. from where the rock tunnel struck the coal. This distance will provide ample room for the side tracks required to handle the coal that will come from the upper lifts, later, when these are developed. The center one of these three raises should be driven 15 ft. wide and used as an incline to drop the coal from the different levels to the gangway below. These levels are located 500 ft. apart, measured on the pitch of the seam.

The two side raises flanking this incline should be 15 ft. wide and used as air-courses for their respective sides of the mine. A manway should be provided in

each by running a brattice 3 ft. from the rib and building a stairway for safe and easy climbing to reach the different levels.

It should be stated, here, that these upper levels are not to be started, until the incline and air-courses have reached the surface, where an electric hoist must be established at the mouth of the incline. This hoist should be capable of dropping five-car trips from any level to the gangway below, the cars being each of three tons capacity.

As soon as this is done, work on the several levels or lifts can be started and these entries should then be pushed forward to the boundary lines. A sufficient number of rooms should be opened on each lift to give the desired tonnage of coal. The rooms on the several lifts can be driven up in pairs with large panel pillars between them, say two rooms to every panel of 300 ft.

RETREATING SYSTEM MOST PRACTICABLE

My plan would be to start from the boundary and work out the coal on the pillar-and-stall, retreating system. I believe this would prove the most economical and practical method of working these two seams. Care should be observed to keep the workings in the upper levels in advance of those in the levels below, and to maintain the proper angle of the breaking line, as experience will determine.

The extraction of the coal in the overlying seam should be accomplished by driving crosscut tunnels from each level to the seam above, which will enable the coal to be brought out on the level in the seam below and dropped down the incline provided in that seam.

In closing, allow me to suggest that if this property is very extensive a series of inclines should be provided at points determined as being most convenient and practical for the extraction of the coal in both seams.

Glen White, W. Va. J. W. POWELL,
Shaft Contractor.

Entry of Air to Safety Lamps

Continual diffusion of gas prevents clear line of division between gas and air—Experiment to test a safety lamp with a carbide lamp to show entry of gas does not take place through the chimney.

SINCE the inquiry regarding the entry of air into a safety lamp was published in *Coal Age*, Feb. 8, p. 260, a number of letters have appeared in reference to the matter. In one of these, in particular, the attempt is made to show that much of the air entering a safety lamp passes through the mesh of the gauze just above the glass cylinder.

The writer of one letter (May 10, p. 761) in explaining that the purpose of providing entry for the air below the flame was to lessen the tendency of the lamp to smoke by reducing the conflict between the ascending and descending currents, strongly urged that there is always "a primary ascending current and a secondary descending current" within the combustion chamber of every safety lamp of the general type of the Wolf and the Koehler lamps.

Several years of practical experience with different makes of lamps, particularly the Koehler, in both the anthracite and bituminous fields, has convinced me that the entrance of air to the combustion chamber of either the Wolf or the Koehler lamp is practically confined to

the ports of entry below the flame and that no appreciable amount of air enters these lamps through the mesh of the gauze chimney.

In raising this question as to the entry of air into a safety lamp, the inquirer mentions a test made with a Burrell gas detector when the end of the rubber tube attached to that device was held on a level with the top of the safety lamp chimney, close to the roof in the mine. In this position the detector showed 1.7 per cent of gas and a faint cap was observed in the lamp. Then, on lowering both the lamp and the detector about ten inches, no trace of gas was found.

RAPID DIFFUSION PREVENTS CLEAR DIVIDING LINE

To my mind, this result was plainly due to the diffusion of the gas collected at the roof. Personally, I do not believe there is ever formed a distinct line of division between an accumulated body or layer of gas and the air, owing to the continual diffusion that is taking place between the two, as has often been explained in the columns of *Coal Age*. Any movement of a person walking in an entry or raising a lamp towards the roof very naturally disturbs the gas and causes it to mix more rapidly with the air.

On many occasions I have gone into places where, on lifting my lamp towards the roof no indication of gas could be observed until I blew gently against the roof and was then able to detect a faint cap on the flame of the lamp. These instances show that a thin layer of gas at the roof will not enter the top of the lamp; but blowing against the roof brought the gas down to where it entered with the air at the ports of entry below the flame.

Some may ask, "If diffusion was continually taking place between the gas and the air why was it necessary to blow the gas from the roof, in this case?" My answer is that the layer of gas at the roof was very thin and the zone of diffusion did not extend low enough to enter the ports of entry below the flame. It is my belief that the discharge of the heated air and products of combustion through the gauze chimney of a lamp prevents the entry of air or gas at that point, under all ordinary conditions.

TESTING A SAFETY LAMP WITH A CARBIDE LAMP

After reading the several letters setting forth the views of writers on this subject, I decided to make the experiment of testing my safety lamp with the acetylene gas generated in a carbide lamp, after the manner that some readers will recall was described in a previous issue of *Coal Age* (Vol. 22, p. 760), under the title "Testing a Safety Lamp with a Carbide Lamp."

For that purpose, having assembled and lighted my safety lamp, I charged the carbide lamp with fresh carbide and turned on the water but did not light that lamp. Holding the carbide lamp in a position near the top of the safety and allowing the gas generated by the action of the water on the carbide to play about the chimney of the safety lamp, there were no apparent results, as the flame gave no indication of the presence of the gas.

However, on lowering the carbide lamp to a point near the level of the ports of entry below the flame there at once followed a series of miniature explosions within the combustion chamber. I concluded that if the gas-charged air, which surrounded the chimney in the first case, could have entered through the mesh of the gauze the same small explosions would have been

produced within the lamp, as in the second case. Let me say that this is offered in no spirit of criticism but in the hope of shedding further light on a most important subject.

REESE THOMAS.

Royalton, Ill.

Inquiries Of General Interest

Machine Mining When Working Steep Pitches

Difficulty in Keeping Machine Up to Its Work—Suggests Use of Cable and Winch Located Above Panel and Operated by Control Switch on Machine

READING the inquiry of L. L. Travis that appeared in *Coal Age*, June 7, p. 942, regarding the working of two seams having an inclination of 45 deg. reminds me of a proposition of another kind with which we are confronted in the working of a seam of coal on an equally steep pitch.

In regard to the best method of working out the coal on such steep inclinations, allow me to suggest that our experience has proved quite conclusively that the longwall retreating panel system is the most satisfactory method to adopt, provided the conditions are such as to admit of applying that system successfully. Our proposition differs from that described by Mr. Travis only in the fact that our mine is opened on a slope, which avoids the necessity of driving the long rock tunnel he mentioned.

In my opinion, the adoption of a system of mining that is capable of recovering the largest possible percentage of lump sizes is of paramount importance. After carefully considering the adaptation of different methods of mining the coal and being forced to admit the limitations of the punching machine, our choice fell on the chain machine as being the best means of cutting the coal.

However, the use of a chain coal cutter, on a 45-deg. pitch, presents one almost insurmountable difficulty and that is, keeping the machine up to its work. After trying different means of overcoming this trouble, a scheme has suggested itself to my mind that I would like to present for the consideration of *Coal Age* readers, many of whom have doubtless become expert coal cutters, under varying conditions.

My idea is to develop a chain machine containing, within itself, only the mechanism for driving the cutter chain. This machine would be attached to and supported by a cable dropped down the incline, from a winch located on the level above the panel being worked. The operation of the winch is to be controlled by a switch on the coal-cutting machine, within ready reach of the operator or machine runner.

It is needless to say that this winch must be a very slow-speed affair, designed to meet the conditions required where a slow winding drum is electrically operated. In this plan, it is clear that the coal forming a panel would be taken out in consecutive skips reaching from the bottom to the top of the panel. The machine

can be held into the face of the coal by the post and chute boards usually built on such a pitch, for conducting the coal to the mine cars in the level below the panel.

Allow me to ask of *Coal Age* and its readers if this scheme appeals to them as having any value that would recommend its trial and adoption where conditions will permit. As far as my knowledge goes, the greatest difficulty, in the application of longwall chain machines to the cutting of coal on heavy pitches, is the inability of the machine to feed forward without containing within itself such a heavy driving mechanism as to make it cumbersome and difficult to handle.

Seattle, Wash.

WILLIAM STRAIN.

It is not clear what plan this correspondent has in mind, regarding pillar support on the upper side of the panel. In working out the coal on a longwall retreating panel system, where a mine has been opened by a slope driven on the full dip of the seam, it is assumed that the extraction proceeds, lift by lift, in regular order, from the surface downward, leaving sufficient pillar protection at the outcrop to prevent surface drainage from entering the mine.

In this plan, it is natural to assume that the gangway levels are driven to the right and left of the slope and extended to the boundary lines, where the panel is cut across between two consecutive lifts and a longwall face opened extending from bottom to top of panel, on the full pitch of the seam.

Assuming the conditions in the roof and floor of the coal are favorable, it would seem that the correspondent's plan has merits that would recommend its trial in any particular place. *Coal Age* will be glad to receive comments giving the opinion of its practical readers who have had experience in the operation of coal produced on steep pitches.

Can Blackdamp Become Explosive

Reduction of carbon dioxide to carbon monoxide makes mixture explosive—Coal dust suspended in air and rendered incandescent by flame the active agent.

THERE has been some discussion here, recently, regarding the question of whether a body of blackdamp can be transformed into an explosive mixture, under any conditions that can possibly exist in the mine. The contention of a few that this is possible has led us to submit the question to *Coal Age*, hoping for information that will settle the dispute.

STUDENT.

Houston, Pa.

It is true that, under the conditions existing in a mine at the moment of an explosion in which coal dust has played an important part, the carbon dioxide (CO₂) formed by the explosion may be reduced to carbon monoxide (CO), owing to the presence of large quantities of incandescent particles of carbon (coal dust) floating in the air. However, this fact can hardly be taken as answering the question, whether blackdamp can be rendered explosive under conditions that may exist in the mine.

As is well known, blackdamp is a mixture of carbon dioxide and air. Such a mixture is deficient in oxygen by reason of the presence of the gas. Assuming that the blackdamp in question has been produced by other causes and is not the immediate result of an explosion,

it can be stated that the mixture cannot be rendered explosive under any conditions that may commonly exist in the atmosphere of a mine. The condition, in such a case, is quite different from that resulting in the production of carbon dioxide in the presence of quantities of coal dust floating in the air and rendered incandescent by the flame of the explosion.

In this latter case the mixture formed by the explosion can hardly be described as blackdamp, although having much the same composition except for the presence of the incandescent carbon particles, which are the active agent in the reduction of the carbon dioxide to carbon monoxide and the formation of an explosive condition on the addition of fresh air. Therefore, in answer to the question asked, we would say that, in the general understanding of the term "blackdamp," such a mixture cannot be rendered explosive under conditions that commonly exist in a mine.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—*An entry has 17 working rooms. Rooms 11 and 12 are full of gas. Men are working in Rooms 13 to 17, inclusive, also in the entry and air-course. State how you would remove this gas, the air being conducted on the split system.*

ANSWER—Before making any attempt to disturb the gas accumulated in Rooms 11 and 12, notify the men working in by of these rooms to extinguish their lights and withdraw promptly and as quietly as possible. At the same time, notify all the men working on those entries to withdraw from the mine. This being done and having selected reliable and experienced men to assist him, the fireboss should station a man at the mouth of the entries with instructions to permit no one to enter.

Then, having increased the circulation as far as this can be done with safety to other sections of the mine, proceed to turn practically all of the air into Room 11, by building a brattice or hanging a canvas just in by from the mouth of that room. Use none but approved safety lamps that have been carefully examined before starting the work. If necessary, extend brattice up the mouth of the room or start it from the outside rib of the last open crosscut between that room and No. 12. The brattice should be extended gradually toward the face, keeping a careful watch of the lamps and making frequent tests to determine the progress of the work.

When all the gas has been driven from the face of Room 11, the same work must be performed in Room 12, by extending the brattice gradually, from the outside rib of the same crosscut to near the face of Room 12. It may be a good plan to hang a canvas in the last open break through between Rooms 12 and 13, in order to prevent the gas from passing out through the last four rooms on these entries. If convenient to do so, a crosscut on the entries may be opened to allow the gas to pass at once into the return air-course.

Finally, the work must be continued from room to

room and at the face of the two entries, until all the places have been swept clear of gas. Every place on these two entries must be carefully examined and found to be safe for work before men are again permitted to enter.

QUESTION—*What do you assign as the cause of the greatest number of explosions of firedamp?*

ANSWER—Probably the greatest number of gas explosions have been caused by the careless use of open lights in places supposed to be free from gas or generating but a small amount not considered dangerous. Another frequent cause of explosions of gas is the use of defective safety lamps. A third but less frequent cause is due to the presence of matches and smoking material carried into the mine in violation of the rules and regulations of the place.

QUESTION—*How would you conduct your examination of a gaseous mine to ascertain its true condition?*

ANSWER—Equipped with an approved type of safety lamp that has been carefully examined, assembled, lighted and tested, the examiner should enter the mine or section to be examined and follow the intake air throughout its course, having first noted that the usual quantity of air is in circulation and passing into the section. Each entry, passageway and working face should be examined for all possible dangers that may exist. A careful test for gas must be made at or near the working face of each place examined and the roof and coal closely inspected and its condition noted. Where bad top is found this should be marked to be taken down or made secure by timbers. The quantity of timber, posts and tracks should be noted in each working place.

QUESTION—*Describe the different systems of ventilation in use.*

ANSWER—Aside from natural and furnace ventilation employed under conditions favorable to their use, the two general systems of ventilation are known as the blowing and the exhaust systems, respectively. In the blowing system, the mine is ventilated under a pressure greater than that of the atmosphere. By means of a fan air is forced into the mine against the frictional resistance of the airways, which must be overcome by the pressure due to the action of the fan.

In the exhaust system of ventilation, the mine is ventilated under a pressure below that of the atmosphere. In this case, the action of the fan creates a depression in the fan drift; and the atmospheric pressure, acting on the other opening, forces the air into the mine against the frictional resistance of the airways. The ventilating pressure is then the difference between the atmospheric pressure and the vacuum or depression created by the fan.

QUESTION—*If certain working places in a mine generated gas frequently and other working places gave off little gas, which would you examine first in making your rounds in the morning and for what reason?*

ANSWER—In the absence of other reasons that would change the order of the examination, a fireboss should first examine the places generating little gas, leaving those generating gas in larger quantities until the last. The reason for this is that there is more danger of gas accumulating in places generating gas freely, between the time of making the examination and the entrance of the men for work. If these places are left and examined last their condition when the men enter for work will correspond more closely to that found by the fireboss in his examination.

Mine Inspectors Talk Safety from Many Angles In Convention at Pittsburg, Kansas

Firing mine shots by radio, making mine electrical machinery and equipment really safe, using water effectively to reduce "bug dust" in machine cutting, training men to be real miners instead of dangerous novices—such subjects as these were discussed by the Mine Inspectors' Institute of America at its Pittsburg (Kan.) convention, July 10-12, in such a way as to be helpful to coal mining. The essentials of the convention were reported in last week's *Coal Age*, but much of the discussion was left for this issue.

Inspector James Dalrymple, of Colorado, took the lid off. He had tried since last summer's convention to sound out Colorado opinion on what should be done to lessen the hazards of running electrical machines, but got only eleven answers from sixty letters. Eight were for limiting the use of such machines only in most gaseous mines, and against any other limitation. Eight also were for putting machines under strict requirements to make them permissible before they could be sold.

Mr. Dalrymple's own opinion is that insulation is the most important factor in electrical safety. He believes 95 per cent of insulation is bad. In wet places he thinks cable, for instance, would be safer if it were bare because moisture damages practically all insulation; he believes the miner puts too much confidence in it. That is the reason in the last nine years in Colorado seventeen men have been electrocuted by trolley wires and twenty-four by new insulated wires.

"We should have all electrical machines the safest that it is possible to build," said he, "and passed upon by the Bureau of Mines, not merely by the manufacturer, who is financially interested."

WOULD EQUIP FANS WITH AUXILIARY POWER

He held that ventilating fans should all be equipped with auxiliary power. In Colorado power goes off so frequently that a fan without auxiliary power is dangerous. Gasoline-engine auxiliaries are going to be advocated for Colorado by a joint conference of insurance-company inspectors and state inspectors. In nine years ten Colorado miners have died because of fan failure and something must be done about it.

President Lambie, in the discussion, suggested that to make machines in mines conform to permissible regulations every machine should be examined by a Bureau of Mines man after delivery at the mine where it is to be used. Dr. J. J. Rutledge, chief of the Maryland Bureau of Mines and long in the government service, said that at present the U. S. Bureau checks up on permissible explosives manufacturers by surprise tests and that possibly the electrical section does the same thing on electrical machines that bear the Bureau's approval of design, but that a real source of trouble lies in the fact that manufacturers nowadays adopt their own "permissible" standards and so label their output. This often confuses the buyer and the miner.

"There should be government standards for everything electrical," contributed Chief Inspector James Sherwood of Kansas, "and they should be rigidly enforced." He thinks the practice of snipping cable connections onto trolley lines should be prohibited along with all other uninsulated connections. His opinion is that danger from electricity increased when direct current began to give way to alternating current. Line surges too short to damage machines have killed men on circuits with voltages as low as 110. Dr. Rutledge suggested that storage-battery cutting machines are practical and should be safe enough for anybody.

"But when all is said and done," offered Martin Bolt, assistant director of the Illinois Department of Mines and Minerals, "what are we inspectors to decide when electrical engineers can't agree on what should be done?" Inspector V. E. Sullivan, of West Virginia, said inspectors at least could do their best by publicity to advertise the dangers of electricity and keep miners on the watch.

Before the end of the convention the institute, although disapproving Mr. Dalrymple's contention that all electrical machinery and equipment should be made permissible by the Bureau of Mines, resolved that the bureau be requested to make every possible effort to discover means to make such equipment "as safe as possible."

A novel plan of wetting "bug dust" was reported in use by the Tennessee Coal & Iron Co. Frank Hillman of the Woodward Coal & Coke Co. of Alabama said the scheme is to loosen the plates on the cutter bar of a mining machine and lay in the groove therein a $\frac{1}{2}$ -in. pipe. Water playing out the open end of this pipe is right at the cutting point and is carried into the kerf and mixed with the dust much more thoroughly than by merely running water on the top of the cutter bar. The machine dust comes out as mud and is therefore thoroughly wet down and as little dangerous as dust can be.

The institute so thoroughly approved of this plan that it passed a resolution mentioning the scheme and favoring "the application of water wherever practicably possible," especially in cutting. The word "practicably" was inserted after it was considered that in some fields water is scarce and expensive.

Mr. Hillman said washing down not only floor but ribs and roof and the tops of outgoing loads in Woodward mines is regularly practiced. This is considered good protection against both the start and the spread of explosions. In the Dolomite blast, he said, it was significant that the explosion traveled only 400 ft. from the bottom into the mine.

Mr. Sullivan contributed the information that dust explodes because of the gases in it. They invariably travel up an incoming air stream because the oxygen in the new air forms the nucleus for combustion from the initial flame.

Rock-dust "barriers" made famous by the old Ben Coal Corporation in Illinois "are all right, but they can't prevent a blast from starting," according to Inspector Hoey, of a southern Illinois inspection district. "You can't put them close enough to the face," said he. "They must be hung over panel entries. I know of them stopping just one explosion and that was at night when nobody was around. What if the regular thirty-two men had been on duty in that pair of entries just then? They would have died, no doubt. So it is necessary to prevent blasts at the source."

Salt stemming helps in Kansas, Inspector James Sherwood said. Mr. Bolt told of locomotive sand along a haulage way acting as a rock-dust barrier, stopping an explosion in Old Ben No. 11 mine.

WOULD BAR BLACK POWDER AS MENACE

It was almost unanimously agreed that black powder is a menace to any mine and should be barred forever, even though it often permits of getting out a bigger percentage of lump.

Compelling men to be safe is difficult business, but there are some methods worth trying, Secretary J. J. Walsh, of the Pennsylvania Bureau of Mines, said in his letter to the convention. Notwithstanding all the Pennsylvania laws and rules, accidents occur with appalling frequency, largely because men become indifferent to danger by constant association with it. This, he said, is particularly true regarding roof-fall accidents, which cause about 50 per cent of the state's casualties each year.

"What can be done?" he queries. "It is doubtful if additional legislation would prove of much benefit, for the reason that the laws already in force, if strictly obeyed, would insure the safety of the men who are taking down coal. The only thing that can be done to lessen the casualties that occur from this cause is to bring the workmen to a clearer sense of their responsibility. More competent and careful supervision by the mine officials also would be help-



OFFICERS OF MINE INSPECTORS' INSTITUTE OF AMERICA AND SOME OF THOSE IN ATTENDANCE
AT THE CONVENTION IN PITTSBURG, KAN.

Front row, left to right: Dr. J. J. Rutledge, director of the Maryland Bureau of Mines, Institute treasurer; Martin Bolt, Assistant Director, Illinois Department of Mines and Minerals, Institute secretary; Frank Hillman, safety engineer for Woodward Coal & Coke Co., second vice-president of the Institute; R. M.

Lambie, West Virginia chief mine inspector, retired president of the institute; James Sherwood, Kansas chief mine inspector, new president; James Dalrymple, Colorado chief inspector, first vice-president; E. J. Hoey, Illinois district inspector, third vice-president, and J. S. Rogers, assistant secretary.

ful. Both employees and officials grow careless in their work and there is need for discipline that will strictly enforce obedience to the laws and rules governing safety—discipline that metes out severe punishment to the men in charge and to the employees who, by carelessness and recklessness, place in constant jeopardy the lives of the men in the mines.

"A specific suggestion may be made in urging more systematic propping. The foreman and the superintendent should decide on the distance between the props, and the foreman or assistant should insist on strict compliance with the decisions thus made. When this is done the matter of safety then rests with the miner, and no person can do anything more to safeguard life unless it be the fireboss, assistant foreman or foreman who may happen to visit a place at a critical period and be able to give warning of impending danger. As the miner is alone at the face about 90 per cent of the time during the day, he should be taught how to protect his own life.

"It is the aim of our department in its effort to reduce accidents by falls to have more frequent examination of the different chambers in the mines. With the co-operation of the miners and the operators we hope to have the face of each chamber examined by the miner five or six times daily. This would mean more than 750,000 roof examinations every day in the mines of Pennsylvania."

What effect does accident compensation have on accidents? The general feeling of the institute is that there has been no marked decrease. Everybody agreed that reported injuries—especially minor ones—have at least doubled, but that this does not prove actual injuries are any more numerous than they were before. Although compensation should have reduced accidents by bringing about stricter inspection and more rigid enforcement of safety rules through insurance-company pressure, this has by no means worked out.

There have been too many cases of coal companies paying an insurance penalty rather than spend the money to make specified safety improvements, according to Dr. Rutledge. He thinks state compensation commissions should have more power to stop that sort of thing. Mr. Sherwood said the abuse of compensation is general and that the cost to coal companies is shamefully high. Somebody is not enforcing the safety regulations, he declared, or accidents would be reduced 50 per cent.

Saying that compensation should reduce accidents but doesn't, Martin Bolt supplied the information that in Illinois the situation is so bad that old-line insurance companies have raised rates from \$3.50 to about \$6. There not only have reported minor accidents multiplied but reports of major hurts causing time losses of thirty days or more have doubled. Mr. Dalrymple suggested that miners should be made to bear 10 to 20 per cent of the cost instead of the operator bearing it all. That, he thought, would bring miners around to a sounder view of compensation.

The only man who had noted a reduction of accidents since compensation legislation went into effect was Frank Hillman, of non-union Alabama. He said his company, the Woodward Coal & Coke Co., gets real aid in inspection from insurance companies, and accidents in the state have been reduced.

The general sentiment was that unionism defeats much safety effort and that strict discipline by companies over miners would be a remedy.

Chief Inspector Sherwood advocated a codification of the mining laws of the nation in their safety provisions, declaring they should be uniform in all states except as to certain local details. One uniformity he proposed was a national certification of miners. Every man should pass an examination before he is permitted to enter a mine as a full-fledged miner.

"As it is now in Kansas," commented Mr. Sherwood of his own state, "an Italian can come out of New York with a bear and tambourine, leave the bear and tambourine at a mine mouth and go in as a miner. He is a constant danger not only to himself but to everybody else in the mine. All the operator can do about it is pay him and make sure the pay is on time. I believe every miner should be required to learn to read and write English so as to understand safety signs before he gets his miners' certificate. Also he should be required to possess a first-aid certificate. The issuance of such certificates should be in the hands of competent and unbiased persons and each certificate should be revokable at every violation of the safety regulations."

Mr. Bolt was for uniformity of as much as possible of mining laws, but not all features because there is too much variation between states. He favored first-aid certificates but issued only after a man had learned mining and had had underground experience. However, he knew the operators of the country would be against such a certification

plan, contending that it would seriously shorten the labor supply.

The apprentice system was Inspector Dalrymple's suggestion for the proper way to make new miners. No examining board can tell whether a man is careful and of good enough judgment to be fit to be a miner; only an instructor after long acquaintance with him could tell that. He also saw operator opposition to any extension of the mine-examining-board plan because through state boards the union can bar all non-union candidates. There was much favor among the inspectors for the apprentice plan, but J. S. Rogers feared it would merely permit a man to qualify a son or relative prematurely in order to increase the family income; but that the plan would be good if the instructor was allowed merely to say when a man was ready to take a state examination.

The service of the U. S. Bureau of Mines to the mine inspector and to the industry as a whole was discussed by Dr. Rutledge, who has been connected with the bureau fourteen years. He spoke of the valuable work the explosives section of the bureau had done to prove the constant danger of mine dust and to test and grant permits for permissible explosives. He prophesied that some day, through the bureau's research, the country will be firing shots safely by radio and will be using a granulated permissible producing as high a percentage of lump as does black powder.

Illustrating the service of the bureau's electrical section he told how its engineers broke no less than 20,000 lamps before their rigid requirements for lamps were fulfilled. The electric cap lamp alone is worth the whole cost of the section, he thinks. He prophesied it will some day give the industry a sparkless motor and safer mining machines and that one of its best gifts will be a thoroughly good electric shovel.

The chemical section has done many things for greater mine safety. It can tell in two hours after it receives a sample of air drawn from a sealed off fire section of a mine whether that section is safe to open. From its proximate analyses of coal samples it can determine the explosibility of the dust of that particular coal. Such determinations are dependable warnings to an operator of dangers to be guarded against.

The bureau's experimental mine 13 miles from Pittsburgh, Pa., has tried out almost everything imaginable in coal mining—explosive conditions, gasoline locomotives, underground automobiles.

"The bureau has done so much of direct benefit to mine inspectors," said Dr. Rutledge, "that it is hard to imagine anything else it could do. However, I think it should keep on broadening its scientific investigation. It should have demonstration mines in many fields. It should devote more time to demonstration of the best mining methods or soon our most scientific method of mining—the longwall—will be lost. Field men should supply confidential reports to state inspectors on accidents. I do not mean that the present system of issuing everything only from headquarters should be broken down, but I do believe state men should get confidential reports such as I mentioned."

Further, Dr. Rutledge urged solemnly that a uniform code of mine safety be worked out on the order of the boiler code of this country. There should be uniform methods of marking for all safety investigations also.

President Lambie declared one of the most beneficial things the bureau's engineers could do for the safety of mining would be to develop a machine that will eliminate explosives. If a machine is ever made efficient which can shear, undercut and pull down coal, not only will mines be much safer because roofs will not be loosened by shock, admitting gas and causing falls, but coal will be cleaner and bigger.

Mr. Dalrymple said the "hydraulic cartridge" machine developed in Colorado years ago may some day answer the purpose, especially if the Frick coal interests of Pennsylvania take it up for further development, as they now talk of doing.

W. D. Ryan, of the bureau's field force, spoke at the close of the Wednesday session, dealing with the good feeling that now generally exists between state and bureau men, declaring it should continue always.

Editors Favorable to Anthracite Report of Coal Commission

Most Papers Approve Recommendations—Stand on
Nationalization Commended—Opinion Divided
on Federal Operation in Emergency

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

If newspaper editorials reflect the opinion of the public, the U. S. Coal Commission's report has the approval of the vast majority of the people, for the comment favorable to the report greatly exceeds the criticisms. It is particularly noticeable that a large number of these editorials approve what the Commission has recommended and would go even further in the effort to insure a constant supply of coal. It is not only the newspaper that is elated over the election of Magnus Johnson which advocates doing what the Commission recommends and much more, but vigorous editorials to that end have appeared in the conservative papers of the country—publications which are outspoken against the radical tendencies which have flared up in the Middle West.

The returns from the clipping services indicate that an unusual amount of newspaper space has been given to this report and to editorials commenting on it. With few exceptions, they accept the Commission's belief that the mining and distribution of anthracite are matters which affect the public interest in a legal way and that there is an obligation of the part of mine operators and mine workers to give continuous service.

A few papers characterize the whole report as unfair and as constituting a dangerous precedent in its proposals which require publicity of accounts and otherwise allow the federal arm to be thrust into private business. Some editorials take the ground that the Commission has recommended nothing that is likely to be put into effect and as a consequence has wasted \$600,000 of public money. Almost all of the editorials agree with the Commission's stand on nationalization.

Opinion is very much divided as to whether the President should be empowered to take over the operation of mines during an emergency. The opinion is expressed that the Federal Government would be no more successful in inducing the men to return to work than would be their regular employers. Nearly all editorial writers who touched on that point show skepticism as to the ability of the government to obtain anything like a normal production of coal. Some of the editorials reflect opposition to the compulsory divulgence of so-called business secrets.

Some of the newspapers, not unfriendly to the plan, doubt its feasibility because of the legal difficulties involved in attempting to establish federal control over mines or even to force publicity of accounts. In that connection attention was called to the fact that the Supreme Court of Indiana in passing upon the Fuel Commission Law of that state held in effect that the state has no authority to fix conditions of mining and to set prices on coal since the commodity is likely to be carried in interstate commerce. At about the same time a court in the District of Columbia ruled that the Federal Trade Commission has no right to demand production costs because mining is not interstate commerce.

In accordance with the plan already announced, the Commission has begun the issuance of some of the material on which its anthracite report was based. The first exhibit is the study of earnings of anthracite miners made by Miss Anne Bezanson. Other exhibits will be forthcoming at frequent intervals in the future.

Resume Anthracite Wage Conference

Representatives of the anthracite mine workers and operators resumed their conference at Atlantic City July 23 in an effort to arrange a new contract to replace that now in force, which will expire Aug. 31. The parleys were interrupted for ten days to permit the miners' representatives to attend the biennial convention at Wilkes-Barre.

Brief by Farrington to Coal Commission Blames "Gunmen" for Herrin Massacre

CHICAGO, July 24.—Frank Farrington, president of the Illinois mine workers' union, on July 21 made public a brief he was sending to the United States Coal Commission in answer to the brief of the Bituminous Operators' Special Committee, which condemned the union for its activities in connection with the Herrin massacre. Farrington's reply paints the operator of the Herrin strip mine in dark tones and his gunmen in deepest black. "The operator, W. J. Lester, had no business importing hired killers into a mining neighborhood, peacefully awaiting the end of the 1922 strike," says the brief, "and the gunmen had no business insulting and robbing people on the public highways near the strip mine and otherwise driving the naturally peaceful people of Williamson County to take up arms in self-defense." The authors of the brief express the hope that the slaughter which followed the capture of the mine guards will teach American industry that the day of the hired gunman is over.

Ask Rehearing of Assigned-Car Case

Application for a rehearing in the assigned-car case was made to the Interstate Commerce Commission Wednesday, July 18, by various of the subsidiaries of the United States Steel Corporation. In this application it is contended that the present record is insufficient to enable the commission to reach a fair conclusion in respect to the use of private coal cars by these concerns. The petition points out that not one pound of coal mined by the parties to the request is marketed, sold or shipped in competition with coal mined in the same or in adjacent districts. It is pointed out further that the nature of the manufacturing process requires continuous operation of steel plants. The distances between the plants and their coke ovens on the one hand and the mines on the other require the use of private cars to insure continuity of coal supply.

Counsel for the National Coal Association is engaged in the preparation of an answer to the brief of the railroads in the assigned-car case. The brief is being written by E. S. Ballard, of Butler, Lamb, Foster & Pope, of Chicago, who successfully prosecuted the case which resulted in the recent favorable decision.

Interior Official Denies Federal Coal Plan

A detailed plan for government operation of mines in the anthracite field has been prepared by the Bureau of Mines and Interior Department officials, says a front-page news article printed in the Washington *Evening Star* of Tuesday, July 24. The plan was worked out during the last strike, says the article, but can be put into effect in 24 hours, if needed. Acting Secretary of the Interior Finney authorized the Washington correspondent of *Coal Age* to deny the report absolutely. Further denial was made by Acting Director Dorsey A. Lyon, of the Bureau of Mines.

Alabama Union Fades; Autonomy Abrogated

The United Mine Workers of America abrogated the autonomy of District 20, having jurisdiction over Alabama territory, effective July 1. Inability of the district organization, after more than thirty years of existence, to be self-supporting was the reason assigned for suspending the autonomy of the district organization and the dropping of local officials from the payroll. The International union has placed International representatives in charge of the remaining remnant of union locals. The open shop is more strongly established in Alabama coal mines than ever before in the history of the industry and efforts to organize the mine workers of Alabama effectively has ever been signally ineffective, though the national organization has expended millions of dollars in Alabama on organization work and

backing strikes, none of which was ever won by the union forces.

According to a statement released by the United Mine Workers, the U. S. Coal Commission has been asked by the miners' union to investigate conditions under which Alabama mining companies are said to employ convict labor. A letter made public July 22 by the United Mine Workers, carrying the petition, said that reports, "spread broadcast," indicated that convicts had been "compelled to suffer torture" in order that "non-union mining companies might reap a profit."

In addition, the union's letter asserted that "Alabama non-union coal companies have hammered wages of mine workers down since last year" and lowered costs of coal production, but at the same time had raised the prices of coal. The unnamed concerns were said to be "gouging the public pocketbook in shameless fashion."

Strike Situation in Nova Scotia Clearing

The situation in the bituminous-coal fields of Nova Scotia is "rapidly clearing up," according to a statement made July 22 by John L. Lewis, president of the United Mine Workers. Reports which Lewis has received from Provisional President Barrett indicate that in a dozen of the 100 local unions embraced in the district the miners have voted to return to work in obedience to the orders of the international president, and that in probably two-thirds of the remaining locals referendums have been started to allow every individual miner a chance to express either his allegiance to the authority of the international or his allegiance to the deposed officers of the district.

A factor in the speedy settlement of the Nova Scotia trouble, it was pointed out, was that the strikers are now without funds.

On July 18 President Lewis revoked the charter of District No. 26, embracing the Nova Scotia field. At the same time he removed from office District President Daniel Livingstone, District Vice-President Alexander McIntyre and District Secretary-Treasurer J. B. MacLachlan, and set up a provisional district to function within the jurisdiction of former District 26, under the international union representative, Silby Barrett of Glace Bay.

Lewis instructed union miners in the district to return to work and advised the British Empire Steel Corporation, against which an unauthorized strike has been pending, that the international union has assumed the obligations of the existing joint wage agreement.

The trouble in Nova Scotia started when 8,000 of the 13,000 miners in District 26 two weeks ago went on unauthorized strike to protest the presence of provincial police and militia in the district to watch the property of the British Empire Steel Corporation, Ltd. whose employees are on strike. As soon as he learned of the strike Lewis sent word to his representative to order the men back to work. His orders were ignored.

The miners in the Drumheller coal field of southern Alberta went out on strike on July 13 as a mark of sympathy for the miners in Cape Breton, N. S. High union authority ordered the men back to work until a vote of the whole of the members of the union had been taken, but the men refused to obey the order and still are on strike. The mines have been picketed, but the men operating the pumps are allowed to work.

THE AMERICAN RAILROAD ASSOCIATION has agreed to qualify its recent statement to the effect that there is no shortage of open-top equipment for coal loading. Following the issuance of a statement to that effect, specific instances were cited by the National Coal Association which had been overlooked at the time the statement was prepared.

APPLICATION TO BUILD A 15-MILE BRANCH of railroad to permit of opening of coal mine was made Tuesday by the Okmulgee Northern Ry. Because of the recent action of the I. C. C. denying similar privilege to the Virginian, the applicant presents an argument with the application to the effect that coal could be sold cheaper than that of other mines now served.

Coal Commission Not to Urge Extra Session of Congress; Annual New England Alarm Sets In

John Hays Hammond, chairman of the U. S. Coal Commission, and Commissioner Thomas R. Marshall stated July 22 at Mr. Hammond's home in Gloucester, Mass., that there would be no strike in the anthracite fields next autumn, that the Coal Commission will not urge President Harding to call an extra session of Congress to pass special legislation dealing with the coal situation and that the price of anthracite to New England consumers will not be higher than the prices of the last two years, according to the Boston *Herald*.

Mr. Hammond believes that for the Commission to urge President Harding to call an extra session to deal with the coal situation would be uncalled for and an unwarranted presumption. There is nothing in the present situation which would warrant such action, he said.

"So much publicity has been given the coal industry, cost of labor, margin of profit, wages of labor, etc.," said Chairman Hammond, "that this alone would prove a strong detriment to any such runaway prices as have been named. I do not believe there will be a coal strike."

"The commission has very high hopes," Mr. Marshall said, "that all the former grievances have been forgotten and that the operators and miners realize that operators should receive a decent return on their investment; that the miners should receive a living wage according to the American conception of what that means and that upon that basis there must be uninterrupted operation of the mines to furnish coal to the people of the United States at the cheapest price."

"We have no reason to believe that both operators and miners are not going to reach a conclusion at Atlantic City to keep the mines open and give the people the cheapest possible coal. It is our view that the least interference will promote peace and do the most good."

"If they should lock horns and operations stop, then the commission would seriously take up the question of its duty to lay additional information before the President, not from any party standpoint but from the standpoint of the people of the United States."

The move for a special session of Congress, started by Senator Brookhart, of Iowa, as a plan to deal with the falling price of wheat, was supplemented July 21 by Representative Treadway, of Massachusetts, who said that the same shortage of coal would exist in the New England States next winter as last winter unless Congress acted in a special session on the recommendations of the Coal Commission. Action deferred until the regular session in December, Mr. Treadway said, would be too late.

"I am thoroughly convinced that the only way possible to prevent much suffering next winter is through government supervision of prices and distribution," Mr. Treadway said. "The Coal Fact-Finding Commission's report says that the President in emergencies should take charge of production. I think we should have drastic legislation."

"There is no greater public need than for anthracite coal for domestic use. Electric light rates and distribution are regulated. Water, car lines and freight rates are regulated. There is as great a need for fuel as for any of these public utilities. Consequently, the federal government must step in and see that the people are dealt with fairly by those having the stocks of coal."

"I feel that the subject is so important that whether there is a strike or not, the President should call Congress into special session on his return. I will have legislation drafted ready for consideration as soon as Congress reassembles. I will see the President as soon as possible and lay before him the facts as I find them and urge remedial legislation before cold weather."

Factional Row in District 1 Settled; Brennan Voluntarily Withdraws

William J. Brennan, president of District 1, in abandoning his intention of contesting the election of Rinaldo Cappellini, insurgent leader, who won the district presidency by a plurality of 9,719 votes in the election last month, brought to an end—for the present—the factional fight that threatened to disrupt the biennial convention at Wilkes-Barre last week. Brennan welcomed peace when it was evident that he lacked votes in the convention, Cappellini forces being greatly in the majority.

It was the plan of the Brennan forces to attack Cappellini's election on the floor of the convention, on the ground that under the constitution of the organization he was ineligible to office, Brennan having ousted him as district organizer some months ago. A resolution was prepared and submitted to the resolutions committee July 17 asking that Cappellini be barred from office, but this resolution was withdrawn the next day and the Brennan plan of attack abandoned.

The insurgents forced an issue when Enoch Williams, secretary-treasurer of the district, presented a motion that the convention adopted, making the appeal of Cappellini for reinstatement to the office of district organizer a special order of business. Then the Brennan resolution was withdrawn from committee.

Cappellini asked the 375 delegates assembled to undo that which Brennan did in removing him from office. The appeal easily got a majority of votes and with Cappellini reinstated as a district organizer the last prop was knocked from under the threatened contest of Brennan.

Settlement of the factional row in District 1 means that Rinaldo Cappellini, regarded as the leading agitator among anthracite workers, will sit as a member of the miners' section of the subcommittee negotiating the new wage contract after Aug. 1. Despite his record, however, it is gen-

erally understood that Cappellini will uphold Lewis in the present negotiations. The fact that William J. Brennan, former president of District 1, whose friends opposed seating Cappellini, voluntarily withdrew from the content is regarded as supporting the theory that Cappellini will not be a disturbing factor.

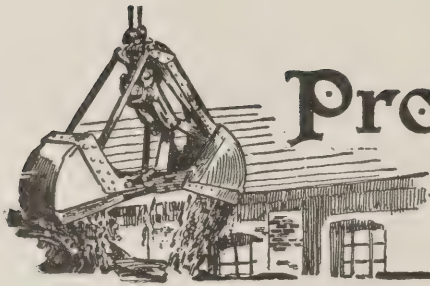
Defense in Dock Case Is Now Starting Before Federal Trade Commission

The evidence for the defense is being started in the Minnesota hearings before the Federal Trade Commission in the charges against the dock organization. The prosecution was heard through all of June and a few days of July.

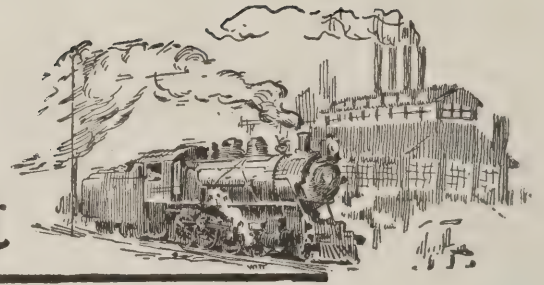
The hearings before the Federal Trade Commission continued up to July 9 with evidence to sustain the charges against the dock association. At that time an adjournment was taken to Duluth to take testimony there. Following, the defense was given a chance to disprove or explain the circumstances of the evidence offered against them. The defense assert that they will be able to show much of the evidence against them to be imagination of a hectic variety.

It is possible that there will be some new orders issued to the coal trade, such as requiring them to sell to municipalities which seek to buy, instead of leaving the business to the local retailer; there may be an opening up of purchasing to anyone with the money to pay for a carload. This would be objectionable to the complaining association, which would wish to maintain the field for the legitimate dealers as much as the dock association might.

At Duluth evidence was taken from dealers and operators of commercial buildings in an effort to establish that dock coal is sold at lower prices in Minneapolis than in Duluth. Dock men attributed the mixed situation in the trade to the southern Illinois mines being able to lay down coal cheaper at Minneapolis than the dock coal owing to the railroad freight rates being in their favor.



Production and the Market



Weekly Review

While prices of bituminous coal are hugging the bottom for the season, those for domestic sizes of anthracite quoted by independent producers are getting stronger every day. The pressure on industries and railroads to buy and store soft coal this summer is being relentlessly applied by the Federal Fuel Distributor and the Department of Commerce at Washington. The result is a steady production of soft coal since the first of the year averaging about 10,500,000 tons per week.

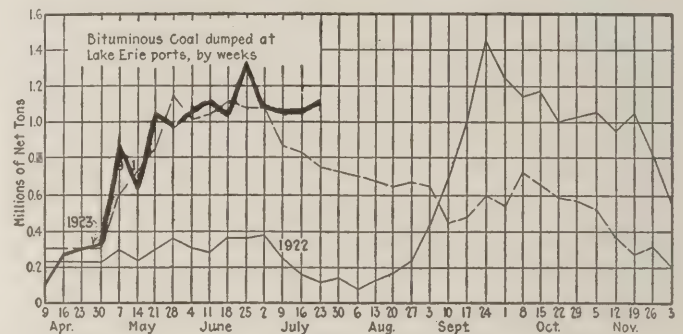
Buying has been so quietly conducted and the coal so judiciously selected that the prices on the open market have declined to a level that is now regarded as the bottom. *Coal Age* Index of spot prices of bituminous coal at the mines was 197 on July 23, a drop of one point in one week. The corresponding average price was \$2.38 per ton, which is admittedly below the normal average cost of production, although it does not follow that all coal sold at these prices represents a loss to the producer. The higher cost mines that are not protected by contracts have largely ceased production in the summer months. There is very little spot buying at this time, and it is not expected that there will be any activity in the market until late August or early September. Prices of anthracite steam sizes have followed bituminous coal prices downward. The large companies are storing steam sizes and the independents selling well below circular.

BITUMINOUS MARKET DOWN; ANTHRACITE UP

In contrast with the sluggish bituminous-coal market is the activity in the domestic sizes of anthracite, where quotations as high as those in the middle of last winter have been reached in the last week in a few instances. Despite the assurance of Chairman Hammond of the Coal Commission to New England consumers, as reported in the press this week, that prices of company coal would rise no higher next winter, there

is a remarkably strong undercurrent in the trade and throughout the anthracite region that concessions will be made to the wage demands of the miners, increasing the cost of production and the price to the consumer. Following the slump in production caused by the July 4 holiday, the output of hard coal rose again to over 2,000,000 tons in the second week in July and slightly less than 2,000,000 in the third week.

Production of bituminous coal in the first six months of this year was 273,270,000 tons, a figure, according to the Geological Survey, which has been exceeded but

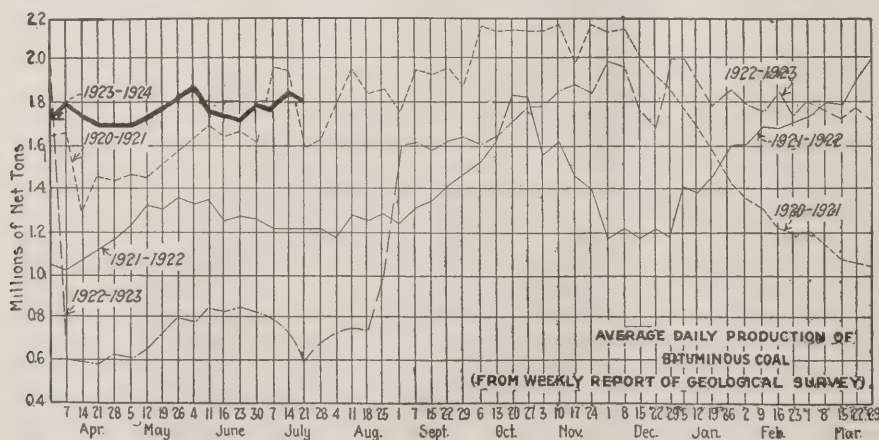


LAKE COAL DUMPED

(Net Tons)

	Week Ended July 23	Season to July 23
Cargo	1,058,767	12,793,996
Fuel	57,806	637,124
Total	1,116,573	13,431,120

once—in 1918—in the past ten years. In the Middle West buying of domestic lump by the retail trade has practically ceased and the market continues its downward trend. Railroads in that territory have about completed their storage program and many industries are buying only as they need the coal. Conditions are dull in New England. Receipts of soft coal are stead-



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
June 30	5,226,000	10,458,000
July 7 (b)	3,678,000	8,743,000
July 14 (a)	4,123,000	10,938,000
Daily average	687,000	1,823,000
Calendar year	195,651,000	292,952,000
Daily av. cal. year	1,182,000	1,775,000

ANTHRACITE

June 30	25,000	2,105,000
July 7	23,000	1,580,000
July 14	32,000	2,051,000
Calendar year	23,380,000	54,800,000

COKE

July 7 (b)	94,000	377,000
July 14 (a)	100,000	376,000
Calendar year	3,412,000	10,821,000

(a) Subject to revision. (b) Revised from last report.

ily diminishing and there is nothing in the general situation to indicate an improvement for some time. Textile mills are shutting down or curtailing operations and buying no coal. A survey of 1,100 industrial plants throughout New England made early this month showed 300 plants using oil fuel and the remainder with an average of 90 days' reserve coal stored away in their stockpiles.

Producers are not accepting orders at present prices for any except immediate shipments, believing that prices will react upward at the first indication of buying.

Activity in the export market is mostly centered in orders from Italy, Holland and South America. France is out of the market and the flurry of Canadian buying is over. Some English coal is being received but it is on old contracts. Dumpings at Baltimore for the first half of July were 151,377 tons of cargo and bunker coal. During the week ended July 19, 357,979 net tons of coal was dumped at Hampton Roads for all accounts, as compared with 348,130 tons in the previous week.

Chicago Market Softens Further

The general trend of markets in the Middle West continues downward without much relief in any quarter. Enough coal gets into demurrage to spatter distress prices all over the market at Chicago. Good southern Illinois screenings are hard to move at \$1.50, especially since a tremendous stock of them, stored since spring, has just been unloaded at \$1.15. Central Illinois fines, produced in a little greater volume during the past two weeks than a month ago because a few more mines have reopened, drag at \$1.40, and so it goes. There is no demand for domestic sizes and prices range rather crazily from the Franklin County circular of \$4.35, which nobody gets, down to \$2.75 for certain Williamson County independent lump and egg. On the whole the market is at its soggiest without much hope for improvement for another two weeks at least.

In the Standard field business is unusually quiet. There is practically no demand for anything. Screenings were reported as selling as low as 85¢@90¢ this week, which forced the price of 2-in. lump from \$2.25 to \$2.40, 6-in. from \$2.50 to \$2.75, steam egg \$2.15 and steam nut \$1.85 to \$2. Mine-run still continues \$1.85. A little railroad coal is moving out, but everything is slow.

In St. Louis business is as nearly dead as it could be.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 24 1922	July 9 1923	July 16 1923	July 23 1923†
Smokeless lump.....	Columbus....	\$6.00	\$5.85	\$6.00	\$5.75@ \$6.25	
Smokeless mine run.....	Columbus....	6.00	3.25	3.25	3.00@ 3.50	
Smokeless screenings.....	Columbus....	5.50	3.10	2.90	2.75@ 3.10	
Smokeless lump.....	Chicago....	8.25	6.10	6.10	6.00@ 6.25	
Smokeless mine run.....	Chicago....	8.25	3.60	3.60	3.25@ 4.00	
Smokeless lump.....	Cincinnati....	5.40	6.00	6.00	6.00	
Smokeless mine run.....	Cincinnati....	5.25	3.60	3.35	3.00@ 3.75	
Smokeless screenings.....	Cincinnati....	4.90	3.35	3.00	2.50@ 3.50	
*Smokeless mine run.....	Boston....	7.65	5.35	5.35	5.50@ 5.75	
Clearfield mine run.....	Boston....	3.65	2.25	2.35	2.00@ 2.75	
Cambria mine run.....	Boston....	4.00	2.85	2.85	2.50@ 3.25	
Somerset mine run.....	Boston....	3.75	2.50	2.60	2.25@ 3.00	
Pool 1 (Navy Standard).....	New York....		3.50	3.50	3.25@ 3.60	
Pool 1 (Navy Standard).....	Philadelphia....		3.55	3.60	3.25@ 3.80	
Pool 1 (Navy Standard).....	Baltimore....					
Pool 9 (Super. Low Vol.).....	New York....		2.75	2.55	2.50@ 2.80	
Pool 9 (Super. Low Vol.).....	Philadelphia....		2.70	2.70	2.35@ 3.00	
Pool 9 (Super. Low Vol.).....	Baltimore....		4.75	2.60	2.50	2.35@ 2.60
Pool 10 (H.Gr. Low Vol.).....	New York....		8.75	2.35	2.25	2.00@ 2.50
Pool 10 (H.Gr. Low Vol.).....	Philadelphia....			2.25	2.25	2.15@ 2.35
Pool 10 (H.Gr. Low Vol.).....	Baltimore....		4.75	2.25	2.20	2.15@ 2.30
Pool 11 (Low Vol.).....	New York....		8.25	1.80	1.85	1.80@ 2.15
Pool 11 (Low Vol.).....	Philadelphia....			1.85	1.85	1.75@ 2.00
Pool 11 (Low Vol.).....	Baltimore....		4.75	2.05	2.05	1.95@ 2.00
High-Volatile, Eastern		Market Quoted	July 24 1922	July 9 1923	July 16 1923	July 23 1923†
Pool 54-64 (Gas and St.).....	New York....		8.75	1.65	1.75	1.60@ 1.95
Pool 54-64 (Gas and St.).....	Philadelphia....			1.55	1.60	1.60@ 1.85
Pool 54-64 (Gas and St.).....	Baltimore....		4.75	1.75	1.75	1.70
Pittsburgh sc'd gas.....	Pittsburgh....			2.40	2.65	2.60@ 2.75
Pittsburgh mine run (St.).....	Pittsburgh....			1.95	1.95	1.90@ 2.00
Pittsburgh slack (Gas).....	Pittsburgh....			1.50	1.40	1.40@ 1.50
Kanawha lump.....	Columbus....		6.00	3.00	3.00	2.75@ 3.25
Kanawha mine run.....	Columbus....		5.90	1.85	1.85	1.75@ 2.00
Kanawha screenings.....	Columbus....		5.90	1.10	1.10	1.00@ 1.15
W. Va. lump.....	Cincinnati....		5.15	3.25	3.10	2.75@ 3.00
W. Va. gas mine run.....	Cincinnati....		5.15	1.75	1.85	1.85@ 1.75
W. Va. Steam mine run.....	Cincinnati....		5.25	1.75	1.85	1.85@ 1.75
W. Va. screenings.....	Cincinnati....		4.75	1.05	1.05	.85@ 1.25
Hocking lump.....	Columbus....		5.75	2.75	2.75	2.50@ 3.00
Hocking mine run.....	Columbus....		5.50	1.85	1.85	1.75@ 2.00
Hocking screenings.....	Columbus....		5.50	1.25	1.25	1.20@ 1.35
Pitts. No. 8 lump.....	Cleveland....		7.25	2.55	2.50	2.15@ 3.00
Midwest		Market Quoted	July 24 1922	July 9 1923	July 16 1923	July 23 1923†
Franklin, Ill. lump.....	Chicago....			3.90	3.90	3.00@ 4.35
Franklin, Ill. mine run.....	Chicago....			3.00	3.00	2.75@ 3.25
Franklin, Ill. screenings.....	Chicago....			1.65	1.65	1.50@ 1.85
Central, Ill. lump.....	Chicago....			2.60	2.60	2.50@ 2.75
Central, Ill. mine run.....	Chicago....			2.10	2.10	2.00@ 2.25
Central, Ill. screenings.....	Chicago....			1.35	1.55	1.40@ 1.60
Ind. 4th Vein lump.....	Chicago....			3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run.....	Chicago....			2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings.....	Chicago....			1.60	1.60	1.50@ 1.75
Ind. 5th Vein lump.....	Chicago....			2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run.....	Chicago....			2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago....			1.45	1.45	1.40@ 1.50
Standard lump.....	St. Louis....			2.35	2.35	2.30@ 2.75
Standard mine run.....	St. Louis....			1.85	1.85	1.85
Standard screenings.....	St. Louis....			1.15	1.20	.85@ 1.00
West Ky. lump.....	Louisville....		10.25	2.25	2.30	2.10@ 2.25
West Ky. mine run.....	Louisville....		10.25	1.65	1.70	1.60@ 1.85
West Ky. screenings.....	Louisville....		10.25	1.15	1.20	.90@ 1.25
West Ky. lump.....	Chicago....		11.00	2.40	2.40	2.00@ 2.25
West Ky. mine run.....	Chicago....		11.00	1.15	1.15	.90@ 1.00
South and Southwest		Market Quoted	July 24 1922	July 9 1923	July 16 1923	July 23 1923†
Big Seam lump.....	Birmingham....		2.40	3.25	3.25	3.15@ 3.40
Big Seam mine run.....	Birmingham....		2.35	2.05	1.95	1.75@ 2.15
Big Seam (washed).....	Birmingham....		2.50	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago....		9.40	3.25	2.85	2.75@ 3.00
S. E. Ky. mine run.....	Chicago....		9.40	2.35	2.10	2.00@ 2.25
S. E. Ky. lump.....	Louisville....		9.25	2.75	2.85	2.60@ 2.85
S. E. Ky. mine run.....	Louisville....		9.25	1.85	2.00	1.60@ 2.00
S. E. Ky. screenings.....	Louisville....		9.25	1.05	1.05	1.25@ 1.85
S. E. Ky. lump.....	Cincinnati....		7.00	3.25	3.10	2.75@ 3.25
S. E. Ky. mine run.....	Cincinnati....		5.00	1.60	1.85	1.85@ 1.75
S. E. Ky. screenings.....	Cincinnati....		4.65	1.05	1.00	.75@ 1.10
Kansas lump.....	Kansas City....		5.00	4.00	4.00	3.50@ 4.50
Kansas mine run.....	Kansas City....		4.75	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City....		4.25	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.

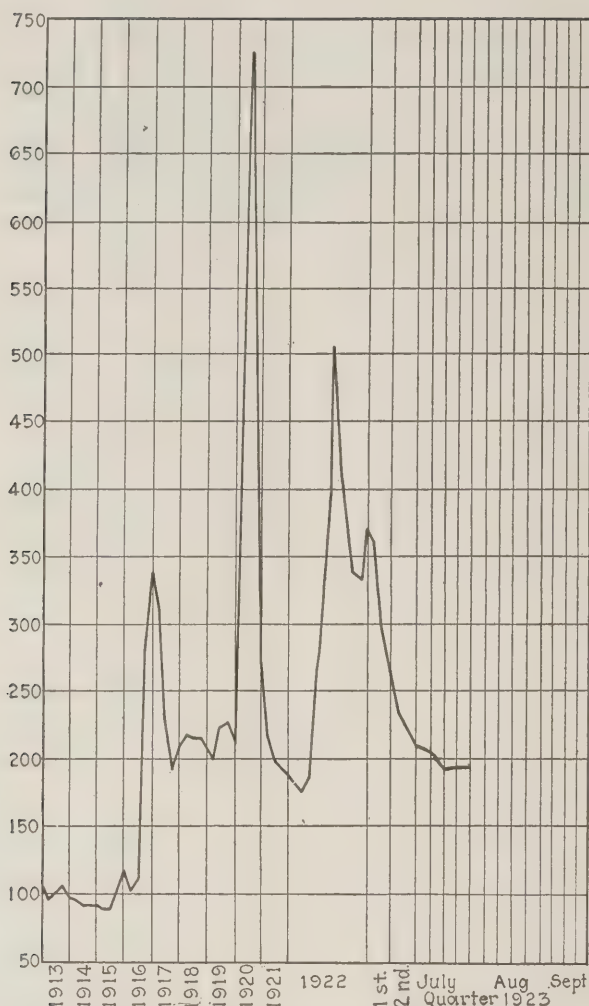
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest		Pre-Strike Company	July 16, 1923		July 23, 1923†	
			Independent	Company		Independent	Company	Independent	Company
Broken.....	New York....	\$2.34			\$7.60@ \$7.75		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia....	2.39	\$7.00@ \$7.50	7.75@ 7.85		7.00@ 8.10		7.00@ 8.10	
Egg.....	New York....	2.34	7.60@ 7.75	7.60@ 7.85		8.50@ 12.00		8.50@ 12.00	
Egg.....	Philadelphia....	2.39	7.25@ 7.75	7.75		9.25@ 11.00		9.25@ 11.00	
Egg.....	Chicago*....	5.06	7.50	8.25		8.50@ 12.00		8.50@ 12.00	
Stove.....	New York....	2.34	7.90@ 8.20	7.90@ 8.10		8.50@ 12.00		8.50@ 12.00	
Stove.....	Philadelphia....	2.39	7.85@ 8.10	8.05@ 8.25		9.25@ 11.00		9.25@ 11.00	
Stove.....	Chicago*....	5.06	7.75	8.25		8.50@ 12.00		8.50@ 12.00	
Chestnut.....	New York....	2.34	7.90@ 8.20	7.90@ 8.20		8.50@ 12.00		8.50@ 12.00	
Chestnut.....	Philadelphia....	2.39	7.85@ 8.10	8.05@ 8.15		9.25@ 11.00		9.25@ 11.00	
Chestnut.....	Chicago*....	5.06	7.75	8.25		8.50@ 12.00		8.50@ 12.00	
Ranges.....	New York....	2.34				8.30		8.30	
Pea.....	New York....	2.22	5.00@ 5.75	5.75@ 6.45		6.75@ 8.00		6.75@ 8.00	
Pea.....	Philadelphia....	2.14	5.50@ 6.00	6.10@ 6.25		6.15@ 7.50		7.00@ 7.50	
Pea.....	Chicago*....	4.79	6.00	6.25		7.00@ 8.50		7.00@ 8.50	
Buckwheat No. 1.....	New York....	2.22	2.75@ 3.00	3.50		2.75@ 3.50		2.75@ 3.50	
Buckwheat No. 1.....	Philadelphia....	2.14	2.75@ 3.25	3.50		2.75@ 3.50		2.75@ 3.50	
Rice.....	New York....	2.22	2.00@ 2.50	2.50		1.80@ 2.50		1.80@ 2.50	
Barley.....	Philadelphia....	2.14	2.00@ 2.50	2.50		1.75@ 2.50		1.75@ 2.50	
Barley.....	New York....	2.22	1.50@ 1.85	1.50		1.25@ 1.50		1.25@ 1.50	
Barley.....	Philadelphia....	2.14	1.50@ 1.75	1.50		1.15@ 1.50		1.15@ 1.50	
Birdseye.....	New York....	2.22		2.00@ 2.50		1.60		1.60	

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	July 23	July 16	July 9	July 24
Index	197	198	197	460
Weighted average price.....	\$2.38	\$2.40	\$2.38	\$5.57

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Deliveries of anthracite, smokeless and coke, good until a week ago, have practically stopped. Hot weather has done its worst. Country business around St. Louis, both steam and domestic, is dead.

Kentucky Cuts Prices to Get Business

In western Kentucky prices on prepared sizes are being held quite well though there is some price cutting to get business. This is largely blamed on cancellations, whereas it is actually due to loading coal on prospects, resulting in distress stuff that has to be moved.

Screenings, which had been expected to improve, have worked lower, and are now coming into competition with some good grade of eastern Kentucky screenings, which are quoted by jobbers to industrial consumers on the Louisville market at 75c. f.o.b. mines. Western Kentucky is asking 90c., as a lower freight rate to Louisville gives that field an advantage.

More than half of Kentucky's mines are down. Many dealers and others who stocked regret it now because of prevailing low prices today. Operators blame dealers for trying to take too wide a margin, while letting producers be charged with causing high coal prices. Quotations on domestic eastern Kentucky average \$8 and on Western Kentucky \$7.

Northwest Takes Anthracite

Anthracite movement from Duluth and Superior docks has been improving because of strike talk. Current quotations are as follows: Egg, \$12.50; stove, \$12.80; nut, \$12.85; pea, \$11, and buckwheat, \$8.50. The Duluth market in bituminous is slow with prices steady, as follows: Youghiogheny and Hocking lump, \$6.50; run-of-pile, \$5.50; screenings, \$4, with some docks quoting screenings carried over from last season at \$3.85. Split lump or stove is \$7.50; run-of-pile, \$6.50; screenings, \$4.50; Kentucky lump, \$8.50; run-of-pile, \$7.25, and screenings, \$5.25; Elkhorn lump or egg, \$9; run-of-pile \$7.50; screenings \$5.75; Pocahontas, lump or stove, \$10; mine-run, \$7.50, and screenings, \$6.50.

The Milwaukee coal market is stagnant. City dealers are having a smattering of trade, but jobbers say business is dead in the country. Everybody thinks there will be plenty of coal the coming winter, and it is this feeling that checks the demand.

Western Business Is Flat

Western markets show no life whatever. In the Kansas and Oklahoma regions there is no demand for anything and "no-bills" at the Kansas mines run over 200 cars steadily. Summer storage price offers have been almost futile all the way from Kansas City to Salt Lake City, where they were supposed to have been cancelled July 1 but were not because of poor business at any price. In Utah they are already talking of a coming car shortage.

No Interest Seen in Ohio Markets

Buying is at a low point in the Columbus market, as neither steam users nor retail dealers are disposed to stock up. Buying for present needs seem to be the general rule. Railroads are taking the usual percentage while some buying by utilities is reported. Considerable distress coal is reported on the market which is being let go at low prices. The Southern Ohio Coal Exchange reports production of 123,000 tons from 442 mines in the Southern Ohio field during the week ended July 7. There is plenty of coal in the Cincinnati market, but there is a lack of interest in offerings. Some sales are being made of all rail coal to the Northwest. West Virginia 2-in. lump is quoted at \$2.25@2.50 as compared with \$2.50@3 last week and southeastern Kentucky 2-in. lump at \$2.25@2.50 as compared with \$2.50@3 last week. Steam demand at Cleveland continues quiet while retail dealers are confined pretty much to smokeless fuels and anthracite. As a result of railroad fuel inquiries in northern and southern West Virginia many producers are inclined to believe that heavier railroad-fuel buying will stimulate business a little later in the season. Production in Virginia is keeping up well, ranging around 60 per cent of capacity.

The market at Pittsburgh seems to have recovered from the depressing influence caused recently by curtailment of purchases of byproduct steam and gas coal, particularly the last named, by the steel mills. The mills are running at a lower rate than formerly and are producing only for immediate or very early requirements. The situation at Buffalo continues quiet. There is no buying. For the week ended July 15 loadings in the central Pennsylvania district were 18,700 cars, as compared with 15,503 cars the previous week. During the first six months of 1923 production in central Pennsylvania was 26,075,675 tons.

New England in Grip of Doldrums

In New England the market is still in the doldrums. Both all-rail and by water receipts are steadily diminishing and the general industrial situation is not favorable to any increased demand during the next month or so. The textile mills in particular are suffering from the light market for finished goods and throughout the territory shutdowns and curtailments are the rule. The effect upon steam coal is depressing, and spot sales are few and only for small tonnages.

For distribution inland from ports like Providence, Boston and Portland there is only scattering inquiry and except for occasional "market cargoes" prices are around

\$7 per gross ton on cars. There have been part cargo-lots forced on the market at a considerably less figure. The Hampton Roads factors continue to dominate areas adjacent to tidewater to the extent that they get what business is offering, but the aggregate tonnage is small.

Navy standard grades of Pocahontas and New River are being held more or less firmly at Hampton Roads, the current range of price being \$5.50@\$5.75 per gross ton f.o.b. vessel. Dumpings are confined, however, for the most part to deliveries on contract, almost no coal having changed hands recently on spot business.

In central Pennsylvania the situation varies very little. A few of the more favorably known coals have been enjoying fair business, especially on long-term contracts, but the great bulk of Clearfields and Cambrias find it hard going. The extra tonnage that accrued to central Pennsylvania while Hampton Roads prices were at \$6.75@\$7 is now rapidly falling off and July figures will show a marked contrast with those of May. In all directions steam coal seems to be a drug on the market with slight prospect of improvement in the near future.

Only Bargain Hunters in New York Market

The New York tidewater market is dull. Shipments are not heavy and quotations remain on about last week's basis. Consumers are not taking in heavy tonnages but are picking up bargain lots at low prices. There is a slight change for the better in the Philadelphia tidewater market, but it seems to be only temporary. The Baltimore trade feels as if better conditions are almost at hand. There have been inquiries from large concerns as to autumn and winter needs. Trade at Birmingham is slow and consumers are showing little interest. Several thousand tons of coal are being loaded at Mobile for West Indian points. Domestic buying is fairly active for high-grade coals.

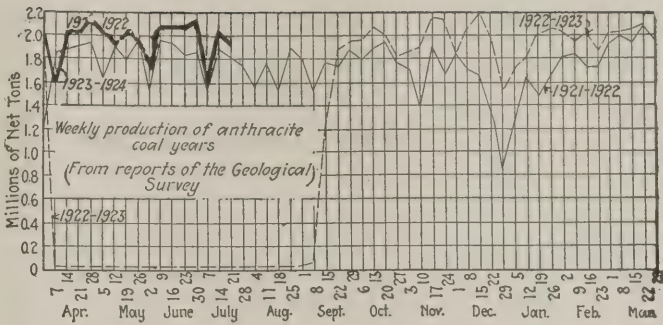
Lake Movement Continues Apace

Better lake movement is expected at Columbus during August than is now being had. Demand for lake coal at Pittsburgh has improved, while 138,100 net tons of anthracite were shipped from Buffalo last week, of which 77,000 tons cleared for Duluth and Superior, 15,000 tons for Chicago, 33,300 tons for Milwaukee and 12,800 tons for Fort William. More hard coal has been received at Milwaukee so far this season than was received during the entire season last year.

Demand for Domestic Anthracite Mounts

Demand for anthracite domestic coals has increased considerably. Retail dealers seem to be receiving larger shipments, which are being delivered to consumers as rapidly as possible. Chestnut coal, next to pea size, is the easiest of the larger coals. Strong demand and lack of coals feature the Philadelphia market. Consumers in all sections are being urged to lay in their supply of coal, which only adds to the pressure already placed on the dealers. Movement of hard coal to Baltimore so far this month has been a disappointment to the trade there. Retail dealers have orders on their books far in excess of receipts so far.

"In the pick-up after the holiday anthracite production passed the two-million ton mark in the week ended July 14," says the Geological Survey. "On the basis of 39,221 cars reported loaded by the nine principal anthracite



carriers, the total production, including mine fuel, local sales and the output of washeries and dredges, is estimated at 2,051,000 tons. Early returns for the week July 16-21 indicate a lower rate of output and a probable yield of about 1,900,000 tons."

BIDS FOR FURNISHING AND DELIVERING COAL to the various camps, arsenals, forts and buildings under the jurisdiction of the U. S. Army along the Atlantic seaboard as far south as Virginia are being received by the Quartermaster's Department, Brooklyn. The total amount required is 86,061 net tons of anthracite, 52,453 net tons bituminous and 355 net tons of coke. The bids have been divided into three parts. The first part, covering the New England States and Forts Michie, Terry and Wright, in New York State, was opened July 25 and called for 12,391 net tons of egg coal, 5,439 tons stove coal, 4,348 tons chestnut coal, 5,435 tons bituminous mine-run and 450 tons bituminous 2-in. lump coal. The second part will be opened on July 31 and covers New York, New Jersey and Delaware. On Aug. 6 the third batch of bids will be opened for camps and other army buildings in Pennsylvania, Maryland and Virginia. Deliveries on all contracts are to run until June 30, 1924, although in most cases the entire tonnage will be called for by Sept. 1 of this year.

How the Coal Fields Are Working

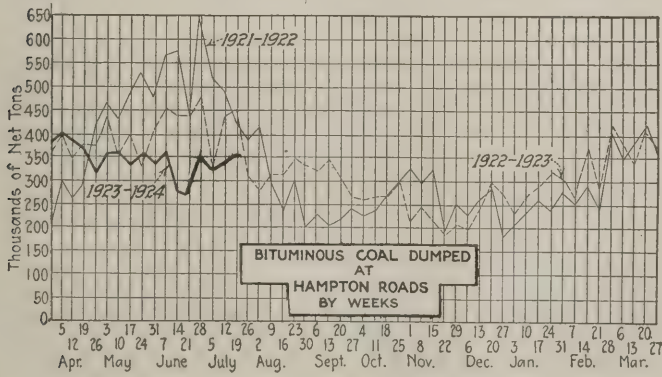
Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to June 30, 1923 Inclusive	Week Ended July 7, 1923
U. S. Total.....	55.7	65.3	42.5	71.2
Somerset County.....	74.9	74.3	42.5	71.2
Panhandle, W. Va.....	51.3	57.3	59.1	52.3
Westmoreland.....	58.8	65.8	60.5	67.0
Virginia.....	59.9	55.7	59.3	57.8
Harlan.....	54.8	22.1	24.4	(a)
Hazard.....	58.4	16.4	28.8	53.4
Pocahontas.....	60.0	36.6	41.9	72.9
Tug River.....	63.7	28.8	40.1	59.7
Logan.....	61.1	26.2	33.2	46.5
Cumberland-Piedmont.....	50.6	31.7	53.4	41.5
Winding Gulf.....	64.3	30.4	37.6	31.4
Kenova-Thacker.....	54.3	42.4	38.3	45.3
N. E. Kentucky.....	47.7	28.4	32.2	36.1
New River.....	37.9	31.6	34.9	43.4
Oklahoma.....	59.6	59.1	68.6	52.4
Iowa.....	78.4	75.9	46.9	49.5
Ohio, Eastern.....	46.6	40.8	45.1	69.8
Missouri.....	66.8	76.3	67.8	77.4
Illinois.....	54.5	49.9	41.0	33.0
Kansas.....	54.9	55.9	48.1	43.1
Indiana.....	53.8	37.7	45.7	41.4
Pittsburgh†.....	39.8	41.2	45.2	69.5
Central Pennsylvania.....	50.2	53.4	52.9	57.4
Fairmont.....	44.0	35.5	46.7	67.9
Western Kentucky.....	37.7	32.4	31.2	34.2
Pittsburgh*.....	31.9	56.1	69.1	92.2
Kanawha.....	13.0	15.6	26.2	36.9
Ohio, Southern.....	24.3	38.1	30.0	21.7

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surpluses and Shortages

	Cars Loaded — All Cars Coal Cars		Surplus Cars — All Cars Coal Cars		Car Shortage
Week ended July 7, 1923.....	854,748	160,218	64,067	4,620	.....
Previous week.....	1,021,770	185,757	239,160	146,743	.....
Same week in 1922.....	707,025	70,860	63,636	3,896	.....



Foreign Market And Export News

British Coal Production Further Declines; Welsh Miners Get Wage Increase

Another decline in Great Britain's coal output was recorded during the week ended July 7 when production was reported at 5,306,000 tons, says a cable to *Coal Age*. This was a decline of 95,000 tons when compared with the previous week.

The Welsh coal market is steadier. Following a good deal of contract activity, the mines have become better booked up, and the tone is firmer. Market conditions have encouraged buyers to come forward more freely, and business with France, South America, and the Continent is showing a steady improvement.

Welsh miners have received a wage raise of 9.62 per cent, making the wage-rate 37.62 per cent over the standard of 1915. For a year and a half now the wage-rate has been on the minimum of 28 per cent above the standard.

The Newcastle market is much firmer. Germany is inquiring on a large scale. The demand from other European countries with the exception of Italy is increasing.

German Coal Situation

The marked reverse which the coal market in the German interior suffered, starting at the first days of April, equally affecting domestic and imported coal has given place to a brisker tone. This reverse was caused partly by the business slump, which greatly reduced industrial activity and by expectations of a near end of the Ruhr blockade. Revival of business on the one hand and the growing conviction on the other, that no political change can be expected in the near future has again stimulated the demand with the result that lively business on the import market is being looked for.

The tendency is getting stronger not to rely on Great Britain alone but extend the import business to other markets if only as a stabilizing factor. The shipments so far obtained from the United States have, as far as can be heard, given full satisfaction as regards quality, which has been greatly

instrumental to wiping out the prejudice against American coal, caused by previous experiences. It is therefore more than likely that the chief coal importers will in the future exhibit an increased activity on the American market.

Export Clearances, Week Ended July 21, 1923.

FROM BALTIMORE

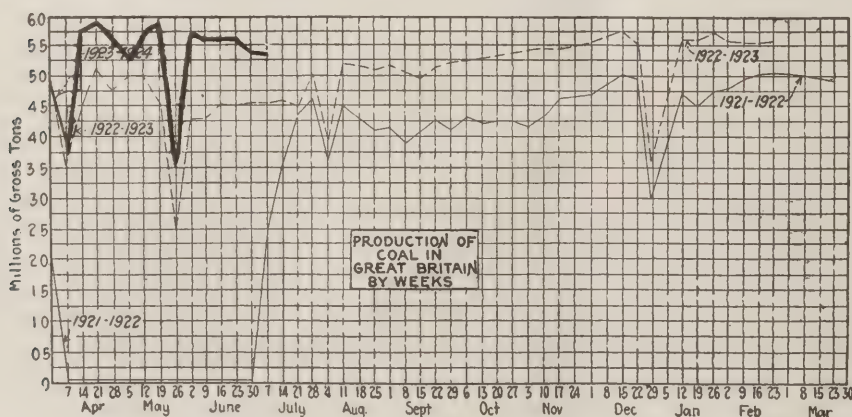
	Tons
For Canada:	7,964
Br. SS. Twickenham	10,842
Br. SS. Rose Castle	10,858
For France:	5,618
Br. SS. Kumeric	8,178
Span. SS. Aratz Mend	9,228
For Germany:	10,732
Br. SS. Wentworth	6,745
For Holland:	7,328
Ital. SS. Iris	3,004
Nor. SS. Strinda	8,068
For Italy:	3,223
Ital. SS. Tuscola	7,667
For Sweden:	2,965
Swed. SS. Narvik	8,458

FROM HAMPTON ROADS

For Brazil:	3,450
Br. SS. Baron Napier, for Buenos Aires	6,295
Br. SS. Norwich City, for Rio de Janeiro	7,185
Br. SS. Lady Kathleen, for Rio de Janeiro	5,066
Braz. SS. Mandu, for Rio de Janeiro	7,142
For Canada:	3,004
Nor. SS. Marshall, for Bathurst	8,068
Br. SS. Sheaf Mount, for Montreal	3,223
Dan. SS. Phoenix, for St. Thomas	7,667
Br. SS. Black Heath, for Sydney, N. S.	2,965
For Cuba:	8,458
Nor. SS. Hundvaago, for Cienfuegos	3,450
Ger. SS. Luise Hensoth, for Havana	9,051
Nor. SS. Elida Clausen, for Havana	10,062
For Hawaii:	6,068
Du. SS. Flensburg, for Rotterdam	5,923
Grk. SS. Meropi, for Rotterdam	2,570
For Italy:	787
Ital. SS. Alatrium, for Porto Ferrajo	5,923
For West Indies:	2,570
Amer. SS. Mendora, for Kingston	787
Amer. Schr. Edwin G. Farrar, for St. Georges	787

FROM PHILADELPHIA

For Cuba:	...
Nor. SS. Almora, for Havana	...
Nor. SS. Swartfond, for Havana	...
For France:	...
Br. SS. Skipsea, for Marseilles	...
For Italy:	...
Ital. Bark Providence, for Genoa	...



Demand at Hampton Roads Quiet

Demand for coal fell to a minimum at Hampton Roads last week, following a brief revival in trade during the week before. Foreign shipments were brisk, but largely on old contracts which are rapidly being completed.

Large shipments to Canada, which were forecast, did not materialize to any great extent. Coastwise trade was very dull, with bunkers only moderately active.

French Coal May Imports

French imports of coal in May and during the first five months of 1923, according to French Customs returns, follow, in metric tons:

Coal:	May	Jan.-May
Sarre.....	52,386	552,960
Great Britain.....	1,706,192	7,367,581
Belgium.....	196,157	980,427
U. S.....	102,235	121,015
Germany.....	84,599	502,322
Spain.....	20	3,340
Netherlands.....	45,980	253,629
Czecho-Slovakia.....	19	4,321
Other countries.....	5,743	6,250
Totals.....	2,193,331	9,791,845

United States June Domestic Coal Exports

(In Gross Tons)

Coal	1922	1923
Anthracite.....	40,284	418,594
Value.....	\$354,443	\$4,504,939
Bituminous.....	540,550	2,418,769
Value.....	\$2,903,175	\$12,653,967
Coke.....	29,090	63,841
Value.....	\$258,902	\$680,325

Twelve Months ended June

Coal	1922	1923
Anthracite.....	2,992,385	3,733,714
Value.....	\$32,201,158	\$40,691,885
Bituminous.....	13,035,800	15,953,379
Value.....	\$67,915,106	\$97,523,225
Coke.....	297,431	964,878
Value.....	\$2,607,161	\$10,645,522

Hampton Roads Pier Activities

N. & W. piers, Lamberts Pt.:	July 12	July 19
Cars on hand.....	1,346	1,370
Tons on hand.....	93,069	74,662
Tons dumped for week.....	109,522	133,344
Tonnage waiting.....	19,000	
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,917	1,846
Tons on hand.....	108,120	106,400
Tons dumped for week.....	108,100	101,443
Tonnage waiting.....	13,390	3,568
C. & O. piers, Newport News:		
Cars on hand.....	1,060	1,160
Tons on hand.....	53,875	60,485
Tons dumped for week.....	93,208	84,837
Tonnage waiting.....	9,100	23,340

Pier and Bunker Prices, Gross Tons

PIERS			
	July 14	July 21†	
Pool 9, New York.....	\$5.50@ \$6.00	\$5.35@ \$5.85	
Pool 10, New York.....	5.00@ 5.35	5.00@ 5.40	
Pool 11, New York.....	4.30@ 5.00	4.50@ 5.00	
Pool 9, Philadelphia.....	5.30@ 5.75	5.25@ 5.75	
Pool 10, Philadelphia.....	4.45@ 5.25	4.45@ 5.25	
Pool 11, Philadelphia.....	3.75@ 4.35	3.70@ 4.35	
Pool 1, Hamp. Roads.....	5.75	5.50	
Pools 5-6-7, Hamp.Rds.	4.85@ 5.00	4.50	
Pool 2, Hamp. Roads.....	5.25@ 5.50	5.25	
BUNKERS			
Pool 9, New York.....	5.80@ 6.30	5.65@ 6.15	
Pool 10, New York.....	5.30@ 5.65	5.30@ 5.70	
Pool 11, New York.....	4.60@ 5.30	4.80@ 5.30	
Pool 9, Philadelphia.....	5.70@ 6.00	5.70@ 6.00	
Pool 10, Philadelphia.....	4.75@ 5.55	4.80@ 5.60	
Pool 11, Philadelphia.....	3.90@ 4.65	3.90@ 4.65	
Pool 1, Hamp. Roads.....	5.75	5.50	
Pool 2, Hamp. Roads.....	5.25@ 5.50	5.25	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	July 14	July 21†
Admiralty, large.....	30s.@ 31s.	31s.
Steam smalls.....	18s.@ 22s.6d.	21s.6d.
Newcastle:		
Best steams.....	26s.6d.@ 27s.	26s.@ 26s.6d.
Best gas.....	28s.@ 30s.	28s.
Best bunkers.....	26s.@ 29s.	28s.

† Advances over previous week shown in heavy type, declines in italics.

News Items From Field and Trade

ALABAMA

Officers and directors of the DeBardeleben Coal Corporation, recently formed by the merger of the Corona Coal Co., DeBardeleben Coal Co., and Empire Coal Co., have been announced as follows: Henry T. DeBardeleben, president; Walter Moore, vice-president; Milton Fies, operating vice-president; G. M. Bowers, secretary-treasurer. The above officers with the following additions form the board of directors: W. F. Hull, New York; Morris Adler, Eugene Fies, Julien Adler, W. W. Gradford, Birmingham; T. Johnson Ward, Henry Vaughan, Harry Townsend, Philadelphia. The DeBardeleben corporation assumes all the contracts of the merged companies. The new company will give special attention to bunker and export trade at Southern ports, where ample facilities are provided for the storage of coal and bunkering of ships with dispatch. The Birmingham offices of the company will be located on the tenth floor of First National Bank Building in quarters formerly used by the Corona Coal Co.

Alabama produced more coal during the first six months of 1923 than during any similar period for the past five years, according to figures compiled by the Alabama Mining Institute from weekly reports received by that organization. The total for the half year was 9,737,000 net tons, which exceeds the 1922 output by 17 per cent and that for 1921 by 52 per cent for the same period. March was the banner month, with an output of 1,842,000 tons, and also held the weekly record of 416,000 tons March 31. Production for the year is on a basis of 19,473,000 tons. The above figures are conservative, a number of small operations not making weekly reports to the Institute regularly, if at all.

ILLINOIS

The Mt. Olove & Staunton Coal Co., Staunton, has inaugurated the plan of **paying by check instead of cash**, following the hold-up in Staunton recently, when \$45,000 of the company's payroll money was stolen. Checks will be drawn on the Staunton National Bank.

James Miller, who is sinking a shaft on the Orville Taylor farm in the Sangamon valley, near Springfield, has struck a 3-ft vein of coal at a depth of 39 ft.

The old Citizens Mine A, near Springfield, will be taken over by the Central Illinois Coal & Mining Company, a new organization. The mine is located four miles west of Springfield on the C. P. & St. L. R.R. and has been closed down for the past two years. It is expected that 150 men will be employed. The opening of this mine will place in operation all of the fourteen mines in the Springfield switching district and will bring the total capacity of the mines around Springfield to 23,000 tons. F. J. Devlin is mine manager for the new company. James P. Hickey and W. M. Ryan are officials.

The Globe Coal Co., has increased its capital stock from \$1,000,000 to \$3,000,000.

The Abbott Coal Mining Co., of Pekin, has been incorporated for \$10,000 by L. C. and C. J. Abbott, H. C. Gulen, Frank Keays and J. R. Cunningham to sink a shaft and operate a mine.

Plans have been completed and according to reliable information work will be started within the next few days on the sinking of a **new coal mine two miles north of Hurst**, just across the Jackson County line in Williamson County. The Western Coal & Mining Co. with headquarters in Murphysboro will sink the shaft. According to present plans the mine will be one of the largest in the vicinity and will be known as mine No. 3, the company operating one under the name of mine No. 2 at present. In order to provide homes for miners at the new mine the company is planning to erect 150 houses on company property near the new shaft. Approximately 600 men are working at Mine No. 2 and this new mine is expected to employ as many or more when in full operation.

Mine No. 5 of the Southern Gem Coal Corporation at Pinckneyville has been

shut down indefinitely by officials of that company. The orders scheduled for the mine probably will be taken care of from Mine No. 6 of that company. Prior to the shutdown the men working at the shaft had been on a "wildcat strike" over the first engineer of the mine. The men claimed the engineer was incompetent and demanded his discharge. However, the company did not grant the demands.

The Pontiac Coal Mining Co., of Pontiac, has been incorporated with capital of \$50,000 to operate coal mines. The incorporators are C. J. Fromgen, H. H. Webb and C. M. Webb.

The Phillis & Benson Coal Mining Co., operating six miles west of Geneseo, has sunk another shaft, reaching a 5-ft. vein of coal. Mining is expected to begin about Aug. 1.

The Taylor mine near O'Fallon has been forced into further idleness since having been shutdown for some time during which the main shaft was repaired. When men went inside the mine to clean up and make ready for operating, they found fire in the workings. No cause has been assigned for the fire though shots fired before the shutdown may have started the blaze.

The Shed Coal Co., Marion Ill., has been incorporated with capital of \$100,000 by E. E. Allen, P. H. Williams, and H. J. Faust.

INDIANA

More than 20,000 people were said to have witnessed the **Indiana State first aid meet** at Sullivan, July 7. It was the largest event of its kind in the state's history. **The team from Miami Coal Co.'s No. 10 mine won first place** in the contest and will go to the International First-Aid Meet in Salt Lake City, Utah, Aug. 27-29, representing the United Mine Workers of Indiana. Its average was 99½ per cent. The team from Jackson Hill No. 4 mine won second place with a score of 99½ per cent, and will go to Salt Lake City representing the Indiana Bituminous Coal Operators' Association. The scores of other competing teams at Sullivan follow: Jackson Hill mine, West Terre Haute, 98½; Peerless mine, Sullivan, 98½; Miami mine, Clinton, 98½; Jackson Hill mine No. 7, Shelburn, 98; Vandalia mine, Sullivan, 97.8½; Clinton mine, Clinton, 97.6½; Glendora Mine, Vincennes, 97½; J. K. Dering mine, Clinton, 97½; Pan Handle mine, Blacknell, 96.8½; Miami mine No. 8, Clinton, 96½; Knox Consolidated mine No. 3, Bicknell, 96½; Knox Consolidated mine No. 2, Bicknell, 96.3½; Vigo mine, Sullivan, 96.3½; Vermillion mine, Clinton, 96½; Vandalia mine, Clinton, 96½; Howe-Coulter mine, Bicknell, 95½; Knox Consolidated mine No. 4, 95½; Knox Consolidated mine No. 1, team No. 2, 95½; Vandalia mine No. 23, Sullivan, 95; Carlisle mine, Carlisle, 94.8½; Knox Consolidated mine No. 1, team No. 1, 94½; Vandalia mine No. 12, Sullivan, 94½; Templeton mine, Sullivan, 94.1½.

Seventy-five men were thrown out of work when the tippie, machinery, surrounding buildings and two coal cars of the mine owned by the **Sherwood Coal Co.**, of Illinois, ten miles west of Linton, burned. The loss, which was partly covered by insurance, may reach \$75,000. It was a spectacular fire and drew thousands of spectators. Little was saved from the burning structure. Officials of the company said that new surface buildings and machinery would be built at once.

KENTUCKY

The Golden Decker Coal Co., of Barbourville, has filed amended articles, increasing capital stock from \$10,000 to \$50,000.

The White Coal Co., an operating organization of Whick, in Breathitt County has been chartered by M. G. Yingling, J. R. White and Charles Byrd.

It is reported from eastern Kentucky that the **Kentucky & West Virginia Power Co.** will extend its line to Logan, W. Va.,

in the coal fields, and from there connection will be made to Charleston, where 50,000 people are now being served by the parent company, the American Gas & Electric Co. From Charleston it is planned to extend to the manufacturing town of Wheeling. The company after a few short years' operation in eastern Kentucky is supplying current to several towns and a large number of operators in the Elkhorn-Hazard fields.

The Inland Waterways Co., of Louisville, which controls mines on the Kentucky River and river equipment for transporting coal, oil, etc., has started work on combination rail and river terminals at Jeffersonville, Ind., across the river from Louisville, where property is being cleared for that purpose. The company is also starting erection of terminals at Louisville, where temporary equipment has been in use.

The Standard Oil Co., of Kentucky, which has a large underwater or submergible concrete storage pit at its Riverside Refinery, Louisville, this spring enlarged the capacity of the pit to 400 cars, and reports that the pit is now fully stocked.

C. F. Richardson, of the West Kentucky Coal Co., Sturgis, Ky., is one of the incorporators of the Bank of Sturgis, capitalized at \$15,000.

V. M. Lackey, secretary-treasurer of the Dixie Fuel Co., jobbers, and the Phoenix Coal Mining Co. and Douglas Coal Mining Co., Louisville, will be married on July 31, at Nashville, Tenn., to Miss Mildred Adel Harrington, of that city.

Records of cars furnished in western Kentucky for July to date show that the **Illinois Central R.R. has a surplus, with 118.2 per cent reported.** The Louisville & Nashville R.R. showed 68.2 per cent on its Owensboro division and 98 per cent on its Henderson division. Eastern Kentucky mines are getting all the cars needed, due to lack of demand, light loading and the fact that many mines are down.

M. M. Kling, head of the Louisville Coal & Coke Co., Louisville, who left the city a few months ago to make his home in Oakland, Cal., has sold his interest to his partner, R. C. Eyl, who has been in active charge, and to John L. Sullivan and J. L. Timmel. Eyl becomes president and treasurer, while Sullivan is vice-president; and Timmel is secretary and sales manager. Yard and offices are located at Clay and Fulton streets, with a sales office at 718 East Market street.

It is reported that J. W. Reedy and associates have arranged for a new coal development on Carrs Fork, in Knott County, near Whitesburg, where the Louisville & Nashville R.R. is said to be planning an extension of its lines.

From Hartford, on July 14, it was reported that **Opal Wells**, 19 years of age, son of Charles W. Wells, coal operator and former Mayor of Central City, was shot and killed by Charles W. Scroggins, garage mechanic, following an argument concerning the right of Scroggins to pass Wells on the road at a narrow point.

MINNESOTA

The State Railroad and Warehouse Commission has issued a circular urging all consumers to buy coal early, to avert a congestion in the fall and winter.

The **Reeves Coal & Dock Co.**, Minneapolis, has contracted with the Haynes Coal Co., Haynes, N. D., to take the entire output of its lignite mines for five years, with a minimum annual production of 100,000 tons.

The Inland Coal & Dock Co. has let a contract for an addition of 500 ft. to its dock at Duluth to R. C. Buck, Inc., of Superior. With this addition the dock will be 3,500 ft. long and 350 ft. wide, and will afford a bituminous storage capacity of 700,000 tons. The extension will be of concrete and its cost will be \$80,000. It is expected to be completed by early next October.

The City of Two Harbors has placed an order for 5,000 tons of Youghogheny coal for the use of its municipal coal yard with the Valley Camp Coal Co. at \$5.54 a ton. It is understood that the city's price to consumers will be \$10 a ton.

Receipts of coal at the head of the Lakes docks were in good volume during June. Unloading of bituminous were reported at 1,849,400 tons and of anthracite of 224,300 tons. That brought receipts since the opening of the navigation season to June 30 up to 3,480,800 tons of bituminous and 431,900 tons of anthracite. During the same period in 1922, owing to the miners' strike, anthracite receipts were only 5,000 tons and bituminous 286,600 tons.

MISSOURI

Pierre Quinn has surveyed a coal mine on the Choriton lease near Columbia and will open another shaft east of the present one. The present shaft is about 40 ft. deep and the new shaft is to be opened about 1,100 ft. east of it.

John A. Sargent was appointed general manager of the coal department of the Central Coal & Coke Co., Kansas City, July 18, succeeding to the job vacated several months ago by the resignation of Harry N. Taylor to become president of the United States Distributing Co. Mr. Sargent was general sales manager and traffic manager of the Central, and since the resignation of Mr. Taylor had been handling much of the work of the general manager's office as well. Before going to the Central in 1902 Mr. Sargent was in railroad work. No successor to Mr. Sargent in either the sales or the traffic department of the company has been named. It has been announced that he will continue in direct supervision of those departments.

NEW YORK

The Cortright Coal Co., of Philadelphia, has established offices in New York City, with W. J. Borden, who is well known to the local trade, in charge. The company is located on the eighth floor of 1 Broadway.

Dividends declared and awaiting payment, as reported currently in *The Analyst*, include the following coal companies:

Company	Rate	Period	Payable	Books Close
Burns Bros. A.....	\$2 50	Q	Aug. 15	Aug. 1
Burns Bros. B.....	50c.	Q	Aug. 15	Aug. 1
Burns Bros. pr. pf....	13	Q	Aug. 15	Aug. 1
C. Wilm. & F. Coal pf.	13	Q	Aug. 1	July 16
Dominion Coal pf....	4	Q	Aug. 1	July 12
Hillman C. & C. Co., 5% pf.....	14 1/2	Q	July 25	July 14
Hillman C. & C. Co., 7% pf.....	12	Q	July 25	July 14
Ind. & Ill. Coal Corp. pf.	3 1/2	..	July 16	July 9

OHIO

The Carroll Coal Co., Cleveland, has been incorporated with a capital of \$100,000 to mine and sell coal. The incorporators are Louis G. Carroll, John L. Dowling, Edward L. Brady, Frances H. Devlyn and Richard J. Moriarty.

Quite a few operating companies have been chartered in Ohio recently, showing some development work going forward in various Ohio producing fields. Among the number was the Old Minglewood Coal Co., of Massillon, with an authorized capital of \$20,000 to operate in the Coshocton field. Perry A. Keun, William H. Snyder, A. W. Erickson, Charles Beiner and A. W. Inman are the incorporators.

OKLAHOMA

The Rock Creek Coal Mine Co., of Panama, has let the contract to the Oklahoma Gas & Electric Co. to electrify its mine located on the Bedwell No. 2 lease, installing pumps, fans and coal cutters.

PENNSYLVANIA

Reports from the annual sales convention of the International Fuel & Iron Corp., of Pittsburgh, June 1 and 2, show the biggest business year to date in the history of the company. The convention was attended by twenty-two representatives of district and local sales offices throughout the country who came to Pittsburgh for an informal meeting to discuss present and future problems of the company and of coal industry. The company announced that May tonnage was the largest in the history of the company, and that June bookings indicate another record month. Officials state that the company's bookings for the year will be over two and a half million tons of their own coal and about an equal tonnage from outside sources.

The Pittsburgh Testing Laboratory announces the appointment of F. H. Rood as engineer of tests with headquarters at Pittsburgh. Mr. Rood is a civil engineer, graduate of Syracuse University. For many years he was engineer of tests for the New York State Highway Commission; for three years was assistant engineer of tests, Pittsburgh Testing Laboratory and for two years a research engineer with the U. S. Bureau of Public Roads.

One hundred and fifty employees of the

Bertha-Consumers Company, including all branch sales managers and mine superintendents, met with the Pittsburgh office personnel at a company luncheon July 7 in the Fort Pitt Hotel. W. L. Stewart, chairman of the board of directors, was toastmaster and the principal address was made by John H. Jones, president of the Bertha-Consumers Company. Other speakers included W. M. Furey, a stockholder of the company and former president of the Chamber of Commerce, and Captain M. Steidle of the mining department of Carnegie Institute of Technology, as well as a number of the staff of the Bertha-Consumers Company.

Four bills relating to mine laws of the state were vetoed by Governor Pinchot on July 14. All were sponsored by Senator Joseph O. Clark, Indiana County. The veto messages were similar in that all of them stated that the bills were unnecessary.

Fifty men from the mines enrolled in the five weeks' summer course in coal mining at State College. Two are operators, two are coal salesmen and the rest are miners and officials, mostly from the Pennsylvania bituminous regions. Several of the younger men are seriously considering a four-year course at State College.

F. A. Coffroth, a son of E. B. Coffroth, Somerset, has been named as superintendent of the Briar Hill Coal & Coke Co., in Fayette County. He has been associated with the Briar Hill company in various capacities for many years.

The fourth annual first-aid contest of the Bertha-Consumers Co., Pittsburgh, will be held on the grounds of the Pittsburgh Station, U. S. Bureau of Mines, at 2 p.m., Aug. 11. The fourteen competing teams will represent the company's mines in Pennsylvania, West Virginia, Ohio and Kentucky.

After being idle two days, eight hundred miners resumed work July 13 at Maxwell No. 20 colliery of the Lehigh & Wilkes-Barre Coal Co. Their strike was settled at a meeting held by the local union. The men passed their grievance on to a committee of mine workers, who will confer with company officials.

P. J. Moore, mine inspector of the Second Inspection District, with headquarters at Carbondale, in his report for 1922 says 1,956,624 tons of coal was produced and that 7,883 men and boys are employed in and about the mines in that district. Of the coal produced 1,784,323 tons was shipped. There were 2,300 tons of coal produced by electrical machines. Nine fatal accidents occurred inside the mines during the year, and one outside. There are 35 mines, including strippings, in the district, and during the year two new mines were opened and two old mines abandoned.

The Scranton and the Wilkes-Barre mine-cave situation made no progress this year so far as legislation is concerned. While the Legislature, which two years ago passed unconstitutional bills to relieve the situation, again provided two other measures this year, the Davis-Fowler bills, Governor Pinchot vetoed both bills July 12. In his veto message the Governor said that lack of state revenues compelled him reluctantly to withhold his approval from the bills. The Legislature, he said, did not provide sufficient money for all meritorious appropriation measures and for that reason he was compelled to veto many bills.

WEST VIRGINIA

The Kentucky & West Virginia Power Co., Logan, is installing Westinghouse alternating-current motors and equipment to drive three new stocker clinker grinders. The A. C. motor circuits are provided with starting switches, series trip coils with inverse time-element attachments and low-voltage release coils.

It is reported that the Pond Creek Pocahontas Coal Co. has taken over additional properties in West Virginia. The mines, which are on the main line of the Norfolk & Western Ry., and which are in non-union territory, are said to contain approximately 5,000,000 tons of high grade Pocahontas coal.

J. C. Bryndon and H. L. Gandy, president and executive secretary, respectively, of the National Coal Association, were among those in attendance at the meeting of the Virginia Coal Operators' Association at Norton.

Frank B. Carpenter, formerly electrical engineer with the West Virginia Engineering Co., has resigned and been appointed electrical engineer for the J. C. Sullivan mining interests of West Virginia.

The injunction granted by the late Judge A. G. Dayton, of the U. S. Court for the northern district of West Virginia, in the case of the West Virginia-Pittsburgh Coal Co. against John P. White et al. in 1913 has been perpetuated by Judge Dayton's successor, Judge W. E. Baker. Under the terms of the decree granted the United Mine Workers are enjoined from interfering with the employees of the West Virginia-Pittsburgh Coal Co. and are prohibited from attempting to organize the employees of the company.

The Marshall Coal Co. suffered a loss of about \$45,000 when fire broke out in a conveyor at the company's mine about one mile west of Mount Clare, in Harrison County. The property destroyed includes one conveyor, conveyor shed and steam engine; one headhouse, head tipples and equipment; one supply house, including supplies; one company boarding house and three mine cars.

The new store building of the West Virginia Coal & Coke Co., which is being erected at Norton at a cost of \$25,000, is now under roof and will be ready for occupancy by the middle of September. The company also has under construction a new office building at the same operation and that building is also under roof. It will cost \$10,000. Plans are being formulated by this company for the rebuilding of the mine tipples at Junior, destroyed by fire late in May.

Early in July there was a strike of 260 miners of Cleveland & Morgantown Coal Co. plant at Pursglove, one of the largest in the Scott's Run field. After being out of the mines for about a week the strikers returned to work on July 14. It was agreed, it is understood, that the miners should return to work under the old working conditions. J. L. Studdard, sub-district vice-president, conducted the negotiations for the miners.

The Ohio County Fuel Co., affiliated with the American Gas & Electric and the West Penn Power companies, has purchased 3,354 acres of coal land in Richland district of Ohio County. The purchase price was \$839,000. The acreage purchased was for the express purpose of insuring a supply of fuel for the Windsor power plant at Beech Bottom for the next half century. At the time the deed covering the sale of the property was filed, a mortgage creating the Union Trust Co. of Pittsburgh as trustee for the issue of \$600,000 of gold serial bonds was filed, the proceeds to be used in completing payment for the tract. The properties purchased are underlain with the Pittsburgh and Wheeling coal veins.

The Western Maryland & Tidewater Ry., constituting an outlet for several thousand acres of coal land south of Grantsville and connecting with the Baltimore & Ohio, has been sold by William E. Ambrose, of Cumberland, and his associates to the Morgantown Coal Corporation, headed by William A. Morgant, which owns 7,000 acres of coal land in Garrett County, Md., and has a number of mines in operation. Mr. Morgant and his associates have not only purchased the railroad, but also the balance of the Jennings interests in Garrett County, including practically the entire town of Jennings. The road will in the future be known as the Casselman Valley R.R.

Suit instituted by the Marine Smokeless Coal Co. against the Norfolk & Western Ry. may involve an interpretation of the Elkins Act, for it is considered possible that it will eventually reach the U. S. Supreme Court. The suit was filed in the Circuit Court of McDowell County to recovering the amount expended, plus interest, in building a spur track up Davy Creek, covering a distance of about a mile and a half. The coal company sets forth the fact that after the spur was completed it was forced to deliver a deed for the spur to the railroad company and that by the terms of the deed the spur became a part of the main line of the railroad company, subject to all the laws and regulations applicable to common carriers and therefore was placed at the service of competing companies who paid no part of the construction cost and who were under no obligation to reimburse to any extent the plaintiff company. It is contended by the coal company that this amounts to a discrimination in law.

WASHINGTON

The Cambridge Coal Co., of Seattle, has incorporated with a capital stock of \$300,000. The incorporators are E. M. Cushman, E. T. Pope and George A. Brooks.

The Beacon Coal Mines Co. has reorganized and hopes to reopen its mines near Seattle. W. J. Muirhead is president and general manager.

The East Fork Coal & Clay Co., of Seattle, has changed its name to the Everett-Fisher Coal Corp. and has increased its capital stock from \$150,000 to \$250,000.

The Sedro-Woolley Coal Co., of Bellingham, has been incorporated with a capital stock of \$40,000 by H. W. Buzzard, M. C. DuVall, Elmer C. Saxon and William Seeger.

A dream for briquetting Washington coal came to an end recently when the equipment of the Centralia Briquetting Co., of Centralia, was sold by the receiver for \$2,560 to the Western Machine Exchange, of Aberdeen, which will dismantle the plant. The briquetting company was organized several years ago by L. A. Kingkinney to manufacture briquets by a process on which Kingkinney claimed to have a patent. The plant never operated on a commercial basis and Kingkinney was made defendant in numerous civil and criminal actions. His death occurred later. It is estimated that Centralians invested about \$40,000 in the company. The sale did not include the building and grounds, which will be turned back to W. A. Davis, administrator of Kingkinney's estate.

Operators in Washington feel that the business of their properties in that state has been saved from practical extinction by the recent decision of the I.C.C. in the Western rate case. The commission made slight increases in coal freight rates between Utah and the Pacific coast instead of the reductions for which Utah prayed. Into Seattle rates on lump, nut and slack were increased 26c. a ton, and into Portland, Ore., for instance, the increases are 15c. on lump, 21c. on nut and 30c. on slack. Washington men contend that if Utah-to-the-coast reductions had been made there would have been little opportunity left for Washington to sell its coal and that sooner or later Washington mines would practically be driven out of business. This would give British Columbia coal a further chance to come down the coast, Washington contended before the commission.

WISCONSIN

The Chicago & North-Western Ry. is building a \$30,000 coal hopper at the foot of Corcoran Avenue in Milwaukee.

A number of coal docks at Superior were damaged by a recent storm. The docks of the Clarkson Coal Co. and the Pittsburgh Coal Co. fared the worst. Three bridges of Dock No. 7, of the Pittsburgh company were badly twisted. The damage caused some delay in unloading vessels.

The Milwaukee Electric Railway & Light Co. has acquired the barge A. C. Tuxbury, a Great Lakes lumber-carrying vessel, and will use her in transferring coal from the docks to power houses on Milwaukee River. About 350,000 tons of coal is handled in this way during the course of a year.

Among the many resolutions forwarded by the Legislature of Wisconsin to Vice-President Coolidge for presentation to U. S. Senate was one embodying a request that legislation be enacted by Congress requiring consignments of coal to be accompanied by statements showing the quality of the product.

WYOMING

A lease on 1,000 acres of coal land near the Crosby mines at Lander was bought at auction at the Lander land office July 5 by the Big Horn Collieries Co. At least 20,000 tons a year must be extracted beginning the third year and at least \$50,000 must be invested in developing the field.

WASHINGTON, D. C.

The Navy Department will receive bids until 10 a. m., July 31, for supplying and delivering 500 gross tons of bituminous mine-run coal to the Naval Experimental and Research Laboratory, Bellevue, D. C.

The Civil Service Commission has announced the opening of examinations for valuation engineers and associate engineers. It is the commission's desire to build up eligible lists from which the Treasury Department can choose engineers capable of examining coal properties for taxation purposes. The salaries range from \$3,000 to \$3,600 for associate engineers and from \$3,600 to \$4,800 for valuation engineers. The explanatory papers can be obtained on application to the Civil Service Commission at Washington.

CANADA

The Dominion Government by order-in-council has continued the suspension of royalties on coals mined in Yukon territory for an additional period of five years.

Eastern Canada Collieries, Ltd., has been granted a Dominion charter, with headquarters at Montreal. The authorized capital is \$50,000 and the company is empowered to carry on business as operators and wholesalers.

The Norwegian steamship O. A. Knudsen, 3,352 tons, and the French boat Banba, 492 tons, both loaded with coal, were lost on the shores of St. Mary's Bay, N. F., on July 1. The crews of both vessels, which are reported to be total wrecks, landed safely.

The city of Toronto is buying bituminous coal for 90 per cent of its school fuel. Last winter it was obliged to do so and now that coal is preferred, at \$7.53 a ton, in place of \$15.50 for anthracite. The price paid for bituminous last winter was \$9.80. Coke used cost last winter from \$14 to \$17.

Railway, government and coal men will attend the conferences to be held at Winnipeg, Manitoba, regarding freight rates on Alberta coal to Eastern Canadian points. The meeting is expected to take place in a few weeks. The object is to obtain a rate on Alberta coal that will permit it to be shipped into Ontario and sold at a price that will assure successful competition with imported coals.

Reports showing a satisfactory year's business were presented at the annual meeting in Fort Erie of the Penn Canadian Fuel Co., with head office in Toronto. Among those present at the meeting were: L. W. McClellan, Toronto; W. R. Crothers, of Pittsburgh; F. H. Hoag, C. W. Moss, C. L. Couch and C. W. Smith, of Buffalo.

The Canadian National Ry. system is making a test of Alberta coal, a carload of coal from Drumheller having been brought to Stratford, Ont., arriving in good condition. It has been placed in storage under ordinary cellar conditions and will be examined in November to see how it stands storage. In case the result proves satisfactory the only factor of the problem remaining to be settled is that of price which will depend mainly on freight charges.

The Engineering Institute of Canada and the Canadian Institute of Mining and Metallurgy have both passed resolutions urging the fuel committee of the Canadian Senate and the House of Commons to consider the importance of appointing and providing funds for a committee of coal, transportation and equipment engineering experts to act in consultation with the engineering departments of the transcontinental railways to determine both scientifically and experimentally the greatest extent to which the cost of the transportation of coal from Alberta to Ontario can be reduced.

A conference of Canadian National and Canadian Pacific railway officials, coal operators, and representatives of the provincial government, was held at Edmonton, Alta., July 16, following which it was announced that a ton rate of \$6 or \$6.50 for the shipment of Alberta coal to Ontario was impossible. Premier Greenfield stated, however, that an arrangement had been effected whereby shipment would be made within the next few weeks of 4,000 tons, at a rate to be definitely decided later, which would be such as would allow Alberta domestic coal to reach Ontario in car lots at a competitive price. The rate at which this shipment would be made would be merely experimental. Jesse Gonge, representing the operators, said that furnace new coal could be sold at the mines for \$4.50 per ton or over. Allowing \$2.50 for dealers' profits, sacking and handling this, if the freight charges were reduced to \$6 to \$6.50 per ton, as against the present \$9 rate, would bring the retail price to \$13 or \$13.50 in competition with a present retail price for anthracite of \$15.50.

William Sloan, minister of mines for British Columbia, has been engaged in making a tour of the underground workings of the coal mines of Vancouver Island. He has been accompanied by the new chief inspector of mines, George Wilkinson. Mr. Sloan found conditions as to the safety of the miners very satisfactory. Some of the workings places in No. 5 mine, South Wellington, and the Reserve mine, near Nanaimo, still are a source of trouble to the miners because of the sulphurous fumes given off by the coal. To this condition the minister paid special attention and he

has decided to call in an eminent bacteriologist and pathologist to see what can be done to eliminate, or at least alleviate, the trouble. Dr. R. H. Mullin, a recognized authority on health work and industrial hygiene and head of the bacteriological and pathological department of the University of British Columbia, is to be asked to make this investigation.

Exaggerated statements have obtained circulation as to contracts entered into for a supply of Mexican coal for Canada, the amount contracted for having been placed as high as ten million tons. It is now stated that through arrangements made by Noel C. Wilde, Commercial Commissioner for Canada in Mexico, 600,000 tons of coal will be shipped from that country to Canada during the coming seasons. Most of the coal is located in the district around Sabinas, in the State of Coahuila. Canadian boats will be used for transportation from the port of Tampico. The price is stated at \$9 per ton f.o.b. Tampico.

With twenty-two hundred tons of Welsh anthracite coal on board, the Eastern Steamship Co.'s vessel "Judge Hart" has arrived in Toronto and is at the Century Coal Co.'s docks. It is the first of a series of shipments that are to come direct from Wales to Toronto.

According to a wire received by the Dominion Superintendent of Penitentiaries from an Edmonton coal company, he has been given a quotation of \$12.80, delivered in the freight yards at Ottawa. This is almost \$4 lower than the rail price of Pennsylvania anthracite.

Shipments of coal from the Nova Scotia collieries during June have been very heavy, with all collieries working full time, the output running from 22,000 to 24,000 tons per day. No. 7 colliery, Sydney Mines, which was idle all winter, is again producing, and No. 15 colliery, which was closed for several years, has been reopened and is being put in condition for operation. The Dominion Coal Co. is making a thorough test of coal mining machines, using different machines in different collieries.

MEXICO

A contract has just been awarded the Wilputte Coke Oven Corporation, New York, for the installation of forty coke ovens, with a complete byproduct and benzol plant at Rosita, in the State of Coahuila. Besides the oven plant, the plans include the installation of an up-to-date power house, a new shaft and hoist and a coal washer which has been designed under the direction of G. P. Bartholomew, general manager of the coal-mining department of the company.

Association Activities

Clarksburg Coal Club

That the outcome of negotiations between anthracite operators and miners and the possible bearing it may have on the bituminous situation is uppermost in the minds of bituminous operators was reflected in the general trend of discussion at recent meetings of the Clarksburg Coal Club, of Clarksburg, W. Va. T. J. Ryan, of the Hutchinson Coal Co., of Fairmont, discussed briefly what might be expected at a recent meeting of the club. J. M. McDonald, of Cincinnati, discussed recent revisions of freight rates on coal from Ohio and Kentucky, pointing out that already West Virginia operators feel the effects of the differential between West Virginia and Ohio sufficient to give Ohio operators a slight advantage. The new ruling, it was stated, enhances the advantage already held.

Obituary

George Hirsch, 67, owner and manager of the George Hirsch Coal Co., Milwaukee, Wis., died suddenly on Wednesday, June 27, 1923. He was one of the oldest jobbers and retailers of coal in Milwaukee.

Fred J. Cropsey, 56, for many years a coal manager in St. Paul, is dead. He was manager for the Carnegie Coal & Dock Co. for many years. He had been a resident of St. Paul for 30 years. A widow and three children survive him.

Publications Received

Mineral Production of Canada for the calendar year 1921. Dominion Bureau of Statistics, Mining, Metallurgical and Chemical Branch, Ottawa, Canada. Pp. 233; 6x9 in.; tables.

Mineral Resources of Alberta, Canada, 1922, Part I, covering Saunders Creek and Nordegg Coal Basins, by John A. Allan and Ralph L. Rutherford, University of Alberta, Edmonton, Alberta, Canada. Pp. 66; 7x10 in.; illustrated. Report on the geology of these basins, with geological map showing structure and areal distribution of the formations including the coal measures.

Progress of Investigations on Liquid-Oxygen Explosives, by S. P. Howell, J. W. Paul and J. L. Sherrick, Bureau of Mines, Washington, D. C. Technical paper 294. Pp. 91; 6x9 in.; illustrated; tables.

Manufactured Gas in the Home, by Samuel S. Wyer, associate in mineral technology, U. S. National Museum, Smithsonian Institution, Washington, D. C. Bulletin 102, Part 8. Pp. 24; 6x9 in.; illustrated. Insert in the front part of the bulletin shows model of how coal is transmuted into gas and delivered to the home.

Trade Literature

Type K Stoker. Combustion Engineering Corporation, Broad St., New York City. K-1. Four-page folder. This stoker under-feeds the coal, and dump grates may be installed in place of shaking grates where the burning characteristics of the coal used make it advisable. The outcome of a test at a plant operating three 150-hp. B. & W. boilers is given.

Catalog of Electrical Supplies, 1923-1924. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Pp. 1302; 8x11 in.; illustrated. The catalog is indexed according to subjects and to sections; it also has a style number and thumb index. A feature not included in previous catalogs has been added to the introductory section under the title "How this catalogue serves," wherein is listed apparatus of particular interest to mines, etc.

Traffic News

That the Monongahela Ry. will be able to move a much larger tonnage from the Monongalia field of West Virginia within a few months was the statement recently made by Colonel H. C. Nutt, president of the road. Discussing plans for additional coal-handling facilities, Col. Nutt said: "We expect to spend thousands of dollars in the Madsville section during the summer and hope to complete the work within three or four months. When the work is completed travel along the highway paralleling the railroad will be much improved and district coal operators will find greater facilities for moving coal." He said that a steam shovel was in operation below Madsville preparing for the double trackage to Lock 9, adding that the improvements in the Madsville yards proper would be started within a short time.

Rates on coal from Standardville and other Utah points to Salt Lake City, held to have been in violation of the long and short-haul provision of the Interstate Commerce Act during the period of federal control, are not in violation of the law, in the opinion of J. O. Cassidy, an Interstate Commerce Commission examiner. In a tentative report to the commission he recommends that the complaint be dismissed. The complaint was brought by two corporations engaged in the retailing of coal and by a manufacturer of gas and certain byproducts of coal.

The Chicago & Northwestern R.R., was granted authority by the Interstate Commerce Commission July 20 to assume obligation and liability in respect to \$4,755,000 of 7 per cent equipment trust certificates. The certificates are to be sold at not less than 96½ per cent of par and the proceeds used to procure additional equipment.

Appointment of Charles F. Wolcott, formerly connected with the Pennsylvania R.R., to be district manager of the Car Service Division of the American Railway Association, in Pittsburgh, Pa., has been

announced by the Car Service Division. He assumed his new duties on July 15. The territory making up the Pittsburgh district includes the western half of Pennsylvania, western New York, northwestern Maryland, northern West Virginia and Ohio east of a line drawn from Parkersburg, W. Va., to Mansfield, Ohio, thence to Buffalo, N. Y. The district, however, does not include Buffalo, Niagara Falls or Suspension Bridge terminals.

The Lehigh Valley R.R. reports anthracite loadings for the first half of July amounting to 504,428 tons, the largest since 1920. Last year at this time the movement of coal was at a standstill because of the miners' strike. Loadings for June stood at 1,224,068 tons and this level is expected to be reached during July.

Hearing in Valuation Docket No. 235, in re tentative valuation of the properties of the Virginian Ry. Co. and the Virginian Terminal Ry. Co., assigned for Sept. 5 at Washington, D. C. before Examiner Pattison, has been cancelled and the case re-assigned for Oct. 8, 10 a.m.; same place and examiner.

Clarence W. Huntington, president of the Virginian Ry., in his annual report of the operations of that railroad for the year ended Dec. 31, 1922, says that the coal strike of last year affected the mining operations on that road at Eccles and west thereof, but the decrease in tonnage was more than offset by increased production in the other mines along the company's lines. At the close of the year there were 113 coal mines, not including wagon mines, in operation on the main line, branches and connecting lines in Virginia and West Virginia, of which eight began shipping during the year, and three additional mines were under way. Four of the above mines were temporarily closed during the year on account of strike conditions. President Huntington says the bulkheads for the new pier being erected at Sewalls Point were practically completed at the close of the year. There was carried over the road during the year 7,397,025 tons of miscellaneous freight as compared with 6,376,648 tons in 1921. Revenue from coal and coke freight was \$14,875,509.10 as compared with \$13,743,394.58 the previous year. Net operating revenue for the year was \$6,570,052.36 as compared with \$5,618,628.97 in 1921, an increase of \$951,423.39.

A total of 8,646 new freight cars were placed in service from June 15 to July 1 by the railroads of the country, according to the Car Service Division of the American Railway Association. This made a total of 79,240 new freight cars placed in service from Jan. 1 to July 1. The railroads also placed in service during the last half of June 158 new locomotives, making in all 1,998 put in service during the first six months this year. Of the 8,646 new cars installed from June 15 to July 1, 2,987 were coal cars. The railroads on July 1 also had 96,855 new freight cars on order. Of the number on order, 38,736 are coal cars. In addition, the railroads also had on order on July 1, 1,902 new locomotives.

Freight rates on coal from Ward, W. Va., to Ironton, Ohio, have been found to be unreasonable by the Interstate Commerce Commission. In a decision rendered in the case of the Dayton Malleable Iron Co. versus the Kanawha & Michigan Ry., the commission holds that for the future the rate will be unreasonable to the extent that it exceeds \$2.14 per ton.

In connection with the \$37,000,000 improvement program planned by the Chesapeake & Ohio Ry., contracts have already been awarded to cover approximately 70 per cent of the \$4,000,000 to be expended on improvements in and near Huntington. One of the first improvements to be undertaken is the double tracking of the Big Sandy division at a cost of approximately \$1,500,000, plans for which are already under way. Additional tracks and sidings are to be constructed on the main line between Handley and Russell. Additional yards, sidings and engine terminal facilities are to be provided in the Coal River district and \$654,100 is to be expended on the Logan Division for additional yards and sidings. Between Handley and Russell \$848,000 will be expended. Improvements to be made in the Coal River district will approximate \$514,000. Improvements to be made to the Guyan Valley division are expected to increase materially the facilities of the company for handling a larger volume of coal from the Logan fields.

Products of mines to the extent of 149,197,528 tons were carried by the Class 1 railroads of the country during the first quarter of the current calendar year. This represents an increase of 23.41 per cent

over the first quarter of 1922. During the first quarter of 1923 the products of mines contributed 53 per cent of the entire tonnage of original freight carried by the railroads. The tonnage contributed to the railroads by the mines of the country during the first quarter of 1923 is subdivided as follows:

	Tons
Anthracite	22,281,156
Bituminous coal	92,106,997
Coke	7,167,182
Iron ore	1,842,549
Other ores and concentrates....	2,504,987
Base bullion and matte.....	175,446
Clay, gravel, sand and stone....	18,997,997
Crude petroleum	1,830,724
Asphalt	322,375
Salt	743,457
Other products of mines.....	1,224,658

Total 149,197,528

Freight traffic in May was 39,597,582,000 net ton miles, the heaviest for that month in the history of the railroads, according to a report by the Bureau of Railway Economics. This was an increase of 2.7 per cent over the same month in 1917, when the previous record for that month was made. The daily average movement per freight car in May was 28.6 miles. Except in May, 1917, when an average of 29 miles was attained, this has never excelled in any month before and only once equaled, that being in the autumn of 1920. The average of 28.6 miles was an increase of three-fifths of one mile over the average for April. The average load per car in May was 28 tons, the highest for any May since 1917, when the compilation of these statistics began except for May, 1920, when the average was 28.2. The average for May this year was an increase of two-fifths of a ton over that for April. The program adopted by the railroads calls for a daily average movement per car of 30 miles and for the loading of all freight cars to maximum capacity in an effort to bring the average loading to 30 tons per car for the entire country.

Coming Meetings

The tenth annual Tennessee First-Aid Contest and Miners' Field Day will be held at Knoxville, Tenn., Aug. 4, in the Knox County Court Yard, under the auspices of the Tennessee coal operators, state mine inspectors and the U. S. Bureau of Mines, R. E. Howe, secretary of the Southern Appalachian Coal Operators Association, secretary-treasurer. J. M. Webb, of the U. S. Bureau of Mines, is instructing the first-aid teams.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the International Safety and First-Aid Meet. Secretary, Benedict Shubart, Denver, Colo.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, AUG. 2, 1923

Number 5

The Check Off as an Issue

IT WOULD have been surprising if the bituminous coal operators had left unchallenged the assertion of John L. Lewis to the anthracite operators that the "check off" had been working for years in the soft-coal fields to the mutual satisfaction of both parties. The statement issued last Saturday by the National Coal Association covers the situation. The check off, however it may have come into being, and whatever its virtues originally as a source of strength to a growing organization of mine workers seeking to stabilize the industry in which they worked, has of late years fallen into disrepute.

The method by which the union forces allegiance and payments of assessments and dues, unique as it is in industrial relations, has not itself been held to be illegal, at least by high courts. But the use to which it is put has been vigorously condemned, and it is a practice now closely bound into the relations with the United Mine Workers and one of which a great many, if not all the organized soft-coal operators would heartily like to be purged. To hold as an argument, as have the committee for the anthracite workers in the recently disrupted negotiations at Atlantic City, that for the hard-coal operators to concede the check off would be to enable the union to better hold the men in line, prevent petty strikes and otherwise benefit the industry, in the face of the record of local strikes and disrupting practices in the oldest organized soft-coal fields of the country, where the check off has been in effect for a quarter of a century, is to strain one's credulity.

Since it is the issue of the check off that is threatening to shut off anthracite production on Sept. 1, the public will seek to learn what the Coal Commission has to say on that point. It will look in vain, however, in the commission's anthracite report of last month for word about the check off. It is not mentioned. There are eight recommendations covering the matter of preserving peace in the hard-coal fields, of preventing and forestalling friction and promoting harmony. That would seem to be its answer to the miners, who say that without the check off they cannot keep the men under control.

It were well to recognize the check off for what it is—a means of financing the United Mine Workers. If they hold above all other demands the need for a forced draft of funds from the men, if they place, as they seem to have done, the demand for the check off above that for corrections in working conditions and higher wage rates, then they are saying that Indianapolis rather than the mine worker requires more money. It is quite generally known that dues are difficult to collect when the payment is voluntary. There are two ways to collect union dues—one to enlist the man's enthusiasm and support so that the money is gladly

given in support of the cause; the other to force the operators to collect it, even if in the process the country is deprived of coal at the beginning of winter.

It is all very well to say that the miners execute individual assignments permitting the company to subtract the moneys from their pay. The practical effect, as every soft-coal operator who collects the check off knows, is to force the men to the agreement. The union furnishes the duress. There are no exceptions; the result is the "full union recognition" desired by Mr. Lewis, and every pay check gives up its toll to the union treasury, in a way and to a degree that does not now obtain in the hard-coal region.

Quid Pro Quo

SECRETARY of the Interior Work will be greeted on his return from Alaska with the compliments of the engineers of the country. He may be somewhat surprised to learn that his summary dismissal of A. P. Davis from the directorship of the Reclamation Service is considered by the profession in which Mr. Davis stands so high to be nothing short of an endeavor to obtain a partisan political advantage. That is to say, the new Secretary of the Interior, who has established national fame for his successful conduct of an asylum for mental diseases, is credited with playing the political spoilsman with the Reclamation Service. The federal government has a net investment of \$132,000,000 in reclamation projects, \$8,000,000 is invested annually in new projects and there is an annual turnover of some \$4,000,000 in the maintenance fund. No less than 100,000 voters in the West, where votes are few, are directly interested in these projects.

Arthur P. Davis was fired after many years of valuable work in building up and protecting this vast and widespread enterprise of our government. He was fired because he would not resign. It is understood that he steadfastly stood in the path of those in the administration who would forget the debts—for votes—of those who owed money on their water rights.

Ex-Governor Davis of Idaho, who now takes administrative charge of the Reclamation Service, is admittedly a practical professional politician—one who, it is reported wanted the secretaryship now occupied by Mr. Work.

Secretary Work's explanation is an insult to the engineering profession. He wants a business man at the head of this bureau! The man he selected succeeded in the grocery business, but his subsequent banking experience was not so successful!

In the Interior Department, which Mr. Work now heads, are other technical bureaus—the Geological Survey and Bureau of Mines in particular. Will he seek business heads for these as well, or are there not sufficient votes appended to these activities?

Selfish Unselfishness

IF HERBERT HOOVER, Secretary of Commerce, were called upon to compress into two words the idea behind "good" trade associations, he might call it selfish unselfishness. In the book on associations which his department recently issued Mr. Hoover makes another effort to drill home the convincing thought that business can be of greatest service to itself by being of greatest service to the public. Accurate compilation and distribution of business statistics on coal, for instance, are essential if the people of this country ever are to understand coal and get the correct mental attitude toward the industry. In no better way can "coal baronism" be expunged from the nation's mind.

No other agency can do it so well as the trade association, Mr. Hoover believes. So the association is the industry's best weapon for defence. Therein lies its selfishness. But the association must be sound in principle and practice from core to surface. The only way to make its statistics constructive is to conduct it "alike for the benefit of producer and consumer." Therein lies its unselfishness.

Such associations we must have, Mr. Hoover thinks, because every industry needs adequate statistical services both for the direction of those within the industry and for the information and understanding of those outside it. There is a point to Mr. Hoover's sentence: "Whether these services are to be maintained by the government or by trade associations, they must be maintained if we are to have an orderly economic life." It is useless to try to decide whether Mr. Hoover means this as a threat. It is not his habit idly to toss threats about. He does habitually devote a master intelligence, though, to problems confronting all American business, and it is evident that he is going to do everything he can to see that this country has "an orderly economic life."

Brain and Brawn

EDMUND HENRIQUES, coal miner at the Gates mine of the H. C. Frick Coke Co., has chosen to sell his brawn rather than his brain, though apparently he does not lack the latter. During the World War Henriques served in the British Royal Air Service as a flyer. For bravery and daring, and for skill doubtless also—bear that duly in mind—he was cited by his superiors.

He is in America digging coal for the public, a job "affected with public interest," and he seems to be doing quite well. The other day he purchased an airplane in New York, rose in the air and flew in five hours to Gates. In the evening after his day's work is done he is said to disport himself with nose dives, tail spins and the like.

The question naturally arises, Is he worthy of the earnings of \$300 to \$350 a month which he is said to be receiving? Is he entitled to have a wage that will enable him to buy and operate an airplane? Is the miner in West Virginia, of whom we have heard, whose wife meets him every night in a Packard getting too big a wage? We do not know. We might if wages in coal mining were left entirely to supply and demand.

The time may come in America when brawn may compete on even terms with brain, especially with the more mediocre kinds of the latter. Certain it is that some people believe that the time already has come. Some say brawn is in the ascendant and prove it by

alleging that those who merely think and plan and do not exercise their muscle obtain less for their work than those who when they exercise their brains do so only in the direction of their own physical efforts.

Unrestricted competition might settle that question, but we do not find it operative any more, for the payment for labor in union mines is kept at a high level by combinations and that at non-union mines may be boosted for all we know by the fear of such conspiracies, whereas brain labor is not thus sustained. Perhaps that is why mine foremen, surveyors, mine clerks, and even superintendents often fail to get wages equal to those paid physical laborers. But then again that may not be the reason. We do not know.

Still it cannot be denied that men who do not disdain hard and dirty labor and who dispense with the dignity of the office man and official yearly are gaining on the lower grades of brain workers. It is getting more and more customary for men to seek the softer jobs, and the market is accordingly overstocked. The sons of miners hunt less arduous occupations than their parents, as more desirable, even if less remunerative.

Say what we will, our ancestors did not find personal toil either derogatory or displeasing. They were inured to hard labor and respected those who were willing as they were to perform it. Because the brain worker has set himself apart does not by that fact entitle him to bigger pay. Direction of the services of others is not necessarily more valuable than the performance of the services themselves. So we cannot feel assured that Henriques has not a right to his evening spin or the man in West Virginia to come to, and leave, his work at the wheel of his Packard.

But at the same time we cannot be sure whether this is so till all men come into an open market to find the true value of their services and learn by unrestricted competition how greatly the country needs their particular class of effort, and how many are able and willing to perform it.

With common-school education what it is, with higher education so cheap, everyone can perform certain of the labors which we class as brainwork jobs, but since man first rose above the animals there have been occupations that needed veritable genius. The men performing such jobs always will be paid more than those who employ themselves at work which demands many foot-pounds of energy and but little skill for its accomplishment.

Meantime, Henriques, so long as your flights leave you with a whole skin, you will as a flyer and a worker typify the new world into which we are about to enter and perhaps have already attained.

SPEED WOULD SETTLE MANY A COAL DISPUTE. But how can a dispute over the quality of a car of coal be settled quickly if the matter goes to a court of law? The car cannot stand on a siding for ninety days rolling up demurrage while some court gets around to it on a crowded calendar. But one or more coal men could hasten out and see that car of coal on a day's notice, or less. Right there is a strong argument for writing an arbitration clause into every coal contract. With such speed possible, an improper or unfair complaint against a shipment of coal would be strictly out of luck. Also, an unprincipled shipper would have a hard time palming off fireproof fuel or anything else that did not appear to be up to the specifications. There would be more justice in coal trading.



Surface Plant, Gallup American Mine, Navajo No. 5

Gallup American Coal Co. Displaces Four Long Slopes With One Ultra-Modern 5,000-Ton Shaft Mine*

Navajo No. 5 Is Sunk in Broad New Mexican Tract to Increase Economy and Output—Main Shaft Equipped with Skip—Other Shaft with Cage, so That Two Seams Can Be Served

BY H. B. COOLEY†

INTEREST has centered lately upon the property of the Gallup American Coal Co., near Gallup, N. M., where a pair of deep shafts tapping a low point of a large coal acreage are displacing four slopes the length of which has reached the "economic limit." New, big-scale underground development, a skip hoist and a noteworthy surface plant are combining to consolidate the scattered slope units into one economical and thoroughly modern 5,000-ton mine—Navajo No. 5. Three coal camps also are being merged into one mining town.

The Gallup American Coal Co. is owned by three of the large copper companies of the Southwest, and the output from the mines of this company insures to its owners and other mining and metallurgical plants in Arizona and New Mexico an adequate supply of fine coal for their power plants and smelters. One-inch screens ordinarily are used to separate the commercial from the "company" coal. Everything that passes over these screens is sold by the coal company through commercial channels.

The Santa Fé railroad uses 1x4-in. egg coal for several divisions of its Southwestern territory, and this size is demanded by some of the mining companies. Domestic grades, especially "Gallup lump," are in large demand throughout the Southwest. Gallup coal is sold as far north as Albuquerque, N. M., east through the Pecos Valley to Amarillo, Texas, south to El Paso, in the same state, and west to Los Angeles and San Francisco.

The Gallup coal field, on the main transcontinental line of the Santa Fé railroad, is the most promising source of fuel throughout a vast territory in the south-

western portion of the United States. The location and extent of this coal field are shown by Fig. 1, from which it can be seen that the Gallup American properties are in the heart of the Gallup field, that company holding extensive coal and surface rights. It is expected eventually to develop 3,000 acres of coal property, all containing two workable seams, from one centrally located mining operation.

Thus far practically all of the developments in this territory have been by means of slopes. Coal has been mined in that way in this field for over 35 years, the most extensive work having been done by the Victor American Fuel Co. That firm had four operations working before the war, and on July 1, 1917, these plants together with all coal and surface rights were acquired by the Gallup American Coal Co.

The mining plants which the present owners have continued to work since 1917 are known as the Weaver Slope, Navajo Slopes Nos. 1 and 2, and the Heaton Slope. Their location with respect to each other and to the new mining operations are shown on the general map (Fig. 2).

As can be seen by referring to this map the slope operations have all been carried to what might be called the economic limit. Foreseeing this fact the present owners several years ago began prospecting for a more suitable location for further developments, and drilling was started to establish the extent and character of the coal underlying their undeveloped property.

The general map—Fig. 2—shows how thoroughly this territory was drilled. After a study of the data obtained from these drillholes it was decided that a shaft should be sunk in what had been proved to be the "basin" of the coal area.

In the meantime several conditions at the old plants began to make the need for this new development more apparent. First, the coal available from the Heaton

*This is the first of three articles on Navajo No. 5 mine. The second article, covering the underground workings and bottom plan, the skip hoist, the auxiliary hoist and the tippie, will appear soon. The third will cover power plant, water supply and other interesting features.

†General superintendent, Allen & Garcia Co., Chicago, Ill.

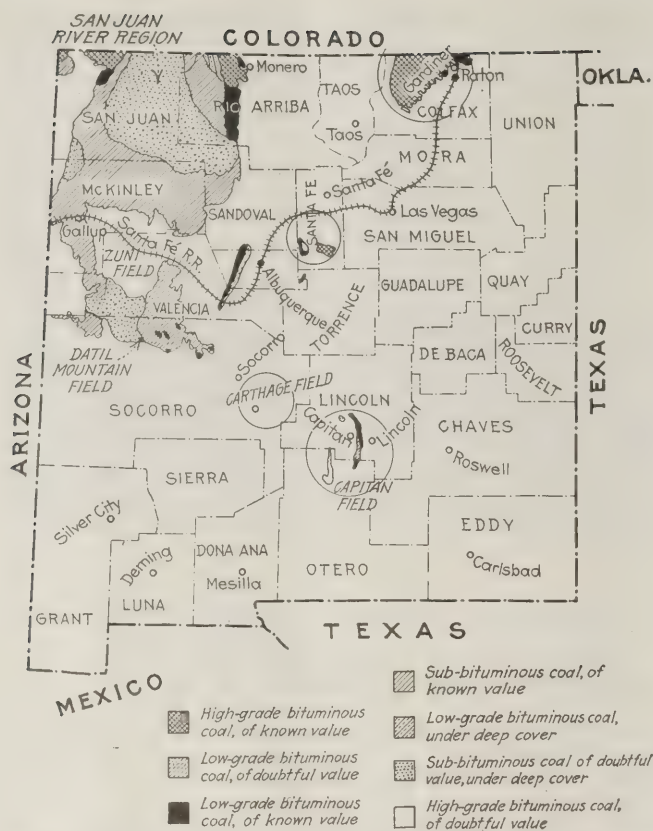


FIG. 1—COAL-RESOURCE MAP OF NEW MEXICO SHOWING LOCATION OF GALLUP FIELD

Gallup lies in the San Juan River region. The coal is sub-bituminous; that at Raton is bituminous. In the Cerillos field some anthracite coal is found in connection with an intrusion of diorite. The nearness of the Gallup field to Arizona is deceptive, the connection with the copper fields unfortunately being somewhat indirect.

Slope was nearing exhaustion. Mining costs at this operation were not excessive, but it was impossible to obtain additional coal rights adjacent to the mine workings. Second, with the increased length of the Weaver and Navajo slopes, the cost of the coal from those mines was rising rapidly, not only by reason of the longer haul but also because the fires in the coal measures above the workable seam, which were difficult to control, rapidly increased the costs of maintaining the slopes, for the heavy ground could be restrained by timbering only with difficulty. Third, the demand for coal began to exceed the maximum production of these properties under the unfavorable conditions with which they then were confronted.

With these factors facing them the owners on July 1, 1920, decided to build a complete new mining plant and the Allen & Garcia Co., Chicago, were selected as engineers and directed to prepare plans for the entire operation. Previous to this time the data obtained from the diamond drillholes had been thoroughly correlated and an accurate contour map of the company property completed.

With this information as a guide, preliminary top and bottom plans were prepared and an effort was made to fit the two sets of plans together in such manner as to obtain the best possible arrangement for both. Underground conditions seemed to favor a main haulageway running approximately north and south. Overground conditions favored a track layout at an angle from that line. The result was that the two main axes of the entire layout lacked 17 deg. of being at right angles with each other. Although at first this feature seemed somewhat of a hardship, it proved

to have several advantages in the detailed development of the plans.

Following the adoption of the general scheme for underground and surface layout, tentative shaft locations were fixed and diamond drilling was started adjacent to these locations.

While this work was under way more detailed plans for the underground haulageways were developed and an accurate surface layout was prepared. All the general features of the entire operation affecting the size of the shafts were decided upon as quickly as possible and the shaft plans were completed and material was on the ground ready to start sinking by the time the drillholes at the shafts were finished. The actual shaft sinking was started Sept. 1, 1920. With this under way plenty of time was available for the completion of detailed plans for the rest of the work.

The determination of the proper size and arrangement for the two shafts involved the consideration of many features. The dimensions for a shaft of this depth should be kept as small as possible without undue limitations being placed on the hoisting capacity or on operating convenience and economy.

To warrant a money investment of the size required to develop this property an ultimate capacity of 5,000 tons per day upward must be anticipated.

If self-dumping cages are to be used for getting this output the hoist cycle must necessarily be fixed by the mine-car capacity. With a coal seam the thickness of which seldom exceeds 5 ft. 6 in., a mine car holding more than three tons is impractical, and thus the coal hoisted per trip with a single-deck cage is limited to that quantity. To get a capacity of 5,000 tons per day,

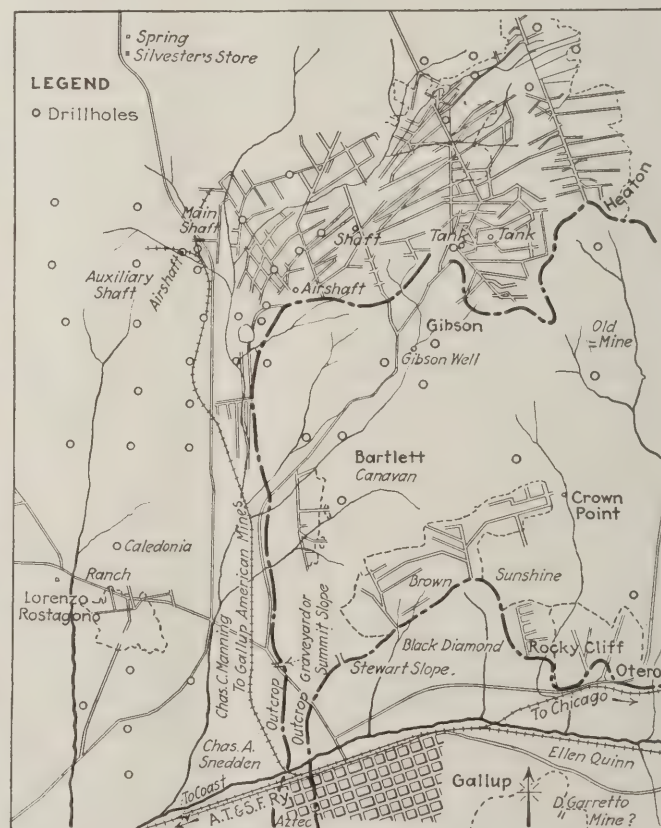


FIG. 2—GALLUP AND ITS NEARBY COAL WORKINGS

The coal fields around Gallup are no longer of unproved value. The network of headings in two of the seams is evidence of that fact. However, the Gallup American Coal Co. has most diligently and methodically proved its property as to coal depth and coal thickness by riddling the proposed seat of operation with drillholes, numbers of which may be noted in this illustration.

hoisting three tons at a time, is manifestly impossible, especially when, as in this case, the total lift exceeds 850 ft.

To use double-deck cages involves many difficulties, such as an expensive car-handling arrangement at the shaft bottom and a breakage of coal in dumping at the top. It was necessary to avoid such breakage in the case of Navajo No. 5. Tandem-deck cages, hoisting two cars simultaneously, were considered, but the idea was abandoned on account of the necessarily tremendous increase in size and cost of the shaft.

The use of skips for hoisting presents a solution for all these difficulties and has many other advantages over all other methods hitherto devised for handling large coal capacities through a single shaft. In consequence, decision was made in favor of the use of skips at the main shaft.

The arrangement at the auxiliary or air shaft was next considered. As has been mentioned, there are two workable seams available throughout most of the area adjacent to the site of the shafts. For the working of the second seam the most feasible plan seemed to be to put a cage hoist in this shaft.

Most modern mines are provided with an independent hoistway of some kind for lowering men and material into the mine. This problem has become more acute at the large-capacity operations where the number of men in the mine often reaches 800 or 1,000 per shift. As from 10 to 20 per cent of the material hoisted at

Gallup is rock, its disposal also presented a serious problem. These considerations all seemed to dictate the installation of cages at the auxiliary shaft with an air compartment for ventilation.

The type of shaft lining to be used was not fully determined even after the diamond-drill cores were available, and it was not until the shaft had been carried to considerable depths that a reinforced-concrete lining was selected. The drillhole logs show nothing to indicate difficulties in sinking, but it was only by skillful work that the heavy ground was held until the concrete lining could be placed.

All the officials in charge of the sinking operation were men experienced in metal-mine shaftwork, and most of the sinkers were Arizona "hard-rock" men of the type notorious not alone for the speed with which they can "punch down a hole" but also for some other stalwart abilities.

The main, or skip-hoisting, shaft is 785 ft. deep from the landing at the surface to the top of the rail in the haulage entries underground with an additional 43 ft. below this point to the bottom, for the skip lands its timbers in the sump. The inside dimensions are 9 ft. x 20 ft. 7½ in., the shaft having three compartments separated by two rows of buntons.

Two of these compartments are used for the skipways, each 6 ft. 5½ in. between guides. The third compartment contains a steel escapement stairway 2 ft. wide, and set on a 45-deg. angle. The stairway is

Drill Hole No. 130

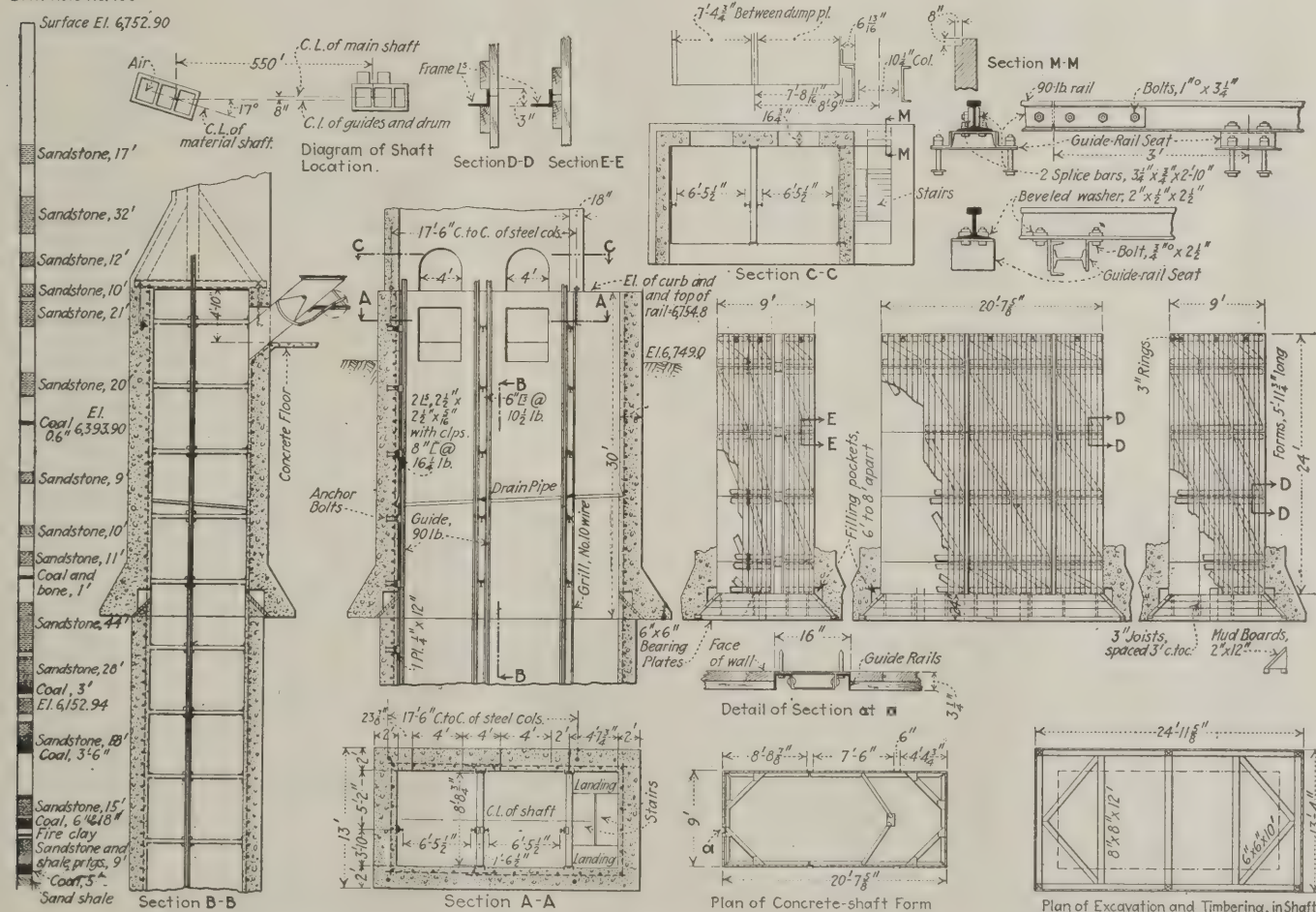


FIG. 3—CONSTRUCTION PLAN OF THE MAIN SHAFT WITH DETAILS OF GUIDES, BUNTONS AND CONCRETE FORMS

The main shaft has two skip compartments, each measuring 7 ft. 4 in. from buntun to buntun or from wall to buntun as the case may be and being 9 ft. wide from wall to wall. It also has a stairway. The guides, it will be seen, are set 8 in. to one side

of the center line of the shaft for the purpose of accommodating the skip. The buntuns are set so that they can be removed, which is of advantage in case of a shaft wreck. The guides are set on brackets at the wall lines.

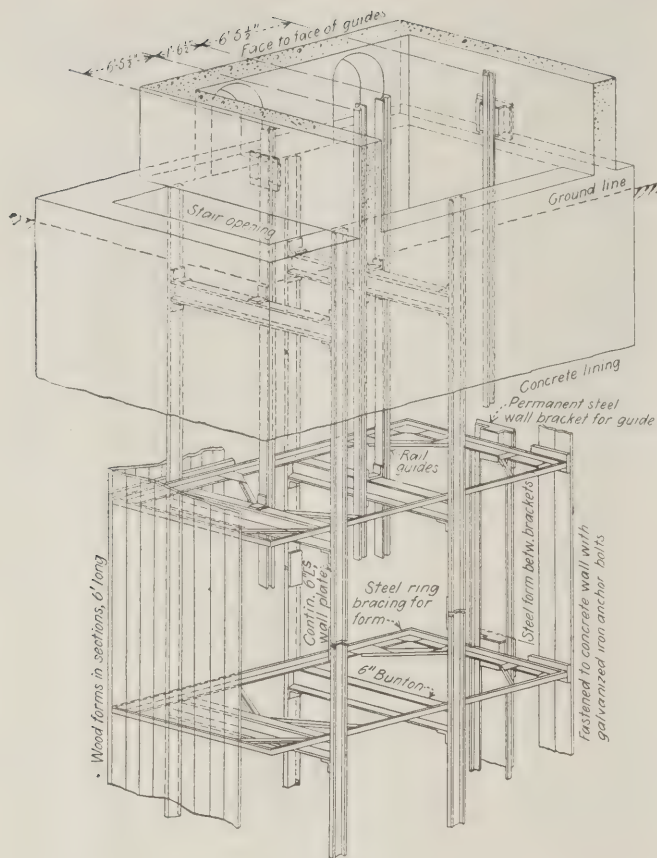


FIG. 4—ISOMETRIC PROJECTION SHOWING DETAILS OF MAINSHAFT CONSTRUCTION

The buntions and wall plates with steel ring bracing hold the form in place, and the concrete is then poured. This method simplifies construction work and relieves the crew of all but a minimum of plummet lining and accurate measurement. The method was so exact and satisfactory that the guides did not in any place need shimming to hold them in line.

protected from falling coal by a continuous iron grillage. The arrangement at the bottom of this shaft will be described in a later article.

Fig. 3 shows a typical cross-section through the main shaft. Attention is called to two features of this shaft arrangement. First, the buntions are so set as to be removable. This is a great advantage in case of a shaft wreck, and a decided improvement over the method of concreting the steel beams into the shaft wall. Second, the guides are set on brackets at the wall lines. Question has been raised with regard to the innovation, some having suggested that it would be difficult to get the guides in line.

The method which has been devised for placing in the shaft the permanent steel framing and the concrete forms in conjunction therewith simplifies the construction work and relieves the construction crew of all but a minimum of plumb lining and accurate measurement.

Sectional wood forms are used and steel angle rings made up especially for each size of shaft are the only interior bracing and spacing members required. The steel bracket carrying the end-wall guide is accurately set by bolting it to the ring angle spacer before the form is filled, and a single plumb line at either end of the shaft is all that is required to plumb the sets which hold the forms.

The permanent steel wall plate, buntions and guide brackets are all set before the form is poured and the chances for misalignment are reduced to a minimum. The steel guides in this entire shaft were set without

a single instance of shimming and throughout the entire shaft the variation of execution from design is not more than $\frac{1}{4}$ -in. Fig. 4 shows an isometric view of the method of construction described.

The auxiliary shaft (Fig. 6) is of the same general type of construction as the main shaft. It is 780 ft. deep from surface to bottom landing, with an additional depth of 16 ft. for a 12,000-gal. water sump at the side of the shaft. The inside dimensions of this shaft are 10 ft. 6 in. x 25 ft. 3 in., the shaft being divided at about the $\frac{1}{3}$ points by a 9-in. concrete partition wall and a steel buntion respectively.

This partition wall permits the use of this shaft for both downcast and upcast air, the primary air compartment being 95 sq.ft. in area. The other two compartments of the shaft are given over to two cageways, the cage platform being 10 ft. long with 6 ft. 3 in. between guides.

The horizontal reinforcement of this shaft is by $\frac{3}{4}$ -in. round bars. At the sides these are 18 ft. 6 in. and 10 ft. 6 in. long, lapped 2 ft., and set on 9-in. centers. At the ends they are 12 ft. 6 in. long and spaced at 12-in. intervals on alternate faces of the wall. This refers to the main part of the shaft. At the top the horizontal side reinforcement is 11 ft. and 19 ft. long lapped 2 ft. and set at $7\frac{1}{2}$ -in. centers. The horizontal end reinforcement is 13 ft. 6 in. long and set also at $7\frac{1}{2}$ -in. centers. The partition-wall reinforcement is 13 ft. 6 in. long and spaced at 12-in. intervals. All the vertical reinforcement is of $\frac{1}{2}$ -in. round bars 14 ft. long spaced 2 ft. apart and lapped 2 ft. on alternate faces of the wall.

The arrangement at the bottom of this shaft is comparatively simple. A pumproom measuring 9 ft. x 10 ft. 6 in. is located at one side of the shaft and is set directly over the water sump. This pumproom houses a triplex reciprocating $5\frac{1}{2}$ x 8-in.

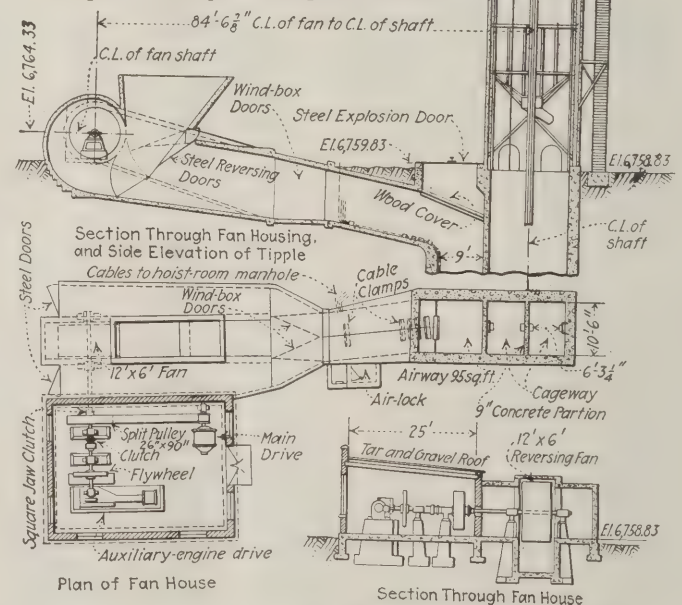


FIG. 5—MATERIAL HEADFRAME WITH SECTIONS THROUGH FAN HOUSE

The shaft to which these structures pertain has cages instead of a skip. The airway is 9 ft. x 10 ft. 6 in., giving a cross sectional area of 95 sq.ft. Immediately above it are a wood cover to relieve the pressure in case of an explosion and steel explosion doors which when blown open can be replaced immediately. The fan is fitted for reversing the air and arrangements are made by which electric drive can, when desired, be replaced by a direct engine drive through a cut-off clutch.

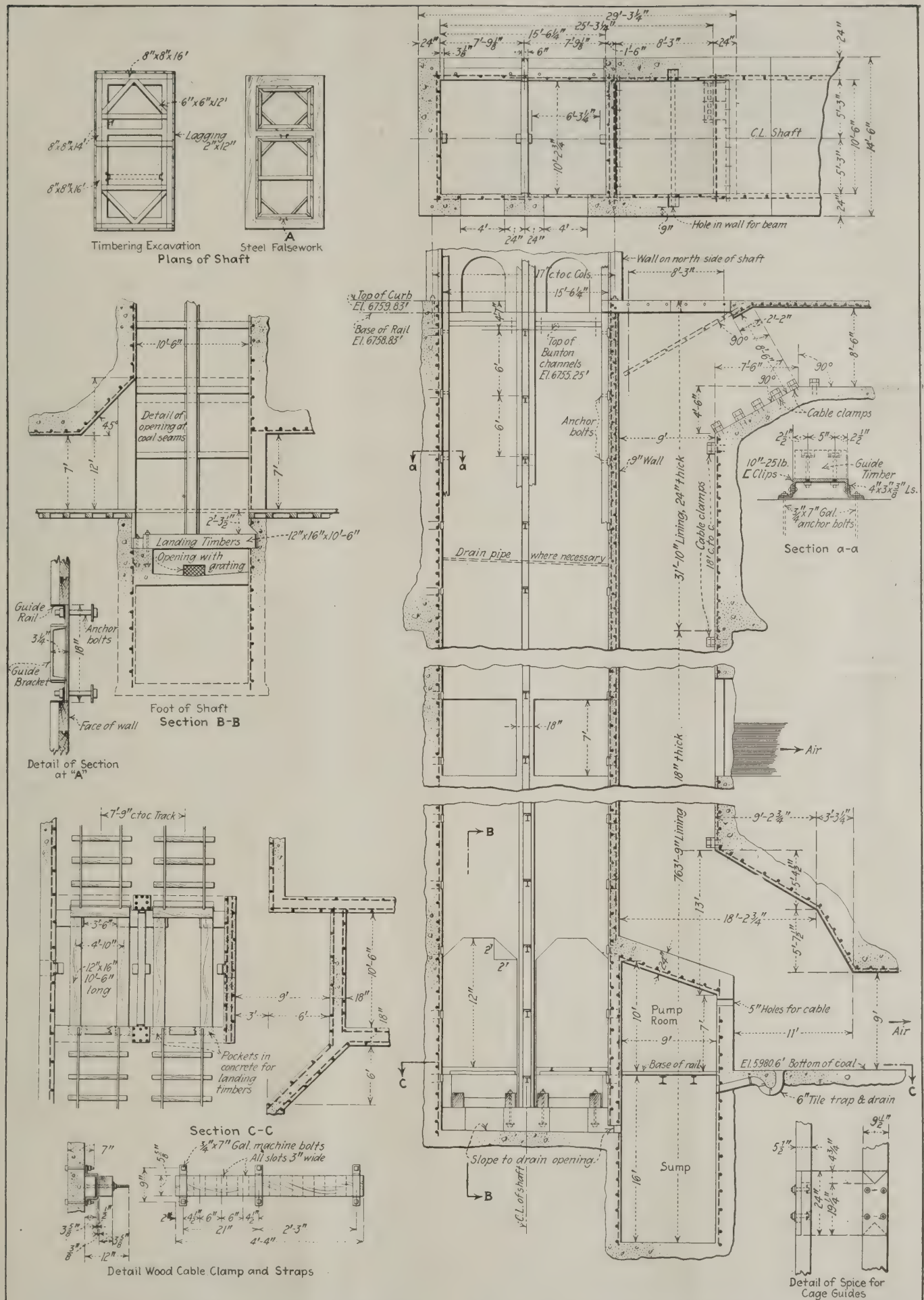


FIG. 6—CROSS-SECTIONS AND DETAILS OF MAN-AND-MATERIAL SHAFT SHOWING BOTH COMPLETED AND FALSE WORK

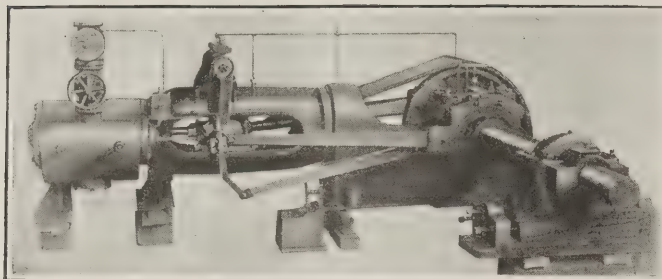


FIG. 7—AUXILIARY FAN ENGINE PRIOR TO MOUNTING

A 14x24-in. engine supplied with steam from the boiler house takes up the work of driving the fan whenever the electricity fails. This fan has no governor. The speed is regulated solely by varying the cut-off, a much more economical plan than throttling down the steam with a governor.

pump driven by a 35-hp. motor, which is run about two hours a day and can easily dewater the sump in 45 minutes. At the opposite side of the shaft the usual pass-way for men is provided and the entry roof is raised to a sufficient height at the shaft to allow taking rails off the cage. All openings within 50 ft. of the shaft are concrete-lined, and every precaution has been taken to prevent a squeeze on the shaft bottom.

Practically no water is encountered in the mine workings and the only water to be pumped is that which escapes into the shafts. Most of this water occurs in a shale stratum at about the 300-ft. level and runs from 25 to 30 gal. per minute. At present this water is caught at the bottom of the shaft and is pumped thence to the surface. Plans are being made for installing a ring and pump chamber just below the water-bearing strata, thus greatly lowering the pumping costs. Practically all this water will be required for the use of the miners in the bathhouse and for miscellaneous surface purposes. There is not sufficient surplus over and above these needs to justify an attempt to use it in the power plant for boiler-feed water.

The problem of ventilation in all the existing mines of the Gallup field is comparatively simple. Gas is practically unknown, and the only ventilation required is for fresh air in the working places. The fan selected is of the undershot type; it normally runs as a blower and is guaranteed to furnish 300,000 cu.ft. of air per minute at 200 r.p.m. with a 4-in. water gage. The fan shaft is arranged primarily for a motor drive with an emergency steam-engine drive through a jaw clutch.

A brief specification of the fan is as follows: Diameter of fan wheel, 12 ft.; width, 6 ft.; 36 variable-length blades; 9-in. diameter forged-steel fan shaft turned to 8-in. diameter throughout the driving end. Total weight, including reversing doors but no steel housing, 56,000 lb.

The emergency steam engine is a 14x24-in. single-cylinder unit of the piston-valve type, and is direct-connected to the stub shaft of the fan. This stub shaft drives the main fan shaft through a jaw clutch which is disengaged when the motor drive is in operation. The engine is arranged with a hand adjustable cutoff for varying the speed and is not equipped with a throttling governor. A Falls automatic overspeed stop provides for any overspeed emergency that a governor might take care of, but does not control the engine during its normal running.

The purpose of this arrangement is to require the operating attendant to regulate the speed of the engine by varying the cutoff. This means a greater steam economy than with the ordinary method of "throttling

down" the governor to get a variation in engine speed. A pressure-reducing valve taking steam at 175 lb. and reducing the pressure to 125 lb. insures a constant steam pressure at all times, which in turn insures a uniform fan speed. The only time when there is any occasion to vary the speed of the engine is when the mine requirements demand an increased air volume.

The entire fan housing, including scroll and évasé chimney, is built of reinforced concrete. Maintenance and deterioration are thus eliminated and it has been found that when the fan is installed with a concrete casing instead of one of steel the total cost is increased not more than 20 per cent. The air tunnel leading to the shaft is partly below grade, and doors are provided in this tunnel for reversing the air should this ever be desired.

Steel explosion doors are provided at the top of the shaft. These normally are left open. An airtight wooden cover is built below these doors, the idea being that in case of explosion the wooden cover is blown out but the steel doors are unharmed and readily can be closed.

The building which houses the fan drive is of brick construction 25x34 ft. inside, with a 3-in. wooden roof supported on steel beams and carrying a composition roof. Steel sash and $\frac{1}{8}$ -in. ribbed glass provide ample illumination. Fig. 5 shows the general arrangement of the fan setting and Fig. 7 is a view of the engine driving the fan.

Law of Mixtures Applies to Volumes

PROFESSOR J. W. WHITAKER, of University College, Nottingham, England, in correspondence with Kenneth D. Dodds, instructor in metallurgy, School of Mines, University of Pittsburgh, draws attention to an oversight in his article entitled "How to Calculate Washed Coal and Refuse from Ash and Sulphur Determinations," which appeared in *Coal Age*, April 19.

He says that the law of mixtures cannot be applied to the specific gravity of a mixture unless the volumes of the constituent bodies be taken instead of the weights. He illustrates the distinction as follows:

"Consider mixtures of coal and shale, the specific gravity of the coal being 1.25 and of the shale 2.5. If equal *weights* are mixed, the specific gravity of the mixture is not $(1.25 + 2.5) \div 2 = 1.875$, for this reason:

A gram of coal has a volume of $\frac{1}{1.25}$ c.c., and a gram of shale, a volume of $\frac{1}{2.5}$ c.c.

Hence 2 grams of the mixture have a volume of

$\left(\frac{1}{1.25} + \frac{1}{2.5}\right)$ or $\frac{3}{2.5}$ c.c., and 1 gram of the mixture has

a volume of three-fifths of a cubic centimeter. Hence 1 c.c. of the mixture has a mass of $5 \div 3$ or 1.667 grams, or in other words, the specific gravity of 50:50 mixture (by weights) is 1.667. If we mix equal *volumes* of coal and shale, the specific gravity of

the mixture will be $\frac{1.25 + 2.5}{2} = 1.875$."

Professor Whitaker's criticism was not directed at the argument or conclusions presented in the article in question, and in fact it applies to a parenthetical illustration. His example shows clearly, however, that volumes must be considered when calculating specific gravities of mixtures.

Thin Layer of Coal Charred at a Low Heat on Traveling Platform of Hot Metal Plates, Saving Byproducts*

Low Heat Conductivity of Coal at Low Temperatures Makes Distillation Slow and Expensive—Difficult to Spread Thin Layers of “Molten” Coal and Prevent Carbonization on Oven Walls—How New System Meets These Problems

BY R. D. LAMIE

Huntington Coal Distillation Co., Huntington, W. Va.

IN THE familiar byproduct oven coal is coked at a relatively high temperature, with the consequent production of hard metallurgical coke and the condensation of the tars, light oils and ammonia and the utilization of non-condensable gases, the major idea being the production of hard coke for blast furnaces, and the obtaining of byproducts being a matter of only secondary consideration. However, this form of utilization is not without its limitations because of the restricted and specialized use of its main product—coke.

Hard metallurgical coke does not make a satisfactory domestic fuel and has little or no use for power purposes, two important fields. The problem, therefore, becomes one of supplying these markets with a satisfactory fuel, at the same time recovering the byproducts.

For a long time the possibilities in this field have been given intermittent attention, but work has been particularly active in this country since 1913, when Parr and Olin published the results of their investigations into the low-temperature distillation of coal.

They and subsequent workers were able to show that if high-volatile coal was coked at moderately low temperatures—1,000 to 1,200 deg. F.—the resulting products were of an entirely different character from those produced in the familiar byproduct oven. The coke obtained was light and porous, and had practically no structural strength; in fact it is not coke, as we ordinarily understand it but a product midway between coke and coal, as it still retains a part of its volatile matter.

The most notable difference, however, was in the yield of byproducts, the quantity of tar being about three times as much as by the older process, and the non-condensable gases, though smaller in volume, are much higher in heat units.

TAR THIN AND BETTER SUITED FOR MOTOR USE

Further, the character of the tar was different. It is much thinner and contains a larger percentage of low-boiling constituents. The creosote fraction is larger. The higher boiling fraction does not contain naphthalene, and the percentage of pitch is less. In fact it more nearly resembles crude oil than the older high-temperature process tar.

With this knowledge came the realization that with a practical method for the handling of the process an entirely new field of usefulness was opened for high-volatile coal. The semi-coke could be adapted to domestic and industrial purposes; the tar could be refined into motor spirit, creosote oil and lubricating oil; the gas could be mixed with water gas to make a gas for

domestic consumption having the required number of heat units.

The problem is of great economic importance and much time and money has been expended in an attempt to evolve a process which will be practical from the standpoint of investment and return. Numerous inventions have been brought out, with varying success, some of them quite ambitious in extent, but mostly lacking in study and understanding of the fundamental principles involved.

The difficulties are largely mechanical. Coal, first of all, is in itself a poor conductor of heat. In the older high-temperature byproduct coke oven, a long, narrow room is filled with coal and the sidewalls heated by means of combustible gases to a high temperature. This heat, because of the high potentials used and the length of time over which it is applied, is gradually transmitted to the coal. While this process is slow—from 16 hours up—still, because of the large mass involved—16 to 18 tons—it is still within the limits of profitable application.

If, however, lower temperatures were used in the side walls, so that at no time would be the coal be subjected to a greater heat than 1,200 deg. F., the time would have to be so prolonged as to carry the process beyond any possibility of an economic return. It is evident then that another method must be devised.

DIFFICULTIES IN BAKING THIN COAL LAYERS

Attempts to solve the problem have been mainly directed along two lines—one being that in order to overcome the coal's inertia of heat transmission, it is coked in a thin layer which is spread by means of revolving paddles or screws over the walls of a strongly heated retort, the layer of coke thus formed being constantly removed. High heat potentials are used around the shell of the retort, but the temperature inside is supposed to be kept low by the constant agitation and admission of fresh, cold coal. This, of course, is not strictly a low-temperature process.

The other general line of procedure investigated has been to heat the coal contained in a retort to a uniform degree of temperature, by means of hot gases, circulating or otherwise, and at normal or reduced pressure. This is strictly a low-temperature process, inasmuch as the degree of heat to which any particle of the coal is subjected is never greater than the low-temperature range, which is 1,250 deg. F. However, the coking time cannot but be prolonged so greatly that the output will not be sufficient to assure commercial success.

The most ambitious attempt in this country has been made along the first lines. A little study, however, would show that the mechanical difficulties of this type of retort would be great. Coal, when heated, softens and

*Abstract of paper entitled “Low-Temperature Distillation of Coal,” read before the West Virginia Coal Mining Institute, June 13, 1923. This is the system that Henry Ford is installing at the River Rouge Plant, Detroit, Mich., and Walkerville, Ont.

becomes sticky, and the spreading of it uniformly in a thin layer over the walls of the retort is a practical impossibility.

Further, under the pressure of the paddles or screws a hard layer of coke is inevitably built up on the walls of the retort. This makes it difficult for heat to be transmitted into the retort, and as it gets thicker it will stop the paddles or screw from revolving unless frequently removed. This necessitates closing down and cooling the retort, and a loss of production. Furthermore, the product will not be uniformly coked, because the conditions in all parts of the retort will not be the same.

Some particles are bound to be overheated and therefore overcoked, and other particles will not receive enough heat to drive off much or any of the volatile matter. The resultant product will be a mixture of coal, semi-coke and hard coke. Under these conditions the byproducts also are bound to be affected. There are other mechanical difficulties inherent in this type of retort, which need not be discussed at this time.

During the past year a type of low-temperature distillation oven has been developed in a practical way. It has already proved its ability to work almost indefinitely without mechanical trouble of any kind, and at the same time has a coking capacity per unit of investment about twice that of the present-day high-temperature byproduct oven. This coking unit is known as the Piron oven.

In the Piron system the coal is coked in a thin layer

on a movable platform or a series of jointed metallic plates. The heat to distill the volatile matter is transmitted to the coal through the metallic plates, the heating element being a metal bath with internal heating flues. The temperature of the bath is easily controllable within narrow limits, and if desired need not vary 25 deg. F. in a month. No part of the coal is subjected to a greater heat than that necessary to distill it under low-temperature conditions, and therefore, the resulting products are uniform in quality. In fact, so far as the quantity of volatile matter left in the semi-coke is concerned, this can be varied within limits to suit the operator.

The process is a continuous one. Raw coal is fed continually onto the platform or conveyor. After making almost one complete passage through in the oven, the necessary quantity of volatile matter is all driven off, and the dry, porous residue drops off the plates of its own accord. There are no moving parts other than the conveyor inside the distilling chamber, and therefore the coal is not disturbed while in its sticky state.

The resulting residue is a semi-coke now known as carbocite. It is a soft, easily pulverizable substance, and in its natural state, as it comes from the oven, it can be burned directly under steam boilers for power-raising purposes. It is absolutely smokeless and burns with a yellowish blue flame not unlike charcoal. The heat is intense and the ash light and fluffy.

MORE HEAT PER TON IN CHAR THAN IN COAL

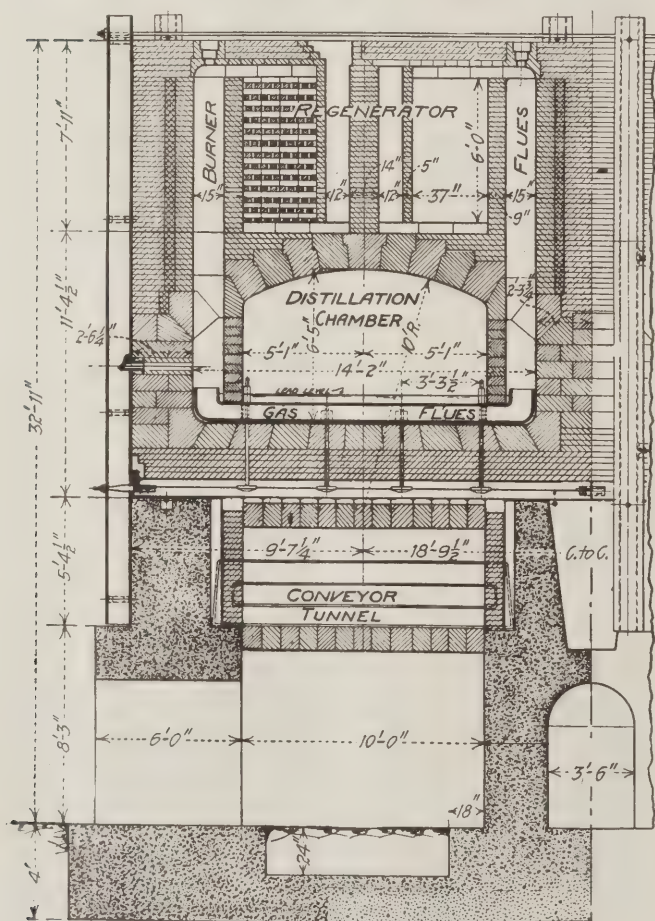
As compared with the coal from which it is made, carbocite will contain only from 10 to 12 per cent volatile matter. This can be increased, however, up to about 18 per cent at the will of the operator. It will be bone dry, and the ash will have been increased by the percentage of volatile taken out. That is, if you start with 8 per cent ash and 35 per cent volatile in the coal, the carbocite will have, say, 10 per cent volatile and 10 per cent of ash, but because the volatile matter left in the carbocite is largely hydrogen, there will be more thermal units per pound than in the coal from which it is made; this in spite of the fact that the percentage of ash has been increased.

Four methods are open for the commercial utilization of carbocite. First, as mentioned before, it can be burned directly under a boiler; second, it can be pulverized and burned in any way that pulverized coal is now burned; third, it can be, under suitable conditions, completely gasified; and fourth it can be briquetted into a fuel suitable for domestic or industrial purposes where a smokeless fuel is necessary and the quantity consumed per day is small.

The yield of tar by low-temperature distillation, as pointed out before, is much larger than by high-temperature distillation and will run from 20 to 30 gallons per ton of coal carbonized, the quantity and quality depending almost entirely on the kind of coal used.

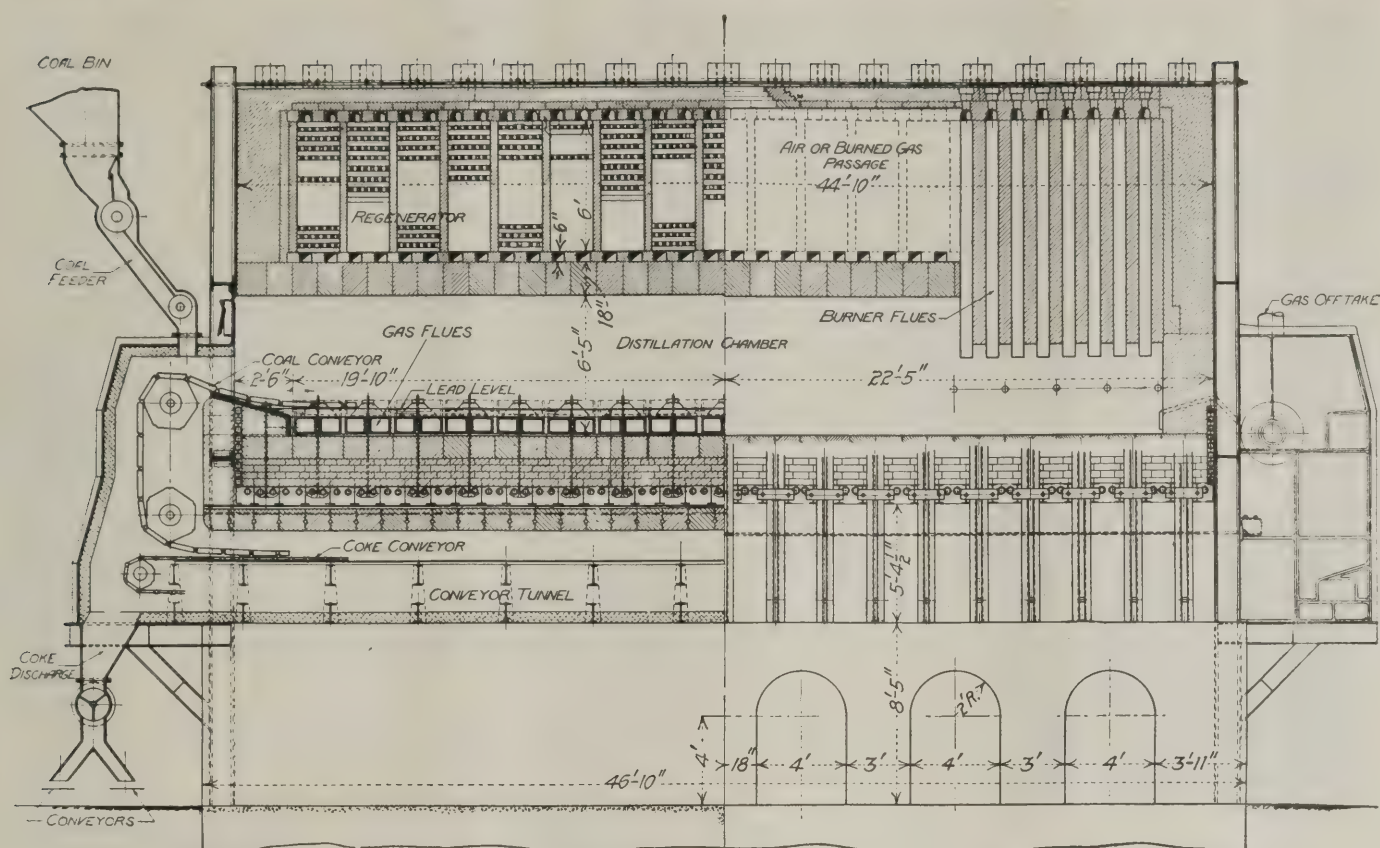
LOW-BOILING FRACTIONS PREDOMINATE IN TAR

In this tar the low-boiling fractions predominate. These fractions are quite suitable for use in internal-combustion engines, and therefore the high-volatile coal of this state has now become an actual source of gasoline. It is unnecessary to point out the economic importance of this fact. It is quite evident to anyone that we are using up our natural resources of crude oil very rapidly, and this year will see a consumption of gasoline undreamed of even during the war period,



SECTIONAL ELEVATION, EMIL PIRON OVEN

The oven used at Huntington, W. Va., here cross-sectioned, had a daily capacity of 25 tons and was a demonstration unit only. Lead rests on the top of gas flues and is kept molten by the heat conducted by them. On this lead, metallic conveying plates float carrying a half-inch of coal which by the time it has passed through the oven is reduced to semi-coke.



LONGITUDINAL SECTION OF OVEN SHOWING COAL FEEDING AND CONVEYING ARRANGEMENT

This unit is typical of the furnaces now being erected by the Ford Motor Co. of Canada, Ltd., at its Walkerville (Ont.) plant and by the Ford Motor Co., at its River Rouge plant, but the River Rouge furnaces are 10 ft. longer. The commercial oven will embody a clay refractory furnace 44 to 52 ft. long having two longitudinal

arched chambers 14 ft. wide and 6 ft. 5 in. in total height provided with curtain walls at each side to separate the heating and exhaust chambers from the distillation space. Cast-iron U-shaped flues in twin form connect the heating and exhaust chambers, the lower section of the flues being completely submerged in a bath of molten

lead with refractory protection for the upturned ends. These flues are closely placed, providing heating gas passages spaced 14 in. apart under the entire lead surface. Regenerators or recuperators rest on top of the oven proper. The coal is laid so thin on the conveyor that it readily takes up heat and is distilled.

when we supplied a greater share of the world's needs.

In the seven years between 1914 and 1921 the production of gasoline increased 426½ per cent; in 1914 the United States produced, in round numbers, five billion gallons of gasoline. The production this year probably will reach eight billion gallons.

Assuming that it is possible within a reasonable length of time to process fifty million tons of West Virginia high-volatile coal per year, what would it mean to this state in dollars and cents?

From fifty million tons of coal we would obtain 1,250,000,000 gallons of tar, 150,000,000,000 cu.ft. of surplus gas with a thermal capacity almost as high as that of natural gas, and 300,000 tons of sulphate of ammonia.

From this quantity of tar can be obtained 500,000,000 gallons of motor fuel equal, if not superior, to any now being produced from crude oil, and worth \$90,000,000; 150,000,000 gallons of creosote oil for creosoting poles, ties and timbers, a great deal of which is now imported, worth \$15,000,000; 300,000,000 gallons of lubricating oil, worth \$60,000,000; together with other recoverable values, amounting to \$15,000,000 to \$20,000,000 dollars more, a total from the tar of about \$180,000,000. The gas also might be sold for industrial purposes. Basing its value on coal at \$6 per ton burned under the boilers, it will bring in an additional income of \$40,000,000. The sulphate of ammonia will net \$10,000,000 more, or a total of \$230,000,000, or \$4.60 per ton of coal carbonized.

And we still have the carbocite left—37,000,000 tons of it—usable for any purpose for which coal can be

used. Briquetted it can be sold in competition with anthracite for domestic or other purposes. Not only is it a substitute for anthracite but it can actually be made a superior fuel, because it has less ash and no unconsumed particles are left in the ashes.

Natural gas is an ideal fuel, but the gas resources of West Virginia are rapidly being depleted. Today our industries are looking elsewhere for their power. With careful regulation natural gas as an economic domestic fuel may last for thirty years, certainly not much longer. What is going to take its place? That question can be answered now. Coal will be completely gasified. It will be brought to the mouth of the mines, treated in low-temperature ovens to recover the by-products, motor spirit, lubricating oil, ammonia, etc., and the resulting semi-coke completely gasified. The gas will then be pumped through pipe lines to the cities, and the byproduct shipped to consuming centers.

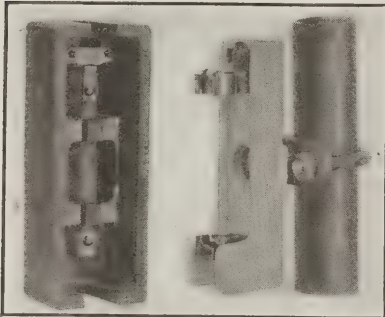
This idea while revolutionary, is within the bounds of possibility in the near future. In the meantime low-temperature ovens will be built for the more economical production of power. Already large plants for this purpose are under way. The most interesting phase of the low-temperature development, from the high-volatile coal-producer point of view, is the utilization of carbocite as a domestic fuel, because it will open up an entirely new field for this particular coal.

It also will have a marked tendency toward stabilizing the industry because the waster will be put to such a great disadvantage that he will have to drop out and leave the field to the people who are willing to utilize everything and waste nothing.

New Equipment

Potential Transformer Fuses and Fuse Blocks for Indoor Use

SAFETY on the front of switchboards having been brought to a high standard attention now is being paid to the most dangerous pieces of equipment behind the board. For instance, a new inclosed cartridge type potential transformer fuse and fuse block made for voltages of 2,500 to 25,000 for the protection of indoor potential transformers has been placed on the market.



2,500-VOLT FUSE BLOCK

Open view showing method of mounting the fuse in the cover. In renewing the fuse the cover and fuse are disconnected, making it safe to handle the fuse for renewal or inspection.

It can be used also to protect other circuits where the current does not exceed one-half an ampere. The fuses can be applied without preventive resistances in locations where the maximum short-circuit current does not exceed the interrupting capacity of the fuse. When a preventive resistance is used the short-circuit current will be limited, ir-

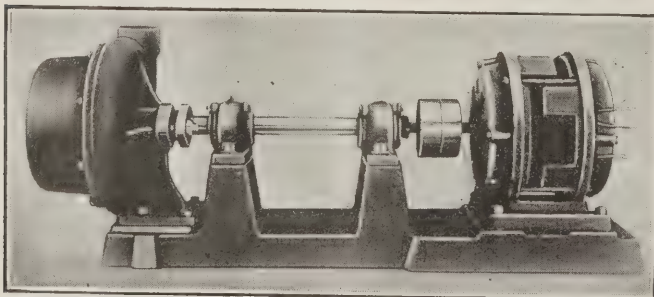
respective of the power back of the fuse, to a value within the interrupting capacity of the fuse. For 15,000- and 25,000-volt service the same fuse is used, with a different preventive resistance to limit the current and a different fuse base for each of the two voltages.

The 2,500-volt fuse base is provided with a cover of molded insulation which holds the fuse and provides for its safe handling. The higher voltage bases use corrugated post-type insulators.

Some of the special features of these fuses and fuse blocks, recently placed on the market by the Westinghouse Electric & Manufacturing Co., are their high interrupting capacities, strong non-absorbent fiber casings and provision for the proper venting of gases.

Ball-Bearing Pump Is Self Priming

AN INTERESTING feature of a new ball-bearing, motor-driven pump of 75 gallons capacity, known



SELF-PRIMING PUMP

The fact that this pump is automatically primed as soon as it is started obviates the usual worry that attends most centrifugal pumps.

as the Fulflo pump, is its self-priming characteristic. It also is equipped with a free-floating impeller having anti-clog features. In smaller capacities the same type of pump, which is manufactured by the Fulflo Specialties Co., of Blanchester, Ohio, may be used for a central-supply tank system for feeding heavy cutting tools or for pumping oil, brines, enamels, etc., in the shop or factory.

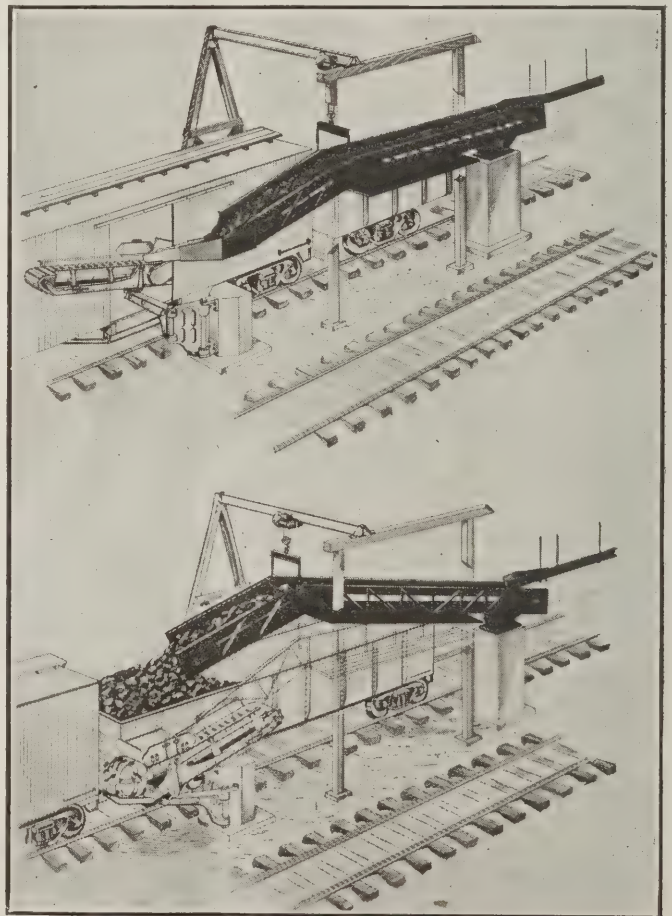
New Coal-Loading Boom Eliminates Necessity of Sorting Cars

A NEW and improved swiveling loading boom, depicted in the accompanying illustrations, is being put out by the Link-Belt Co., of Chicago. It is known as the "Knox Gon-Box Loading Boom."

An important feature of the Knox boom is its extreme flexibility, as it is able to swing and swivel with such freedom as to permit the loading of either gondola or box cars, from which fact it derives its name.

If gondola cars are being loaded the boom is swiveled over the center of the railroad track and thus delivers the coal to the center of the gondola car—acting similarly to ordinary loading booms. While in this position it also can be lowered to within a few inches of the car floor.

When box cars are loaded the boom is swung parallel to the loading track, where it delivers the coal to a chute leading to the box-car loader. Changes from box to gondola cars, or vice versa, can be made quickly and with ease.



FLEXIBLE COAL-LOADING DEVICE

Owing to the difference in types of cars to be loaded this boom will save much expense by eliminating the necessity of sorting out cars of various types at the mines.



Taking Coal by the Air Route to Coaling Station

Aerial Tramway at Williamson, W. Va., Eliminates Two Bridges, Much Track and Trestling, Yet Cuts Hauling Costs—Lifting Coal 85 Ft.—Easily Handles Thousand Tons in Eight Hours

BY CHARLES K. TRABER AND WALTER C. RICHARDS
St. Louis, Mo.

IN THE last few years the method of transportation in mountainous country from mine to railroad has been greatly changed. The aerial tramway, which has been used for twenty-five years or more,* at first almost entirely for the handling of high-grade ores in mountainous districts, has gradually extended its operation and now has been adopted by many industries. It seems destined within the next generation to carry a large proportion of the coal produced in mountainous regions, especially from the higher seams.

Ten years ago an aerial tramway was considered usually only after other methods of transportation had been eliminated on account of the difficulties of terrain. Now it often happens that an aerial tramway will compete with a railroad switch or other means of transportation under conditions favorable to the latter, for among other advantages it always delivers the coal directly at the top of the tippie, just where it is wanted, and without the expense of costly trestle work or elevating machinery.

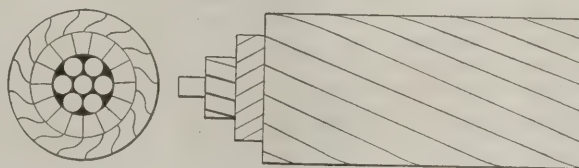
Aerial tramways may be divided roughly into two classes: (1) Continuous systems, where there are a number of carriers continually proceeding around a circuit, receiving the material at one terminal and delivering at the other, thus approximating a belt conveyor in its continuous supply of the product, and (2) the two-bucket aerial tramway, as it is usually

known. This latter consists of two usually rather large carriers, each moving on its own track rope, the one going out as the other returns.

This type of tramway is especially useful where the coal lies somewhat high on the hillside with the railroad in the valley and where the contour of the ground is such that the distance between these points can be made in a single span. Under these conditions the operation is by gravity, the carriers move at a high speed, and large capacities can be attained with an installation that is not only reasonable in first cost but extremely economical, both as regards maintenance and operation.

MAIN-TRACK CABLES MAY LAST TEN YEARS

Operation cost with this type of aerial tramway reduces itself practically to the wages of one man and a little oil for keeping the machinery lubricated. The maintenance cost represents the replacement of certain parts of the rolling stock at long intervals and the ropes at intervals even longer. Instances are on record where the main-track cables of this type of tramway, which represent the principal expense, have lasted as much as ten years. These cables, in order to give this service, must, of course, be well taken care of and should be of the locked-coil type, as shown in the illustration



LOCKED-COIL MAIN-TRACK ROPE

By reason of its smoothness it forms a good running track for the buckets and will last for years. Moisture penetrates it with difficulty. It will be seen that this rope lacks the hemp core and is therefore less flexible than most ropes.

NOTE—The headpiece shows an aerial tramway at Williamson, W. Va. In the background can be seen the shed under which coal is conveyed by a belt to the loading terminal, which is close by a sidetrack where cars can be loaded for the market. The aerial tramway crosses the railroad track and steam in a direct line.

*An aerial tramway was erected by a Dutch engineer, Adam Wybe, for the city of Dantzic in 1644. The first ropeway of any note was built in the Hartz Mountains in 1860 by Baron F. E. von Ducker, but, of course, progress at first was slow, and in this country the time set by the author probably well delimits the period during which the aerial tramway has been generally known.

—EDITOR.



TRACTION ROPE
A flattened-strand rope is used for attaching the buckets.

accompanying this article. The use of this type of rope also insures long life for the carrier wheels, which is especially important on continuous-system tramways where a *number* of carriers are used.

Sometimes it is necessary to convey a long distance, and aerial tramways have been installed in this country as long as sixteen miles. Whenever the contour of the ground is such that intermediate supports are required, it almost always is necessary, except for cases of extremely small capacity, to use the continuous system. This type of tramway usually requires more labor than the two-bucket type, but it still affords an economical method of handling coal both as to maintenance and operation.

The continuous-system aerial tramway is less generally known in the coal fields than the two-bucket type, and therefore merits description in some detail.

Such a tramway has been designed and built for the Pond Creek By-Products Colliery of the Fuel Department of the Norfolk & Western Ry. It is located at Williamson, W. Va. This property was acquired by the railroad company for the purpose of furnishing coal to a large coaling station to be established in the Williamson yards. The mine openings are on a hillside somewhat less than half a mile from the coaling station.

The coal handled comes from two seams, the Thacker and the Pond Creek. The upper seam is 320 ft. above the level of the valley, but the lower seam is only 50 ft. above this lower level. Passing through a rotary dump, the coal that comes from the Thacker seam is fed to a rope-and-disk conveyor about 550 ft. long, which brings the coal to the level of the lower seam; at which point it is picked, and may be crushed if desired.

Here the coal from the lower level joins the stream of coal from above and is carried with it by a belt conveyor about 380 ft. long to the loading terminal of the aerial tramway leading to the coaling station already mentioned. This transfer point is arranged so that if the coaling station is not in need of this fuel,

the coal can be diverted to a similar belt conveyor which takes it to a side track where it is discharged into railway cars.

The aerial tramway is about 1,600 ft. long from loading point to coaling station and it crosses in that distance Pond Creek and the Tug River, both of which during heavy rains greatly overflow their banks. The elevation of the top of the coaling station where the coal must be delivered is about 85 ft. above the point where the coal is fed to the aerial tramway.

Consider now what this would mean if some other system of transportation were used. A railroad switch would mean two heavy bridges, and then the coal would be delivered only at the bottom of the coaling station and would have to be elevated with a bucket elevator or skip hoist. If a series of belt conveyors were used, it would also mean expensive trestle work.

With the aerial tramway, however, it was necessary only to build at the loading end a simple structure of timber for receiving the coal from the bins located at that point, then to stretch the ropes from that structure to the top of the coaling station, with several intermediate supports, which are in the shape of A-frame towers. The coal, then, is fed to the tramway buckets through chutes from the storage bins; the carriers are automatically attached to the pulling rope and proceed at a uniform speed to the coaling station, where their load is automatically dumped, and they return to the loading station without further attention.

The only labor required is that of filling the buckets through special undercut roller-gate chutes, and as the buckets come to a stop before being loaded, there is no chance of spillage, unless the attendant is inexcusably careless.

The rated capacity of this aerial tramway is 125 tons per hour, but as much as 140 tons has been handled without difficulty. To do this three men are required; that is, three men represent the entire crew operating this aerial tramway. The gage of the tramway—the distance between track ropes—is 10 ft., and consequently there is no chance of the buckets interfering with each other in their travel over the line.

Loading Station

On the left can be seen the 380-ft. belt conveyor that brings up the coal from the crusher and picking booms to the loading station and the belt-conveyor that elevates to the tippie whatever coal is not needed at the coaling station. On the right, running toward the rear-ground, can be seen the A-frames supporting the continuous-system aerial tramway 1,600 ft. long leading to the Williamson yards. The track to the tippie can be seen in the immediate foreground.



How Coal Is Received

Coal comes to the yard, carried in equipment that utilizes space not needed for main tracks, side tracks, water towers, signal houses, roundhouses and what not—namely, the air. The coal gets to its destination without modifying an iota the original layout, which it could not do if brought by a track. This coaling station is on the Norfolk & Western Ry. Note how far the returning buckets are from those approaching the receiving tower. They could not injure each other in passing even in a heavy wind.



The buckets have a capacity of 35 cu.ft. and hang by a structural steel pendant from a truck equipped with four wheels. This four-wheel truck allows of a nice distribution of the load and prevents excessive bending in the track cable, which would be experienced with these heavy loads if a two-wheel truck were used. The truck cable is of locked-coil construction, which presents an absolutely smooth outer surface, and consequently wears but little, even after long use.

It readily can be seen also that this smooth surface is conducive to long life for the carrier wheels. The traction rope is of the flattened-strand construction, which affords a large area and smooth surface for the

action of the friction grips. The power required is furnished by a 25-hp. motor. Five cents per ton of coal handled will cover operation and maintenance and also will amortize the equipment cost in twenty years.

If conditions of ground had allowed the use of the two-bucket gravity type of aerial tramway the cost would have been even less. The equipment was installed at a much lower first cost than could have been achieved with any other method of transportation, faced as the designers

were with the attendant necessity of bridging the two streams and providing for the deposit of the coal at the top of the station.

The aerial tramway was designed, manufactured and installed by A. Leschen & Sons Rope Co., the special features of the coaling station being designed and erected by Roberts & Schaefer. The work was done under the general supervision of George Duglinson, manager, fuel department, Norfolk & Western Ry., and under the direct supervision of W. A. Wilson, general superintendent, Pond Creek Colliery, and J. H. Dickerson, engineer.

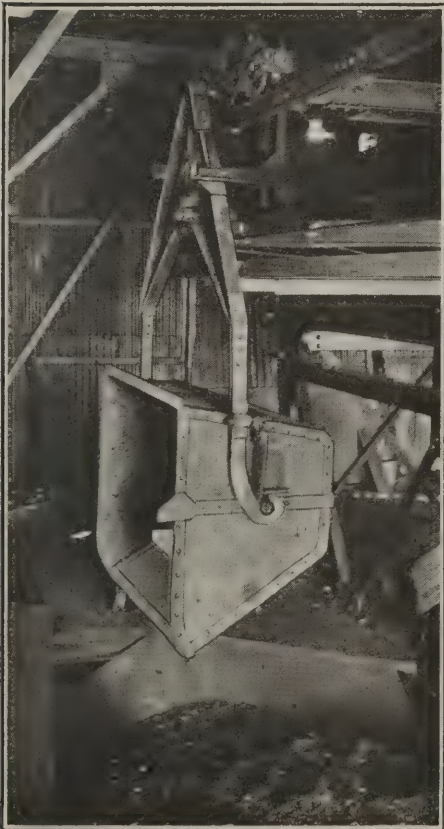
Dr. Morgan Discusses Semi-Coke Processes

ONLY thorough trial on a large scale and at great cost can determine the worth of Henry Ford's project for low-temperature carbonization of coal on a commercial basis, according to Dr. Jerome J. Morgan, member of the American Chemical Society and professor of chemical engineering in the Schools of Mines, Engineering and Chemistry of Columbia University.

"In any discussion of low-temperature carbonization of coal," says Dr. Morgan, "certain fundamental principles in fuel utilization must be kept clearly in mind. 'First: A pound of coal represents a certain quantity of latent chemical energy. Expressed in heat units for an average bituminous coal of medium ash and moisture content, this is roundly 14,000 B.t.u. per pound. This represents the total energy that can be obtained from this pound of coal. No method of treatment can possibly add to this energy.

"Second: Any process of carbonizing coal consumes energy which must be supplied from that originally present in the coal or, as is so often done in the laboratory, from some outside source. Hence the carbonization process is justifiable only when the value of the products of carbonization is greater than the value of the raw coal. In ordinary high-temperature carbonization of coal in a gas retort or coke oven the main products are coke and coal gas.

"The process is justified by the greater 'form value,' that is, value due to form, as a metallurgical fuel of the coke, or as a domestic fuel of the gas. The value of the byproducts, ammonium sulphate and coal tar, help bear the expense of the process, but alone would not justify its use.



CARRIER JUST DISCHARGED

The bucket goes back to the loading station thus tilted. The coal has fallen into the hopper of the coaling station.

"Third: In low-temperature carbonization of coal semi-coke, gas, ammonium sulphate and low-temperature tar are obtained. The semi-coke is not suitable directly for metallurgical fuel; in most cases it requires subsequent treatment for domestic fuel, and only about three-quarters of a pound of it is obtained per pound of coal. The gas from low-temperature carbonization, though richer than ordinary coal gas, is in much smaller quantity, and only about half as much ammonium sulphate is formed as in high-temperature distillation.

"It is only in the case of tar that we find a marked advantage in low-temperature carbonization, and it is to the low-temperature tar that we must look for a justification of the process.

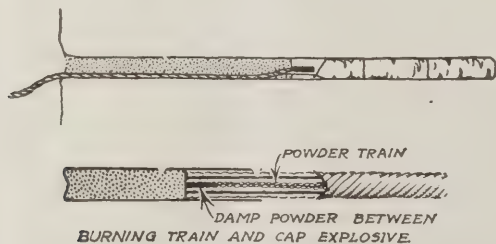
"Fourth: In considering the value of low-temperature coal tar there are many factors which must be balanced. The quantity obtained is considerably greater, often two or three times that from high-temperature distillation of the same coal. Its value, however, in the present market is rather doubtful. As it represents the first step in the decomposition of coal, its composition varies much more owing to the varying natures of the coals being distilled than does the composition of high-temperature tars.

"Many of the current claims for low-temperature tars are based upon work done in Germany on tars from German brown coals, which differ greatly in nature from American coals. This dangerous practice of reasoning by analogy has led to the publishing of many misleading statements.

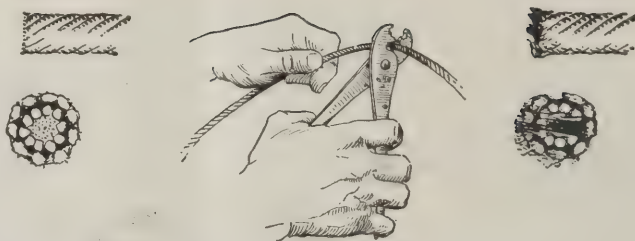
"Fifth: Finally, whether any proposed process for low-temperature carbonization is a commercial success can be determined only by the balance sheet of a plant which has actually been operated on a large scale for a long time. If Mr. Ford, who has the money to spare, cares to undertake this costly experiment, the results will certainly be watched with great interest by others who have tried it and by American chemists and engineers in general."

Much Trouble and Danger from Explosives Incurred—and All for No Advantage

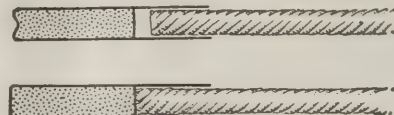
TIME often is best saved by spending it, and material sometimes is saved by a little frugal waste of it, as an E. I. duPont de Nemours circular written by Arthur La Motte points out. Don't crimp a cap on a piece of



fuse, if the ends of the latter have been exposed to damp air, until you have cut off and discarded about an inch of it. The powder core of the fuse takes up moisture at its end, and this damp powder refuses to burn, so that the spark from the powder may fail to reach the explosive in the cap. Result: An unexploded hole, waste of time digging it out, danger in that operation and risk that part of the cartridge thus extracted may fall into the coal unexploded to injure those who burn the fuel or who handle it around the mines, in the yard or at the point of delivery.



Again, cut off the fuse so as to reach at least 2 or 3 in. beyond the collar of the hole and crimp the cap on the freshly cut end; then you will have more confidence that the powder at that end which is in the cap will be dry and effective. The use of "short" fuse or "skin-em-

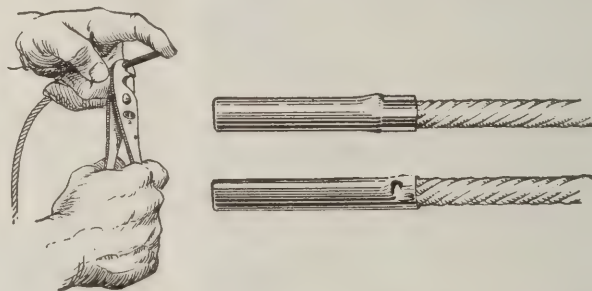


backs" is prohibited by law in some states. It is not only dangerous but wasteful, for the effect of the explosion cannot be as great as when the hole is tamped its full length.

Don't cut the fuse with a dull, dirty knife or a hatchet, which bruises rather than cuts its way through



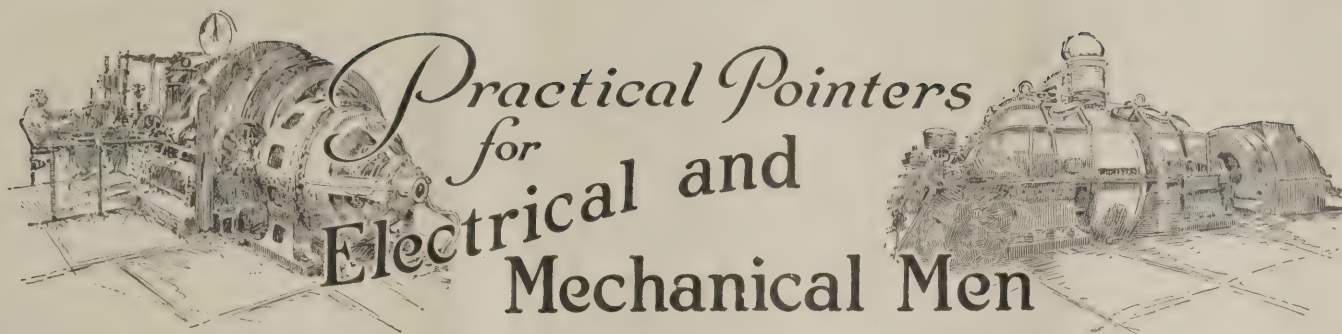
the fuse and is sure to smear some of the waterproofing across the powder train and make the work of the fuse ineffective. A cap crimper will make a straight cut and enable the blaster to bring the powder right up to the



fulminate. Some people cut the fuse with a long slanting cut. No surer and deadlier way of covering the powder at the end of the fuse with waterproofing can be devised. The waterproofing left by such a slanting cut is bent over as soon as it gets inside the cap and tends to insulate the powder from the fulminate. If you *must* use a knife to cut the fuse it must be clean and sharp and the cut must be square.

It is still necessary to add that blasting caps should not be crimped with the teeth, for men still continue to run these unnecessary risks despite all that has been said.





Track Device Automatically Regulates Traffic to Bottom of Slope

TRACK devices made to function by the passage of the wheels of mine cars through them afford automatic operation of track switches, detect loose wheels on the mine wagons and rerail rolling stock that is off the track. There remains another possibility in the use of track devices which heretofore has been little exploited, namely, to open a switch in an electrical circuit, thus lighting a lamp or ringing a bell to signify condition at the place of signaling to the place being signaled. Many opportunities are offered the mine electrician to do electrically what heretofore was accomplished by men. Here is one:

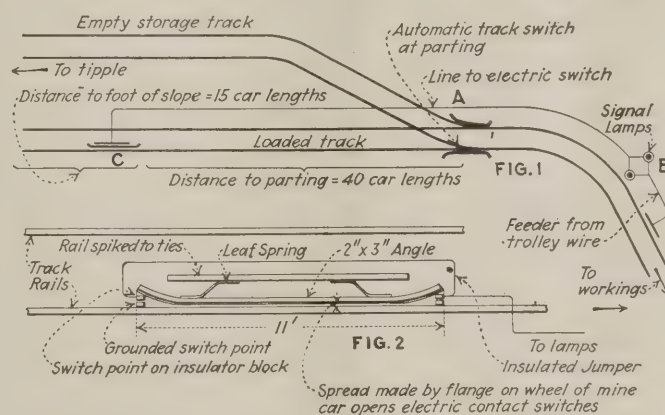
In the Cedar Grove slope mine of the Carnegie Coal Co., Studa, Pa., a loaded trip on its way to the surface encounters a sweeping curve before it arrives at the parting which marks the beginning of the double track on the slope bottom. To pull the loaded trip into the slope bottom would necessitate the construction of a run-around at a point beyond the big curve adjoining the parting and time would be lost in shifting the locomotive from the front to the rear end of the trip. Backing a loaded trip around a curve and through a parting switch is doubly dangerous. Consequently the Cedar Grove management decided that the loaded trip should be dropped to the slope bottom—see Fig. 1—by a flying switch at the parting. The locomotive switches to the empty track and is ready to pull out with the empty trip when the last mine car of the incoming loaded trip is in the clear.

There are two requisites to accomplish this maneuvering with safety: the motorman of the incoming loaded trip must be notified whether there is room or not in the clear for his trip, and the track switch at the parting must be automatic to turn the locomotive to the empty track and direct the mine cars to the loaded track.

At the point *B* are located two green signal lamps. When these lamps are lighted the motorman knows that there is sufficient room on the loaded track for his trip and, accordingly, he does not stop there, but if the lamps are out, he knows that his trip will not clear the parting at point *A*. Consequently, he waits for the signal from the lighted lamps before he drops his trip to the bottom. The distance *AB* is great enough to permit the loaded trip to get up sufficient speed to make the flying switch at the parting *A*. The automatic track switch used at this point is of popular make. A lever on the locomotive throws the switch one way and then another, before and after the passage of the locomotive through it. Though this automatic switch is not new its use in conjunction with the track device herein described is novel and saves the employment of one man.

At a point 15 car lengths from the foot of the slope and 40 car lengths from the parting is a track device which opens or closes the electrical circuit of two signal lamps. This device consists of an angle iron 11 ft. long which is held to the inside of one rail by two leaf springs bolted to the angle and to a short rail which is spiked to the ties, as in Fig. 2. To each end of this angle iron is attached a switch point on an insulating block, which makes contact with a grounded switch point on the main rail.

The two insulated points are connected to each other by means of an insulated jumper and are connected with the lamps by a line which originates as a feeder from the trolley wire.



FIGS. 1 AND 2—AUTOMATIC SIGNAL INCREASES SAFETY AND ECONOMIZES IN LABOR

Track devices on mine-haulage systems make visual signaling very reliable. Here transportation is made both quick and safe.

from the trolley. The return of the circuit is through the track. The circuit is kept open by the spread of the angle iron through the agency of the wheels of the mine cars, which simultaneously spread the contact switches in the electrical circuit. When the last car in a trip passes through the track device the tension of the leaf springs presses the angle iron to the main rail and closes the circuit, thereby lighting the signal lamps at *B*, which notifies the motorman that there is space in the clear for the storage of 40 mine cars on the loaded track

A. F. BROSKY.
Pittsburgh, Pa.

How Induction Relay Operates on Overload

LOOKING over some of my earliest notes, written soon after I began to work in the electrical engineering coal-mining field, I found some sketches which I made on a study that bothered me not a little before I finally found time to work out an explanation for myself. These sketches and notes I am now passing on to you in the hope that they will be of use in explaining a point which may possibly be troubling many a colliery electrician and also in hopes that they will prove the sim-

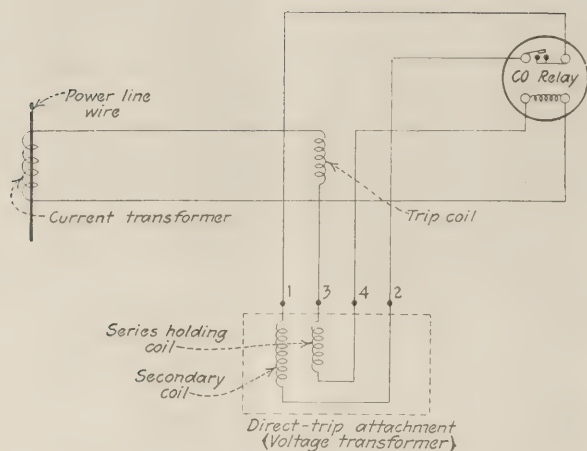


FIG. 1—OVERLOAD RELAY CONNECTIONS WITH DIRECT-TRIP ATTACHMENT

When a load comes on the power line the relay starts to operate, giving the desired time delay. When this predetermined time is up the relay closes the secondary coil circuit of the direct-trip attachment, thus causing the current transformer to send sufficient current through the trip coil to operate the trip and cut off the overload.

plicity of many supposedly complicated pieces of electrical equipment.

For some time I had been wondering about the mystery which surrounded the operation of the Westinghouse type C O overcurrent or overload relay and of course, not knowing the operation, I felt that there must be many a relay of this type at the mines which was incorrectly connected or incorrectly set. The particular thing about this relay which troubled me was its use with the direct-trip attachment.

After some delving around I found that the circuit shown in Fig. 1 is the one most commonly used and

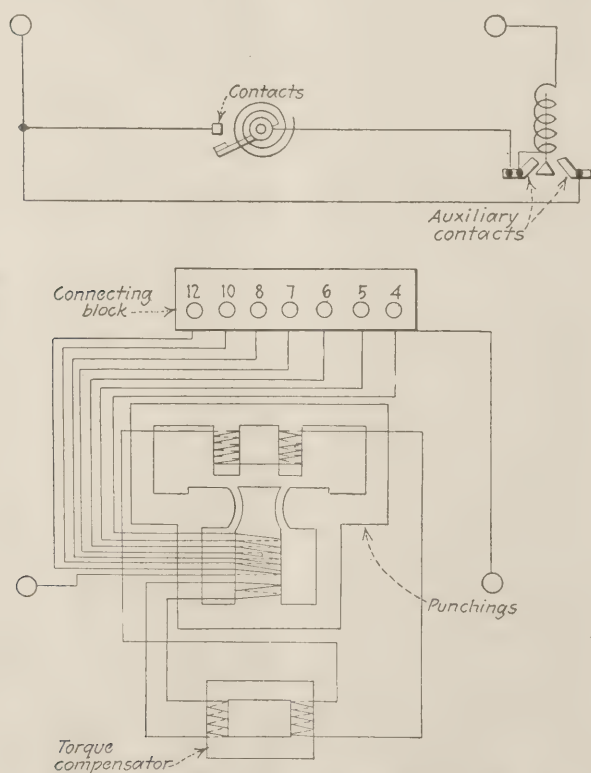


FIG. 2—INTERNAL CONNECTIONS OF RELAY

The upper studs connect to the contacts, which when closed are relieved of the heavy current by the closing of the auxiliary contacts. Time delay is accomplished by changing the distance between the contacts. The lower studs connect to the relay coil which controls the current setting. Cutting in or out sections of the relay coil by changing the position of a contact-making screw in the connecting block determines the load setting.

which shows the usual correction in its simplest form. This sketch, however, needs a little explanation. Let us suppose the load in the line wire increases. Just as soon as this happens there is an increase of current in the secondary of the current transformer. The circuit from the secondary of the current transformer passes through a series circuit including the trip coil, the relay coil and the secondary coil of the direct-trip attachment, which we will call for our explanation a voltage transformer.

When the secondary current increases in the current transformer all the equipment in series with it receives a greater current. Under these conditions the current is not sufficient to trip the circuit breaker on the line to be protected but is sufficient after a time delay, governed by the relay, to close the contacts of the relay. When these contacts close, it closes the secondary coil of our voltage transformer (direct-trip attachment) and it now being a transformer with a closed circuit on its secondary it quickly takes a heavier current in its primary, which will be noted is the secondary of the current transformer. This quick rush of increased current in the secondary circuit then becomes strong enough to operate the trip coil, which in turn trips the circuit breaker and relieves the power circuit of the overload.

ELECTRICAL ENGINEER

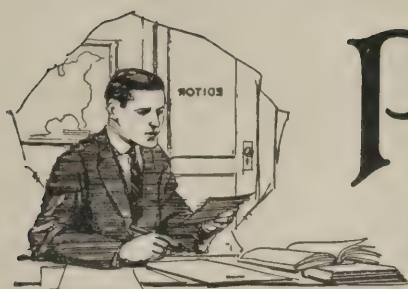
Speeding Up Spontaneous Combustion

AN UNUSUAL piece of apparatus has just been perfected at the Pittsburgh Experiment Station of the Bureau of Mines in connection with a study being made on the conditions favoring spontaneous combustion of coal. This apparatus permits of continuous measurements of the temperature of coal samples as they are subjected to conditions favoring spontaneous combustion. Oxygen is passed through the sample in order that it may develop heat in a much shorter time than would be required under conditions of actual storage. In this way it will be possible to determine which coals are most likely to take fire. The apparatus was designed and built by A. C. Fieldner, superintendent of the station, and J. D. Davis, chemist in charge of fuel chemistry.

Dr. Reinhardt Thiessen is engaged in a study of the constituents of coal. By isolating these constituents it will be possible to determine which of them are most prone to cause spontaneous combustion. Once the particular offenders are known it is believed that it will be comparatively easy to designate the relative susceptibility of various coals to fire.

The tests thus far conducted show that heating is comparatively slow until a temperature of 150 deg. F. is attained. From that point the curve steeply rises to the temperature where combustion begins.

THE REPORT OF SUB-COMMITTEE No. 4 of the International Mine-Rescue Standardization Committee, on the use of mine-rescue apparatus in coal mines, recommends that the minimum number of men trained at a mine be 10 per cent of the men employed at that mine, with an absolute minimum limit of 10 men. As many as possible outside men familiar with the underground workings should be included. In selecting rescue men considerable care should be used, both as to physical and mental fitness and also as to experience in and familiarity with the underground workings.



Problems of Operating Men

Edited by
James T. Beard



Posting the Face of the Coal in Driving Rooms

Danger When Working Under Drawslate—
Reluctance of Miners to Set Needed Posts—
Posting the Coal Face in Machine Mining

SAFE timbering of mines, particularly that of the coal face when driving rooms, is of such importance that volumes might be written on the subject. However, giving heed to one or two recognized facts in timbering will prove more effective in the avoidance of danger than a multiplicity of rules and regulations regarding safety.

Reducing the entire subject to a principle, there is one truth that is the underlying foundation, which I would express in the following words: "One post promptly and properly set is a greater safeguard than a world of experience, in the mining of coal."

DANGER UNSUSPECTED WORKING UNDER DRAWSLATE

Perhaps one danger that is more often disregarded by the experienced miner is that to which he is exposed when working under a drawslate. Nothing is more precarious than the presence of hidden and unsuspected danger, which is commonly the situation in nine cases out of ten where the coal is overlaid with a drawslate that has every appearance of being sound.

Only recently I heard a miner tell his foreman that the drawslate beneath which he was working did not need posting. Upon the foreman's insistence that a number of posts should be set at once the miner replied, "Why man, do you suppose I've been a miner for thirty years and don't know when a place is safe?" That such is the attitude of most miners or that, in many instances, they are permitted to have their own way regardless of mine rules and regulations cannot be denied.

The point I wish chiefly to emphasize is the reluctance of a large class of experienced miners to set the timbers that they must know are needed to insure safety and give them the necessary warning of imminent danger. It is this reluctance of miners to perform the required work and their almost universal disposition to postpone the timbering of their places that is responsible for a very large percentage of accidents at the working faces in mines.

NEED OF SETTING FACE TIMBERS IN MACHINE MINING

In machine mining we face another situation equally bad and difficult to overcome, because it imposes some extra labor on the part of the miners and the machinemmen who cut the coal. Here also opinions are largely influenced by the task that a proper regard for safety imposes on all workers, who are too often willing to assume risks rather than perform what they may consider unnecessary labor.

On his visit to a certain mine, recently, a certain inspector insisted that posts be kept within six feet of the face of the coal, which was being cut with machines. Both the foreman and the machine runner claimed that they must have 14 ft. between the posts and the face of the coal. The foreman stated emphatically that a place cannot be cut if the posts are closer than 14 ft. from the face. Much time was spent in arguing the matter before the men were finally compelled to accede to the demands of the inspector.

SAFE MINING REQUIRES STRICT DISCIPLINE

Situations such as these bring to my mind forcibly what is the one greatest need in the safe mining of coal; and that is discipline in compelling compliance with the safety rules and regulations of the mine. A miner's professed experience must not exempt him from obedience to instructions; and the foreman's desire to produce coal at low cost must not disregard safety.

What can be done in this respect can be clearly seen by visiting the Pike Floyd mine, at Betsy Layne, Ky. In that mine we find each miner sets three posts close to the face before shooting his coal. Should the posts be knocked out by the shot they are promptly reset before other work is done in the place. Here the machinemmen cut more coal than the average and do it with the posts set within 6 ft. 3 in. of the face. The conclusion is that the workers in that mine make safety the first consideration.

GEORGE EDWARDS.

Pikeville, Ky.

Miners Drawing Lots for Working Places

Plan not applicable to this country—Inequalities of the system—Miners should be allowed to choose their own partners.

MY ATTENTION was recently called to the letter of William Allan entitled "Caviling System in England," *Coal Age*, Jan. 25, p. 185. The letter describes a system said to have been practiced in the north of England, which I frankly admit is news to me, I not having heard of it previous to reading that letter.

Briefly described, the system is one in which the miners were compelled to draw lots for their working places, at the beginning of each three-month period. Whether the place was good or bad the miner had to submit to his lot and continue to work the place for the next three months, hoping all the time that he might draw a better place the next quarter.

To say the least the plan is a unique one; but, in my opinion, it would not prove satisfactory in this country. In his letter, Mr. Allan claims that it insured a square deal for all the miners and was profitable for the operator. Regarding the latter statement, there can be little doubt that the operator would profit by the system, as he would not have to worry about the working of the poorer places in his mine.

Compelling a miner to work a bad place where, for three months, he can only earn a bare existence, while other miners close by have good places in which they make double the amount of wages with less labor, does not appeal to me as "a square deal" or one that could be put in practice here with any assurance of success.

In every mine there are hard places that must be worked; but, in all fairness and justice, the miner should be paid for his extra labor, so that he will be able to earn equal wages with those who are given better places. It is no fault of the miner that the coal in his place is thin, or there are boulders in his path, or the nature of the roof requires special timbering. These are burdens that fall to the lot of the operator on whose shoulders they should rest.

"STRANGERS' HOME" AND "CORN-BREAD ENTRIES"

In my own experience as a miner, roof conditions and the thickness and hardness of the coal would change frequently and sometimes very suddenly. Speaking in mining parlance, mines where these hindrances predominate have their "Stranger's homes," their "Corn-bread entries," and the like, because of the natural difficulties in the earning of a good living in such places. It goes without saying that such mines have few steady miners but subsist on a floating population.

In order to appreciate the inequalities of mining coal under a system that takes no account of differences in working conditions, we have only to recall that, but a few years ago, the price paid the miner for digging coal was the same regardless of the kind of coal or other conditions under which he must work. The man digging coal three feet thick, on the side of a steep rock and under a bad top, received no more pay, per ton of coal mined, than the man working where the coal was six feet thick and level, with a good roof above the seam that required no particular attention.

Since then it has come to be recognized that there is nothing square in such dealing. A scale of prices has now been established for different thickness of coal, and allowances are made for bad roof and other unfavorable conditions. The result is that the miner working a bad place is now able to earn about as much money as the men in a good place. The foreman, of course, is compelled to use good judgment, in order to get the coal mined at the least expense, and encourage the men working the poorer places, by promises of a better place when that is finished.

ADVANTAGE IN MINERS CHOOSING THEIR PARTNERS

A more promising feature, however of the caviling system mentioned by Mr. Allan is the privilege afforded every miner of choosing his own partner. This reminds me of an incident that came under my observation several years ago. At that time jobs could not be picked up every day, at coal mines, as there were more men than places in which they might work. The result was that the majority of the miners were slow about quitting their places.

The incident I have in mind related to two miners who were put to work in the same place, the one being an old man and the other much younger. Both men were selfish and each wanted to boss the place. Naturally, it was not long before they were at outs with each other. Not being able to give them separate places, the foreman divided the room, giving one man the right and the other the left side of the breast, with the track between them.

Each man did his own shooting and timbering, but they both used the same powder keg and loaded their cars together. It is not strange that when a shot of one or the other proved bad there was much growling and the chances of dispute between the men were numerous. Today, however, miners are given more privileges and consideration in the choosing of the working partners. As Mr. Allan has suggested, working alongside of a man with whom you are not on friendly terms is a disagreeable experience.

JOHN ROSE.

Dayton, Tenn.

Crumb Coke

Experience of a consumer in burning what was bought and paid for as "coke" but needs to masquerade under a title more closely descriptive of its real character.

BEING a mechanical engineer and professing to know a little about the combustion of coal, I sent some instructions recently to a near friend, whom I knew was having trouble in his plant, owing to the scarcity of coal. In reply, he came back with the following, which may be of interest by way of amusement:

"Thanks for your advice as to how to save coal. You may be able to tell me how to get the coal, as I am using something that was bought and paid for as "coke." It reminds me of an article, headed "Grudekoks," (*Coal Age*, Vol. 23, p. 175) I read some time ago. The term described a new fuel and meant "Embers coke."

Did you ever see soft "Crumb Coke?" No? Well, you are not a high-class M.E. until you have handled and tried to burn that article. It has a wonderful odor while burning; forms a crust like the top of a volcano and keeps the heat securely locked beneath.

When all that was combustible has finally been consumed and fallen through the grate as ash and there is nothing to support the crust it settles down on the bars in the shape of what our stokers call "grate joy killers," otherwise, "klinkers." In my opinion, they well deserve the name first given."

This letter of my friend probably describes the experience of many other consumers of coal.

Newark, N. J.

N. G. NEAR.

Multiplying Airways in Mines

Development of simple rule for finding increase of quantity due to multiplying airways one or more times in a shaft mine.

NOT long ago there appeared in *Coal Age* a problem relating to the increase of quantity that resulted from the addition of another airway of the same size and length as the present airway. The solution assumed the power on the air remained constant and it was found that the quantity of air in circulation increased from 10,000 to 11,696 cu.ft. per min.

The first solution to this problem is found on page 1002, Vol. 22. Later, I gave a second solution, which appeared in the issue May 3, p. 722. Studying over the matter since, I have worked out a simple rule for ascertaining the increase of quantity when the number of airways in a mine is increased two, three or any number of times, assuming the power on the air remains constant. The solution also assumes that the resistance of the original airway is equal to the total resistance of the two shafts, upcast and downcast. Calling that resistance unity or one, the combined resistance

of the two shafts and the original single airway is two.

The rule is as follows assuming a constant power on the air and the resistances of the two shafts and original airway equal, multiply the original circulation by the cube root of twice the square of the number of airways in the mine, divided by the square of that number plus one.

For example, if the original circulation was 10,000 cu.ft. per min., the addition of another airway of equal size and length to the first will increase that circulation to

$$10,000 \sqrt[3]{\frac{2 \times 2^2}{2^2 + 1}} = 10,000 \sqrt[3]{\frac{8}{5}} = 11,696 \text{ cu.ft.}$$

Again multiplying the number of airways in the mine three times, gives for the quantity of air circulated by the same power

$$10,000 \sqrt[3]{\frac{2 \times 3^2}{3^2 + 1}} = 10,000 \sqrt[3]{\frac{18}{10}} = 12,164 \text{ cu.ft.}$$

HOW THE RULE IS DEVELOPED

The rule I have mentioned is found by first assuming the quantity of air constant and calling the power absorbed in passing that quantity through the two shafts unity or one, the total power absorbed in the two shafts and the single airway is then 2. But, since the power varies directly as the rubbing surface and inversely as the cube of the sectional area, or as n/n^3 , or $1/n^2$, n being the number of airways in any case, the power absorbed by the two shafts and n airways is $1 + 1/n^2$, or $(n^2 + 1)/n^2$. Then, finally, increasing this power to the original amount, remembering that the quantity of air varies as the cube root of the power, gives the proportion

$$\sqrt[3]{\frac{n^2 + 1}{n^2}} : \sqrt[3]{2} :: Q : x = Q \sqrt[3]{\frac{2n^2}{n^2 + 1}}$$

In this proportion, Q is the original quantity passing in the two shafts and single airway, n the number of airways and x the quantity circulated in n airways, under the original power.

Retimbering a Shaft Bottom

Decaying and broken timbers overlaid with loose material presented a dangerous condition—Heavy jacks used to force new timbers into position.

READING an article that appeared not long ago, in *Coal Age*, concerning the replacing of old timbers having 15 ft. of loose slate lying above them, recalled a similar experience in my own practice. The condition is one that mine foremen are often compelled to face and calls for the exercise of their best judgment and skill in performing their work.

The instance I have in mind occurred when accepting a position as foreman at an old mine, which had fallen into a condition that would require much labor and time to restore, before active work could be again resumed. On taking charge of the mine, I immediately found that it would be necessary to retimber the shaft bottom.

Starting from the shaft and extending back for a distance of about 75 ft., the old timbers had begun to decay and many of them were breaking under the load of loose material above them. The prospect was a dangerous one.

After making a short survey of the situation, I ordered a sufficient number of 12x12 in. timbers, 15 ft. long, to enable me to make a good substantial job. I

then secured from the section hands on the railroad, two heavy pump jacks. These, together with a good stout timber cut to a suitable length. I intended to use for the purpose of forcing the new collars or crossbeams into position.

When this material was on hand and everything ready the work was started at the shaft. A new collar was brought and raised to the roof where it was supported on two temporary legs. The position of this timber was midway between two of the old timbers. The two jacks were then brought into requisition and, by their use, the new collar was forced up to a firm position against the old overhead lagging that was still in fair condition.

When this timber had been forced up as far as it would go and made level, measurement was taken for the permanent legs. After these had been finished and stood in place the jacks were released and the collar beam allowed to settle on the two legs. In the same manner, other timber sets were placed in position, one after another, until the entire job was completed. Later, the old broken timbers were taken down and removed from the mine. I thought this brief account might be of some assistance to others in a similar situation.

Hillside, Ky.

O. KENNETT.

Inquiries Of General Interest

Available Tonnage Underlying a Coal Property

Estimated Tonnage Based on Percentage of
Extraction and Allowance for Screenings—These
Factors Vary and Must Be Taken Into Account

CONTEMPLATING the leasing of a large coal tract consisting of 1,110 acres, it became desirable to form a fairly close estimate as to the amount of available coal underlying the tract. The record of the prospecting has showed the presence of three seams of coal above the drainage level and three other seams lying below that level. The former have a thickness of 3 ft., 5 ft. and 4 ft., respectively, while the three lower seams each have an average thickness of 5 ft.

Two parties have made widely varying estimates as to the amount of coal underlying this tract and available for extraction. For example, A reports an available tonnage of 47,952,000 tons, while B's estimate is much lower, his report showing an approximate amount that he says will not exceed 35,864,000 tons. It would be interesting to know which of these estimates is more nearly correct.

Before closing the deal for the leasing of this tract, which we have held back awaiting reliable estimates on the probable available coal, we are desirous of ascertaining as nearly as practicable what is the reason for the extreme divergence in the figures that have been given as stated above.

_____, W. Va.

MANAGER.

Estimates on the available tonnage underlying a coal tract will vary according to the assumed basis of figures.

Taking the average specific gravity of bituminous coal as, say 1.3 and its weight $1.3 \times 62.5 = 81.25$ lb. per cu.ft., makes the weight of coal in place, per foot-acre.

$(43,560 \times 81.25) \div 2,000 = 1,770$, say 1,800 tons.

In estimating the available tonnage, or the weight of coal that can be mined and marketed, it is necessary to assume a probable or possible percentage of extraction. This will vary from 80 to 90 per cent or more depending on the method of working and the style of equipment. For example, assuming a 90 per cent extraction and a mine-run basis of shipment, would make the

available tonnage from 1,110 acres underlaid with these six seams aggregating a total thickness of 27 ft.

$0.90(1,800 \times 27 \times 1,110) = 48,551,400$ tons.

Again, assuming an 80 per cent extraction of coal and making an allowance of 16-2/3 per cent for screenings, the weight of lump coal available for shipment would be

$0.80(1,800 \times 27 \times 1,110) 5/6 = 35,964,000$ tons.

Finally, we would say that the first of these two estimates represents the basis of A's figures, while the second is probably the basis of B's estimate.

Examination Questions Answered

Alabama Firebosses' Examination Birmingham, Jan. 22, 1923

(Selected Questions)

QUESTION—*In an airway 8 ft. wide and 6 ft. high, the air has a velocity of 240 ft. per min. What is the volume of air passing per minute?*

ANSWER—The sectional area of this airway is $6 \times 8 = 48$ sq.ft. Assuming the given velocity is an average for the airway, the quantity of air in circulation is $240 \times 48 = 11,520$ cu.ft. per minute.

QUESTION—*Do you favor mixed lights in a mine where explosive gases are generated? Give full reasons.*

ANSWER—No. In a mine generating explosive gas in quantities requiring the use of safety lamps, none but such lamps should be used. In other words, the mine should be worked exclusively with safety lamps. If open lights are allowed in certain parts of a mine generating gas in quantities that require the use of safety lamps in other sections of the mine, there is always the possibility that a man carrying an open light on his head will enter a section where safety lamps are required. He will do this thoughtlessly and without having any wrong intentions, but the consequences are the same. Again, a fall of roof, occurring in the section where gas is generated, may drive the gas out into other parts of the mine where open lights are in use and it will be ignited before the men have any warning of their danger.

QUESTION—*What are the advantages obtained from having safety lamps shielded?*

ANSWER—Safety lamps are shielded in order to protect the flame from a strong draft striking the lamp, or from a sudden concussion of the air, which might force the flame through the wire gauze and ignite the gas-charged air surrounding the lamp. It often happens that a safety lamp is swung to and fro by a man when walking and is thus subjected to a greater pressure than is safe. The shielding of the lamp reduces this danger.

QUESTION—*What precautions should be taken in the use of safety lamps in gaseous mines?*

ANSWER—In the first place, none but approved types of safety lamps should be used. These lamps should be owned by the company and kept in separate lockers or pigeonholes, or hung on individual hooks in a lamp-

house. A competent and reliable person should be given charge of the lamproom, and all lamps should be thoroughly cleaned, examined and filled when delivered there at the close of each shift. Every man's lamp should be numbered to correspond with the check that is given him in return for his lamp. The lamp, after being cleaned, filled and examined, should then be hung on a hook or placed in a pigeonhole numbered to correspond with the number on the lamp. In the morning, each man receives his lamp, it having been first lighted and properly assembled. The man's check is hung on the hook or put in the pigeonhole from which this lamp was taken. When this plan is followed, it furnishes a good record of what men are in the mine and who has not reported for work.

QUESTION—*How long would you allow a safety lamp to remain in an explosive mixture of gas?*

ANSWER—No safety lamp should be exposed to a fire-damp mixture after the presence and character of the gas has been made known by the appearance and action of the flame within the lamp. Immediately on the observance of a flame cap and estimating its height the lamp should be cautiously withdrawn from the gas, avoiding any sudden or quick movement that might force the flame through the gauze and ignite the gas surrounding the lamp.

QUESTION—*When and where must danger signals be placed, in a gaseous mine, to comply with the Alabama Mining Law?*

ANSWER—The law (Sec. 32) requires the fireboss, "after each examination, to leave, at a point at least 25 ft. distant from the face of every slope, drift, entry or air-course and at the neck of every room examined by him, a conspicuous sign or mark indicating the presence of gas in dangerous quantities discovered by him, together with a memorandum of the date of his examination." Sec. 41 of the law also requires that the entrance or entrances to worked-out and abandoned places containing an accumulation of explosive gas shall be properly fenced off and cautionary notices posted on said fencing to warn persons of the danger therein.

QUESTION—*Why is it that marsh gas (CH_4) is generally found lodged near the roof and carbon dioxide near the floor?*

ANSWER—Marsh gas or methane has a specific gravity of 0.559, which makes it only slightly more than one-half as heavy as air of the same temperature and pressure. On the other hand, carbon dioxide has a specific gravity of 1.529, which makes it more than half again as heavy as air, at the same temperature and pressure. Therefore, methane being lighter than air tends to rise and accumulate at the roof, in mine workings, while carbon dioxide being heavier than air, tends to fall and settle at the floor, or in other low places, unless something prevents.

Buy Supplemental Fuels Now, Says Commissioner Smith; Rush for Hard Coal Would Boost Prices

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

NOTE—The following article was written before the anthracite wage negotiations were suspended. When the action of the conferees became known a member of the Coal Commission was acquainted with the contents of this article. He stated that while the termination of the conference may be regarded as adding somewhat to the possibility of an ultimate failure in the negotiations, there is no reason to revise the opinions held before the conference broke up and which are reflected herein.

The Coal Commission apparently is taking it for granted that there will be no failure on the part of the anthracite operators and mine workers to reach an agreement. The members of the Commission returned to Washington last week after a few days' breathing spell, and began to concentrate their entire attention on the bituminous situation. While the comment of members of the Commission indicates that they are watching the anthracite situation closely, it is evident that they are not greatly disturbed by the maneuvering in progress at Atlantic City and Scranton. Chairman Hammond admitted at the press conference July 27 that the discussions are passing through the stereotyped stages of all such negotiations. The necessary preliminary sparring is following the usual course, but Mr. Hammond expressed the belief that the contestants are warming up to the point where they are ready to take off the gloves and go to it with bare fists in real earnest, with the prospects favoring a prompt decision.

ASKS FAITH IN INDUSTRY'S RESPONSIBILITY

In its attitude toward the anthracite negotiations it is apparent that the Commission is living up to the policy outlined in its own report. It is throwing the responsibility on the men in the industry. It has called upon the country to have faith in their ability to conduct their own industry in the public interest, and it is evident that the Commission's faith in the ability of these men to work out their own problems has not been shaken. If by any chance the time should arrive when there should be serious doubt as to their ability to agree it is probable that the Commission would do as it did during the bituminous negotiations, and exert its full influence to insist upon an agreement. In fact, Chairman Hammond stated at Friday's conference that the Commission would reiterate its appeal should the occasion arise and in the interest of the public would make that appeal just as strong as possible. He emphasized, however, that there is no thought of taking such a step yet.

While members of the Commission regard it as entirely natural that New England should be worrying over its winter fuel supply, the opinion seems to be that there is nothing to justify the degree of alarm which seems to have pervaded those states. In New England, at least, it was suggested, the interest is centering on the check which must be given the coal dealer rather than on the check-off. The inference intended was that the price of anthracite had reached the point in New England where a considerable proportion of the population cannot afford to pay it. They are not so much interested in the technical differences which are being discussed at Atlantic City as they are in seeing a reduction from \$16 or \$18 per 2,000-lb. ton which they now are being called upon to pay.

Attention was called at the conference to the almost unanimous editorial support which has been given the Commission's position that anthracite is "affected by a public interest." The comment made in that connection led to the warning that a different situation exists with regard to bituminous coal. In contrast with the natural monopoly in anthracite, attention was called to the fact that outside of New England every state either has coal within its boundaries or is contiguous to a coal-producing state. The Commission is rather proud of the fact that three of its suggestions were acted on immediately. The Interstate

Commerce Commission ordered the investigation of anthracite freight rates. The 12-hour shift is to be abolished and a continuing umpire is to sit with the Conciliation Board. Many persons in communications sent direct to the Commission express their opinions of the report. Up to this time a more or less equal division has been maintained between those who think the report too radical and those who think it too conservative.

At least one member of the Commission, Dr. George Otis Smith, believes that little is to be gained by urging householders to buy anthracite at this time. The possibility of a strike has stimulated buying to the point where it is increasing price levels materially. Any rush to buy domestic sizes of anthracite at this time simply would push the price higher. It is sounder advice, he believes, to buy supplemental fuels at this time. These substitutes can be purchased now at the lowest prices which have been obtainable this year. If there should be a strike on Sept. 1, these substitutes would have to be purchased at an advanced price. If there is no strike, it apparently is Dr. Smith's thought that anthracite retail prices would be likely to recede. A two-months supply of coke, briquets, buckwheat anthracite or soft coal would be worth the investment by way of insurance, to say nothing of the possible saving which would be made in the purchase of domestic sizes during a time when there is no semblance of a buying panic.

Chairman Hammond fully expects Congress to provide the legislation recommended in the anthracite report. He believes it is so obviously in the public interest that there will be no important opposition to it. He was asked if, in case of a deadlock, the President were to take over the mines under emergency power, the mine workers would be any more likely to return to work at the request of the President than they would at the request of the private operators? Mr. Hammond, in reply, expressed the opinion that the probabilities of their return would be increased, but even if they were not, such action on the part of the government would bring to bear on the situation the full weight of public opinion, which would be likely to get results.

The Coal Commission had planned to issue this week a report on civil liberties, but on Monday the bituminous operators announced to the Commission their intention of filing a special brief on the West Virginia situation. At their request the Commission is withholding the report until the brief can be received and examined.

Brydon Names Policy Committee of 25 To Continue Study of Coal Problems

John C. Brydon, president of the National Coal Association, on Aug. 1, named twenty-five of the country's foremost operators of bituminous-coal mines as members of a committee whose purpose it shall be to continue the study of problems confronting the industry, to pass on questions of policy affecting the association and to form a closer liaison between the mine owners and the public.

This committee is to be known as the Policy Committee of the association, a new body formed as the result of a suggestion embodied in the inaugural address of Mr. Brydon when he was elected president of the organization at its recent annual meeting in Atlantic City. In selecting its members the association's president chose not only with a view to giving the industry adequate geographical representation but the personnel is equally divided among owners of mines employing union labor and those conducted under the open-shop system. By virtue of his office Mr. Brydon will be chairman of the committee.

"We must organize to put ourselves regularly and con-

tinuously into closer contact with the public's interest and the public's mind," Mr. Brydon declared. "In my opinion," he continued, "the action taken by the membership of the National Coal Association in authorizing the appointment of a Policy Committee, is the most advanced step we have taken. It means that the members of the association have recognized and are ready voluntarily to assume the obligations which belong to a great industry.

"The membership of the Policy Committee is not confined to the National Coal Association," Mr. Brydon explained. "In making up the committee, counsel and advice have been sought beyond as well as within the association. This has resulted in a committee membership which is truly representative of the industry as a whole.

"For example, the entire membership of the Bituminous Operators' Special Committee, which was not confined to the association, is included in the Policy Committee. The Special Committee has for some months been making a careful exhaustive and intensive study of the soft-coal industry in co-operation with the U. S. Coal Commission. The Policy Committee will benefit by the inclusion of all Special Committee members, who, because of their activities in the investigation now in progress, are among the best informed men on the general situation of the bituminous industry.

"I am confident that the work of the Policy Committee of the National Coal Association will be an important factor in producing results both for the public and the industry itself."

Hoover's Book on Trade Associations Wins Attention in Coal Industry

There is a widely held belief throughout the country that the exhaustive study of trade associations just completed by the Department of Commerce and the publication of the department's book on the subject—"Trade Association Activities"—is going to do much to establish effective associations within the coal industry. The book was issued July 16. It is now in demand and is getting studios attention throughout the industry. Expressions from coal men indicate that they think the book is not only helpful, being the first comprehensive work on the subject, but that its aim is right and that it may unify the several confusing governmental attitudes toward trade associations.

The book comprises an introduction by Secretary Hoover, chapters compiled from the experience of many on statistics, legislative activities, cost accounting, credits, trade disputes and ethics, employee relations, insurance, public relations, traffic, research, and other phases of trade association work, together with a study of association organization, a history of associations and a directory of national and international associations. Altogether it is a 368-page volume that attempts to cover the whole subject, but, as the editors of it say: "Manifestly it has been impossible to collect the matured views of all those qualified by knowledge and experience to give worth-while information," so they will welcome criticisms and suggestions that may make future editions of the book more valuable.

In his introduction, Mr. Hoover, recognizing that the public has gained a warped idea of associations because of "the minority of activities which have been used as a cloak for action against the public interest," declares the business of this country needs the constructive work that associations can best do and that therefore the public should get a clearer and truer idea of associations. The book was published, he says, not to educate big business but to show that legitimate trade associations and other forms of business co-operation are the real basis for promotion of small businesses. Mr. Hoover declares the proper collection and dissemination of business statistics benefits both the producer and consumer and is so necessary to the orderly economic life of the country that statistical services must be maintained either by associations or by the government. All the way through his introduction Mr. Hoover makes it plain that legitimate trade associations are essential and the book outlines, chapter by chapter, what legitimate associations can do.

The chapter on the legal aspects of the trade association situation is of particular interest since it comes from Nelson B. Gaskill, of the Federal Trade Commission. It has been assumed that the Federal Trade Commission is not particularly friendly to the movement.

In his chapter Mr. Gaskill says, among other things: "The trade association is not a combination in restraint of trade with one hand tied. It is not a medium for the exchange of business secrets for the sole benefit of those who join in the exchange. It is not a new arrangement for the accomplishment of any object which needs, because of the law, to be pursued stealthily and in the dark. It is an expression of an interest, common to all in any industry in which it arises, seeking to benefit the individual by bettering the entire industry and the public which the industry serves.

"It serves where the individual acts. It instructs where the individual learns. It works for the individual, but never instead of him. And while the attention of the individual may be focused on himself and his own interest, the aims, objects and ideals of the trade association are fixed in the wider field of the welfare of the whole group, the whole industry and the whole public dependent upon it." Mr. Gaskill concludes, however, with the admonition that the trade association must "hitch its wagon to a star."

Kansas Fails to Get a Machine Scale

The latest effort to get a machine mining scale for Kansas has failed. Conferences between the Southwestern Interstate Coal Operators' Association and the United Mine Workers of District 14 in Kansas City at intervals since last March 19 were broken off June 20 at a final session which lasted three days. A gap of 5c. divided the operators and miners when negotiations ceased. The operators, who had at first proposed that the machine scale be 15c. a ton less than the \$1.25 paid for digging, later offered an 11c. differential, but the miners' union would make no concession from its demand that the differential be only 6c.

A statement issued by the operators' association at the termination of negotiations said that machine equipment for each mine would cost \$12,000 to \$15,000; that the saving in powder purchases by the miners and lightening of the work would have justified a 15c. differential and that the 11c. differential would not fully cover the investment, installation and maintenance, and that therefore a still lower differential as demanded by the miners could not be considered.

The operators' statement, issued by W. L. A. Johnson, general commissioner, said: "It is very regrettable that the miners saw fit to break off negotiations, as it withdraws the ray of hope that the Kansas mining field would be given an opportunity to recover much of its lost market by being able to offer a larger volume of prepared lump coal at reduced cost, which would have enabled some reduction in prices and the maintenance of its market and the extension of the same to a wider field, thus enabling the miner to make greater earnings and have steadier work instead of having 200 or 300 'no-bill' cars on the track and only one to three days' working time a week."

An offer of the operators to arbitrate the differential with a representative of the international board of the United Mine Workers or a committee from that body was refused by the union conferees.

Cutting machines of various kinds have been used experimentally in the Southwest for about a year in the hope that by this time a scale would be worked out, so that by next fall the entire field could be on a machine basis. Several of these have been uniformly successful. In the Cherokee region even in an upper vein only 20 to 24 ins. thick a number of machines have been worked by operators who received the union day scale of \$7.50. Near Pleasanton approximately 15 machines have been working on a combination tonnage and day rate.

In the whole of District 14 the coal has been shot so hard that slack has averaged between 50 and 55 per cent of the total output. This naturally has been a tremendous handicap to the operators. Their hope has been to reduce the slack percentage to at least 40 and be able to produce cleaner coal with much less powder after cutters were installed.

Anthracite Wage Conference Breaks Up When Operators Balk at Granting "Check Off"

Refusal of the anthracite mine operators to grant the demand of the mine workers' leaders for the "check off" broke up the wage conferences at Atlantic City on July 27. The conference was nearly disrupted the day previous when John L. Lewis demanded that the operators grant demand No. 1, which covers complete recognition of the union and the "check off" as a condition of continuing the conferences. Part of two sessions had been devoted to a discussion of the demand when Mr. Lewis presented a motion "that the principle of complete recognition and the check off as explained in demand No. 1 be adopted." The operators voted "No" and the miners "Aye," S. D. Warriner, chairman of the sub-scale committee, declaring the motion lost.

Mr. Lewis said the miners insisted upon this demand and an adjournment was taken until the following day.

Before final adjournment was taken on July 27, Mr. Warriner read a statement setting forth the position of the operators and making an offer to submit the questions at issue to arbitration. This was refused by the miners.

AGREEMENT CONTINGENT ON UNION RECOGNITION

At the conclusion of the conference on July 26 Mr. Lewis said that the making of a new anthracite working agreement is contingent upon the anthracite operators giving full recognition to the United Mine Workers of America.

"Such relationship has existed for a quarter of a century in the bituminous coal fields," said Mr. Lewis, "and the miners are within their rights in asking recognition from the anthracite operators. This demand for recognition will not add a single penny to the cost of the anthracite product, and concession on this point is essential to carry out the recommendations of the U. S. Coal Commission in the matter of penalties for breach of contract. The mine workers are consistent on this point and will continue in that attitude."

S. D. Warriner, replying for the operators, said that they do and have fully recognized the union as a contracting party in accordance with the provisions laid down in the Roosevelt award in 1903 and the award of President Wilson's commission in 1920.

Continuing he said, "Their officers and agents are recognized people with whom we do business and confer to settle disputes and grievances relative to labor matters in the anthracite region.

"This agreement to which the union has heretofore subscribed, has been on the open shop basis, under which anyone can work in the anthracite field in accordance with his constitutional rights so to do. If he elects to become a member of the union he is protected against any discrimination by any employer.

"The operator insisted upon by Mr. Lewis is on the closed-shop proposition, under which no one can work in the anthracite fields unless he is a member of the organization, thereby depriving anybody who may not so elect of his constitutional rights to earn his living at his chosen vocation.

"The operator also is to be compelled to collect from every man working in the anthracite industry, exclusive of clerical and managerial occupations, such fines, dues and assessments as the union may dictate.

"The U. S. Coal Commission of 1923 is very clear on this matter when it says: 'The principle that a man has the legal right to work free and unimpeded by threats, duress, coercion or restraint, when, where and for whomsoever he chooses; that a man has a legal right to employ and discharge as he pleases, and that men have a right to bind themselves together for collective bargaining, touching wages and working conditions, are freely admitted by every one. These principles honestly lived up to would keep the open shop and at the same time permit the existence of the union.'

"To all intents and purposes the agreement under which we are operating is in accordance with these principles."

When the conference was resumed on July 27 Mr. Warriner, after Mr. Lewis had declared that the miners still insisted upon demand No. 1, read into the record a statement setting forth the attitude of the operators, and concluding with an order to arbitrate. Mr. Lewis in replying to Mr. Warriner stated that negotiations could not go on until concession had been made on the matter of the recognition of the union and the installation of the check off. Mr. Warriner's statement read in part:

"You make a condition of further negotiation the acceptance by the operators of your first demand—complete recognition of the United Mine Workers of America, which you very frankly tell us implies the closed shop and the check off. In a word, you say to us that unless we are willing to make membership in your organization a condition of employment, and unless we are willing to collect from the pay envelopes of our employees union dues, assessments and fines arbitrarily levied upon your members, and turn the moneys over to the treasurer of your organization, you must refuse further consideration of a contract to take effect after the expiration of the present contract on Aug. 31.

"As far as the recognition of your organization is concerned, you have such recognition now, for the present contract is with the United Mine Workers of America.

"The demand for a closed shop has twice been a subject of arbitration between us—first before the Roosevelt commission in 1902, and second before the Wilson commission of 1920.

UNION SUBORDINATE TO LAWS OF NATION

"Both of these commissions refused your demands in no uncertain terms and declared unequivocally for the open shop. You seem to ignore entirely the admonition of the Roosevelt commission that 'the trade union is a voluntary social organization and like any other organization is subordinate to the laws of the land and cannot make rules or regulations in contravention thereof. Yet at times it seeks to set itself up as a separate and distinct governing agency and to control those who have refused to join its ranks and to consent to its government, and to deny to them the personal liberties which are guaranteed to every citizen by the Constitution and the laws of the land.'

"In the final analysis nothing could express our view more clearly than the quotation just given.

"It is to be regretted that your position prevents further negotiation and the working out of a new contract by the orderly process of collective bargaining. Therefore, I would like to state definitely the position of the operators.

"We have listened to the arguments you have presented covering the demand just refused, the demand for a general increase in wages, and the other demands, which in the main were a repetition of demands before the Wilson commission in 1920. The industry is operating under a scale of wages which represents the very peak of post-war conditions. The employees in our industry have not suffered a wage reduction and wages today are far above the increase in the cost of living as compared to the pre-war period. The report of the U. S. Coal Commission, just issued, indicates most clearly adequate earnings to permit the essential so far as reasonable standard of living.

"In the light of these conditions we are prepared to execute a contract renewing the present wage scale to April 1, 1925. We will eliminate the twelve-hour day where it is in effect, speed up the work of the Board of Conciliation, and endeavor to embody in the contract clauses covering those minor matters which we have expressed a willingness to consider during the present negotiations."

Mr. Lewis replied extemporaneously at some length to Mr. Warriner's statement, charging it "obviously was prepared for the press, for public consumption."

He declared the quotation from the Roosevelt commission's award was "utterly unfair and unjust," saying the union was "a legal and an American organization recog-

nizing the majesty of the law and the sovereignty of our Republic, and there is no conflict in principle or in fact between any of our demands and the laws of our country or the public welfare."

In demanding "complete recognition" Mr. Lewis said the anthracite men were only asking for that form of human relationship which had obtained in the bituminous industry for twenty-five years. They wanted only a contract with the operators that would be "a formal and complete recognition of the mutual responsibilities by both parties thereto." Continuing, he said:

"The operators' attempt to base their refusal upon the abstract theories enunciated in the report of the commission in 1903 is merely a subterfuge to enable them to evade their responsibilities. The world is not governed by the hoary traditions of the past and the mining industry is no longer bound by the conditions of two decades ago.

"The opinions of men of twenty years ago, of no particular experience in the mining industry, when the trade relationship between the operators and the miners had been of brief duration, are of no particular consequence today. It does not follow that their judgment must forever prevail, despite the onward progress of the world and the changing conditions of the twentieth century."

At the session on July 25 an agreement was reached on demand No. 10, in which the miners asked that mine committees and company officials be authorized to agree upon wage rates for new work and file these rates with the Board of Conciliation.

Bituminous Operators' Committee Attacks Check Off as Inimical to Industry

In a statement issued at Atlantic City, Saturday July 28, the Special Committee of Bituminous Coal Operators challenged the statement of the United Mine Workers that the "check off" has been found a satisfactory arrangement by the soft coal operators. The committee was in session there preparatory to meeting the Coal Commission in Washington on Monday, July 30. The statement follows:

"The anthracite conference has broken down on the insistence of the United Mine Workers for the check off. Mr. Lewis proposes to cut off the supply of anthracite coal to the public on the single issue that the operators will not consent to collect forcibly for his organization dues and assessments from every mine worker in the anthracite fields. That is what the check off means. He appeals to the public for justification of his position on the ground that the check off is a regular feature of the union contract and has worked to the satisfaction of everybody in the bituminous fields.

"No statement could be farther from the truth. On the contrary, the check off has proved so inimical to the steady and peaceful production of bituminous coal that the Bituminous Operators' Special Committee has filed a formal request with the U. S. Coal Commission for the complete abolition of the system.

"The check off is contrary both to the principles of Americanism and of unionism. Under it the central power of the United Mine Workers at Indianapolis is able to wring payment from every worker in the unionized fields, whether he wants to pay or not, for purposes of which he never had a chance to express an opinion and of which he may entirely disapprove. It is taxation without representation, the most un-American system conceivable.

"So far as unionism is concerned the check-off is used in practically no other union American industry. It is a unique weapon of enforced taxation, and insisted on by the United Mine Workers alone. The great self-respecting unions of the country are able to command sufficient confidence among their members to collect their own dues without this artificial means. Even among the miners of Great Britain, who have been unionized for generations, the check off does not exist and would not be tolerated for a moment.

"Collections of dues and assessments for the United Mine Workers' organization by the operators is no part of 'recognition' of the union. No unions could be more fully 'recognized' than the great railroad unions in this country and

the mine workers' union in England. Neither of them has such a check-off.

"Under the check off the United Mine Workers raise every year more than seventeen million dollars. From this huge sum they paid the expenses of armed invasion of West Virginia in 1921 by 12,000 men, an invasion which had to be suppressed by federal troops. By it they recently raised \$300,000 in Illinois to defeat justice against the Herrin murderers. It feeds a fund which every man who commits an act of violence in aid of this organization throughout the country knows will be at his command to help him to escape punishment for his act.

LEGALITY OF CHECK OFF BEFORE COURTS

"The check off is now under attack in the federal courts on the ground of the illegality of the use to which it is being put.

"This system was originally accepted in the bituminous industry in the hope that it would tend to lessen strife and breaches of agreement. The result has been just the opposite. Strife and breaches of agreement have very greatly increased throughout all the unionized fields since the check off was adopted.

"So long as the leaders of the United Mine Workers can command the use of this method of acquired, irresistible power against the community and justice, it is not surprising that they should refuse to submit the controversy to the peaceful solution of arbitration. Their present refusal, backed by Mr. Lewis, to stand for arbitration in any form is directly connected with this iniquitous system.

"The experience of the bituminous industry in the check off has absolutely demonstrated the far-sightedness and wisdom of President Roosevelt's commission in 1902 and President Wilson's commission in 1920 in refusing to impose this system upon the anthracite industry."

John L. Lewis at once replied, stating:

"The statement of the so-called Special Committee of Bituminous Operators attacking the 'check-off' system prevailing throughout the bituminous industry is merely propaganda in behalf of the non-union coal operators who dominate the National Coal Association. These interests are bitterly opposed to the principle of collective bargaining. In denying the principle of collective bargaining they set aside and trample upon a recognized principle of human and industrial relationship and turn backward the clock of progress.

"The non-union members of the National Coal Association are not as bitterly opposed to the 'check off' as they would have the public believe. They daily apply the 'check-off' system in deducting from the wages of their employees moneys for payment of store bills from their swindling company stores, doctors' fees, blacksmithing, house rent, house coal, tools, fuse, mining supplies, taxes and funds for the maintenance of baseball clubs, etc.

"They prevaricate when they state that the United Mine Workers forcibly compel them to contribute to the organization. The miners only ask that the 'check off' in the anthracite region, as elsewhere, operate in behalf of members of the United Mine Workers when they file individual orders constituting a legal assignment with the coal operators for their monthly dues to be deducted."

ABOLITION OF CHECK OFF MAY MEAN STRIKE

On Monday Mr. Lewis again attacked the National Coal Association, charging that it is dominated by non-union interests who seek to destroy the union. He said that any attempt on the part of the bituminous operators to abolish the "check off" would precipitate a national coal strike and asserted that this is just what the non-union operators are seeking in order that they may have the entire coal market to themselves and charge the public high prices.

John Brydon president of the National Coal Association, took issue with Mr. Lewis, asserting that that association represents 60 per cent of the tonnage produced in the union fields and about 40 per cent in the non-union fields. He also announced that the special committee will render a full account of its expenditures to the U. S. Coal Commission and suggested that Mr. Lewis also file an account with the Coal Commission of the disbursements of money obtained by the union through the "check off."

Bituminous Operators Offer Government a Plan to Supply Nation's Fuel in Event of Anthracite Strike

The Special Committee of Bituminous Coal Operators, headed by John Brydon, president of the National Coal Association, spent Monday, July 30, in executive session with the U. S. Coal Commission. The purpose of the conference was to present to the Coal Commission the statement of suggested finding of fact on which it is hoped by the operators that agreement can be reached with the Commission, thereby limiting further efforts on the part of both to a comparatively few controverted matters.

Following the conference the operators issued two statements, one to the press and one to the Commission, transmitting formally the statement of Mr. Brydon on Saturday replying to the claim of the mine workers that the "check-off" is a satisfactory arrangement with the soft-coal operators now in process of formation by the National Coal Association to handle distribution of coal during national emergencies. He stated that this machinery can be perfected in two weeks and offered it to the government in the event that an emergency be caused by a strike in the anthracite region next month.

Mr. Brydon also offered on behalf of the bituminous-coal operators of the country to organize with the proper department of the government a plan for voluntary publicity "of the facts as to costs and earnings of the industry and the wage earnings of miners and other vital information concerning the industry; this information to be compiled and published in such a way as not to reveal to competitors the facts as to particular companies."

The entire soft-coal output of the country excepting only 40,000,000 tons was represented in person before the Com-

missioner on Monday, according to the statement issued by the operators. The missing tonnage is mined west of the Mississippi and only distance kept their representatives from attending, Mr. Brydon said. Iowa is the only field not represented. The union operators who appeared in person before the Commission included A. M. Ogle, Indiana; George B. Harrington, Illinois; Michael Gallagher, Ohio; T. W. Guthrie, B. M. Clark, Charles O'Neill, David Price, W. A. Jones, and T. E. Clarke, Pennsylvania. The non-union operators were Mr. Brydon, Pennsylvania; E. L. Greever, Virginia; E. L. Douglas, Kentucky; S. L. Yerkes, Alabama, and W. H. Cunningham, West Virginia.

Discussing proposals of the operators to the Commission, Mr. Brydon said "This emergency plan is purely voluntary, and as president of the National Coal Association, and thus representing the great majority of the bituminous operators of the United States, I give assurance that the needs of the public will be met and the operation of this emergency distribution machinery will not be open to the criticism of any department of the government. Of course, at this time emergency machinery is being set up to handle any situation, if perchance there should be a suspension in anthracite production. However, the plan is so broad in scope and so practical that it can be used to serve the government and the public under any emergency.

"Good faith in carrying out this plan will require the prices to be reasonable, and that the public may know the prices are reasonable fullest publicity will be given through a central agency of such facts as are necessary to enable the public to reach an intelligent conclusion thereon."

Blizzard Jury Disagrees and Is Discharged

After a trial lasting from June 18 until July 26 the jury in the case of William Blizzard, president of sub-district 2 of District 17, United Mine Workers, reported to Judge Sharp, of the Circuit Court of Greenbrier County, at Lewisburg, W. Va., that they were unable to agree, and were discharged. Blizzard was charged jointly with C. F. Keeney, president of District 17, and Fred Mooney, secretary of that district, with being accessory to the murder of George Munsy, a Logan County deputy sheriff in conjunction with the armed march of 1921.

As soon as the disagreement had been reported and the jury had been discharged, it was announced by Prosecuting Attorney S. M. Autin, of Greenbrier County that Blizzard would be retried.

Kansas Industrial Court Starts Coal Investigation of its Own

An investigation of contracts between the Jackson-Walker Coal & Mining Co. and firms holding leases from the company in the southeastern Kansas field has been ordered by the Kansas Industrial Court. The investigation will start Aug. 13, on a complaint filed by the Industrial Court on its own motion, charging violation of the Industrial Court law and alleged restraint of trade. It entails a possibility of prosecution under the anti-trust law, it has been announced in Topeka.

Seventeen firms with a total investment of approximately one-half million dollars and employing 1,200 miners, are made defendants with the Jackson-Walker company. These firms lease from Jackson Walker, who, in turn lease from the Cherokee & Pittsburg Coal & Mining Co., which in turn leased the coal lands from the Santa Fe R.R. when the control of coal fields by railroads was prohibited by Congress.

It is charged that the leases under which the seventeen companies operate require the sale of all coal produced by them to Jackson Walker, with the provision, however, that they may sell coal in the open market by paying Jackson Walker a royalty of 40c. a ton. Under this provision the

lessees declare, they are unable to meet prices in the open market. They also assert that during the summer the acceptances by Jackson Walker have been so meager that they have found it impossible to operate profitably.

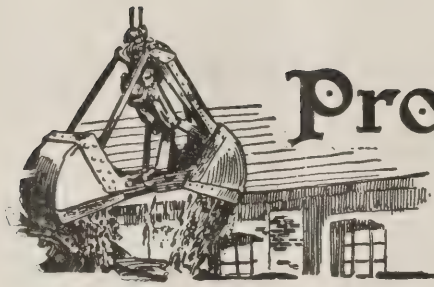
Effective Date of Assigned-Car Order Deferred One Month to Oct. 1

So much pressure has been exerted on the Interstate Commerce Commission by the railroads and private-car owners for a rehearing on the assigned-car and private-car decision that on July 25 the Commission deferred the effective date of the order from Sept. 1 to Oct. 1. This is generally interpreted to mean that the case will be reopened although some believe that no decision has been reached on this and will not be until a number of the commissioners who are out of Washington shall have returned.

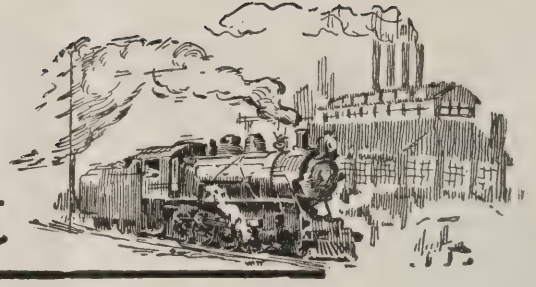
Petitions for a rehearing and argument have been filed by the Seaboard By-product, Chicago By-product, Donner-Union, and Rainey Wood Coke companies, the Cleveland Cliffs Iron Co., the Steel Co. of Canada, the Berwind-White, Westmoreland, New River and Pocohontas Consolidated and Pennsylvania Coal & Coke companies, the Pittsburgh Plate Glass Co., the Chesapeake & Ohio R.R., the United States Steel Corporation, the Public Service Electric Co. and the American Railway Association.

The Central Pennsylvania Coal Producers' Association has answered these petitions and asked that they be denied. It is understood that the National Coal Association will file a similar answer to the petition of the railroads.

THE INTERSTATE COMMERCE COMMISSION has affirmed its original findings in the case of the Hillsboro company versus the Big Four. A re-argument had been allowed in the case. In the original decision the commission held that the failure of the Big Four to make arrangements whereby the Hillsboro company would be able to avail itself of the facilities and rates of the Chicago & Eastern Illinois R.R. did not result in undue prejudice and disadvantage to the coal company. The points involved in this case are now before the Supreme Court of the United States for decision.



Production and the Market



Weekly Review

Abrupt breaking off of the wage conferences at Atlantic City on July 27 has not yet aroused consumers of hard coal to a fear they will be without fuel next winter. Producers of bituminous domestic coals, which were used to advantage by many consumers during the last shortage of hard coal, are receiving inquiries. Operators in the Broadtop district producing egg, stove and nut sizes, are sold ahead for the next few weeks. The inquiry for substitutes also has extended to coke. Quotations for independent domestic sizes of hard coal took another jump last week, some of the smaller operators and shippers quoting from \$12.75 to \$13.00 for egg, stove and nut coals, concessions being made when a proportionate share of the smaller sizes or bituminous coal is taken.

Consumers of bituminous coal are being urged by producers to heed the warnings issued from Washington to put in coal in anticipation of autumn and winter requirements. This has resulted in additional inquiry and some actual orders, although the improvement is scarcely noticeable. A survey of storage piles at industrial plants in various sections of the East shows that stocks are fairly good, with some concerns adding to the supplies already on hand.

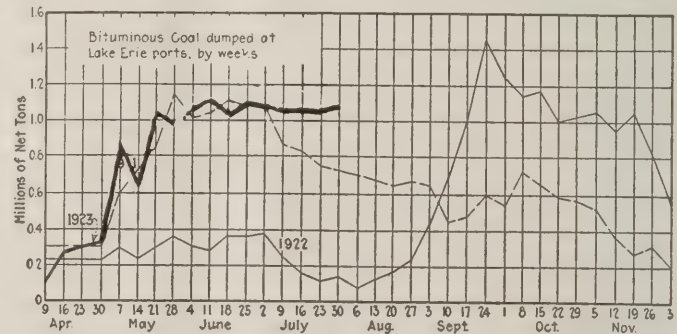
RESERVE STOCKS PROBABLY GROWING

Output of bituminous coal continues at an average of about 10,750,000 net tons weekly and while the tabulated returns of a canvass of reserve storage piles as of July 1 has not been completed, the Geological Survey says it seems evident that unless the rate of consumption increased greatly in June, production was sufficient to permit appreciable additions to the 40,000,000 net tons on hand as of June 1.

For three weeks the price of soft coal has remained almost stationary. Coal Age Index dropped one point on July 30 to 197, corresponding to an average price of \$2.37 f.o.b. mines. Declines occurred in Springfield

and southern Illinois, western Kentucky, Hocking, eastern Ohio and Pocahontas coals with increases in eastern Kentucky and Kanawha.

There are faint signs in the Middle West that the end of the summer slump is approaching. The better feeling followed a pick up in buying of domestic coals in the Northwest. Consumption in New England is much less than expected, and some large consumers are endeavoring to hold off contract shipments. There is some anxiety over the possibility of a suspension of mining in the anthracite fields, but the public does not act favor-



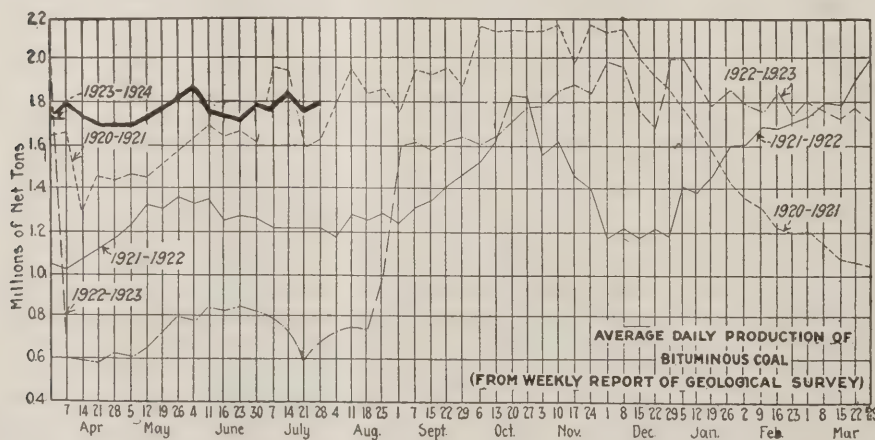
LAKE COAL DUMPED

(Net Tons)

	Week Ended July 30	Season to July 30
Cargo	1,067,202	12,885,151
Fuel	55,027	644,429
Total	1,122,249	13,529,580

ably on the suggestion that they use substitutes for the hard coals.

Export demand is quiet. There were few inquiries during the week according to New York houses those that were received coming from Italy and Holland. At Baltimore there was a drop in shipments to European countries, but an increase in movement to Canada.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
July 7.....	3,678,000	8,742,000
July 14.....	4,123,000	10,941,000
July 21.....	3,692,000	10,673,000
Daily average.....	615,000	1,779,000
Calendar year.....	199,343,000	303,628,000
Daily av. cal. year.....	1,162,000	1,775,000

ANTHRACITE

July 7.....	23,000	1,580,000
July 14.....	32,000	2,051,000
July 21.....	28,000	2,005,000
Calendar year.....	23,408,000	56,805,000

COKE

July 14 (b).....	100,000	376,000
July 21 (a).....	104,000	360,000
Calendar year.....	3,515,000	11,182,000

(a) Subject to revision. (b) Revised from last report

During the first three weeks in July twenty-three ships leaving Baltimore carried in cargo and bunkers 195,586 tons of coal, while for the corresponding period of June thirty-one ships leaving the same port carried 222,012 tons of coal in cargo and bunkers.

Dumpings of coals for all accounts at Hampton Roads during the week ended July 26 were 392,249 net tons, as compared with 357,979 net tons the previous week.

With orders increasing and many miners in the smaller operations taking "vacations" some independent producers of anthracite are refusing to book additional orders at this time. Complaints of curtailed production are heard in some of the smaller mines, due to scarcity of labor on account of the vacation period and the subsequent inability of the operators to fill outstanding orders.

Midwest Is Hopeful Now

Signs marking the approaching end of the summer slump in coal are appearing faintly here and there throughout the Midwest region. They come mostly from the Northwest,

which is beginning to buy a little more domestic. However, even this small upturn has had little effect upon the down-right summer slump. No other activity worth the name has developed either in the domestic or industrial trade. Southern Illinois screenings, even though about cleaned up, do not strengthen. Most of them move at \$1.50 with an occasional car at \$1.60@ \$1.65.

Railroads are now through stocking. A few small shipments at bargain prices will still sell to certain roads, but the storage trade that has kept a number of mines busy during the summer, is over. With domestic business still bumping bottom, there remains little to keep Illinois and Indiana mines running except contract business. Even the anthracite strike talk has not excited the Midwest region into ordering soft coal. Only a little hurrying of anthracite and smokeless lump and egg trade is noticeable.

St. Louis Remains Lifeless

St. Louis business continues stagnant. There is little interest even in anthracite. Plenty of coke is available and a little Arkansas comes in steadily. Dealers expect the first week in August to mark the turn. Steam trade in the city and surrounding country amounts to nothing.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	July 31, 1922	July 16, 1923	July 23, 1923	July 30, 1923†
Smokeless lump.....	Columbus.....	\$8.50	\$6.00	\$6.00	\$5.75@ \$6.00	
Smokeless mine run.....	Columbus.....	8.15	3.25	3.25	2.75@ 3.25	
Smokeless screenings.....	Columbus.....	8.00	2.90	2.90	2.65@ 3.00	
Smokeless lump.....	Chicago.....	8.10	6.10	6.10	6.00@ 6.25	
Smokeless mine run.....	Chicago.....	8.10	3.60	3.60	3.25@ 4.00	
Smokeless lump.....	Cincinnati.....	5.90	6.00	6.00	5.50@ 6.00	
Smokeless mine run.....	Cincinnati.....	5.50	3.35	3.35	3.00@ 3.75	
Smokeless screenings.....	Cincinnati.....	5.15	3.00	3.00	2.50@ 3.50	
*Smokeless mine run.....	Boston.....	8.15	5.35	5.60	5.35@ 5.60	
Clearfield mine run.....	Boston.....	6.00	2.35	2.35	2.00@ 2.75	
Cambria mine run.....	Boston.....	6.65	2.85	2.85	2.50@ 3.25	
Somerset mine run.....	Boston.....	6.00	2.60	2.60	2.25@ 3.00	
Pool 1 (Navy Standard).....	New York.....		3.50	3.35	3.25@ 3.50	
Pool 1 (Navy Standard).....	Philadelphia.....		3.60	3.50	3.20@ 3.70	
Pool 1 (Navy Standard).....	Baltimore.....					
Pool 9 (Super. Low Vol.).....	New York.....		2.55	2.65	2.50@ 3.00	
Pool 9 (Super. Low Vol.).....	Philadelphia.....	8.25	2.70	2.65	2.30@ 2.90	
Pool 9 (Super. Low Vol.).....	Baltimore.....	7.25	2.50	2.40	2.35@ 2.50	
Pool 10 (H. Gr. Low Vol.).....	New York.....		2.25	2.25	2.00@ 2.50	
Pool 10 (H. Gr. Low Vol.).....	Philadelphia.....	8.00	2.25	2.25	2.00@ 2.35	
Pool 10 (H. Gr. Low Vol.).....	Baltimore.....	7.25	2.20	2.20	2.20@ 2.30	
Pool 11 (Low Vol.).....	New York.....		7.75	1.85	1.95	1.75@ 2.25
Pool 11 (Low Vol.).....	Philadelphia.....	8.00	1.85	1.85	1.70@ 2.00	
Pool 11 (Low Vol.).....	Baltimore.....	7.75	2.05	1.95	2.00	
High-Volatile, Eastern						
Pool 54-64 (Gas and St.).....	New York.....	7.75	1.75	1.75	1.65@ 2.00	
Pool 54-64 (Gas and St.).....	Philadelphia.....	8.15	1.60	1.70	1.70@ 1.90	
Pool 54-64 (Gas and St.).....	Baltimore.....	7.90	1.75	1.70	1.70	
Pittsburgh ac'd gas.....	Pittsburgh.....		2.65	2.65	2.60@ 2.75	
Pittsburgh mine run (St.).....	Pittsburgh.....		1.95	1.95	1.90@ 2.00	
Pittsburgh slack (Gas).....	Pittsburgh.....		1.40	1.45	1.40@ 1.50	
Kanawha lump.....	Columbus.....	8.00	3.00	3.00	2.75@ 3.25	
Kanawha mine run.....	Columbus.....	7.75	1.85	1.85	1.75@ 2.00	
Kanawha screenings.....	Columbus.....	7.75	1.10	1.05	1.00@ 1.20	
W. Va. lump.....	Cincinnati.....	6.40	3.10	2.85	3.00@ 3.25	
W. Va. Gas mine run.....	Cincinnati.....	6.40	1.85	1.50	1.40@ 1.75	
W. Va. Steam mine run.....	Cincinnati.....	6.00	1.85	1.50	1.40@ 1.75	
W. Va. screenings.....	Cincinnati.....	5.90	1.05	1.05	.75@ 1.00	
Hocking lump.....	Columbus.....	8.15	2.75	2.75	2.50@ 3.00	
Hocking mine run.....	Columbus.....	7.75	1.85	1.85	1.75@ 2.00	
Hocking screenings.....	Columbus.....	7.75	1.25	1.25	1.10@ 1.25	
Pitts. No. 8 lump.....	Cleveland.....	8.50	2.50	2.55	2.05@ 3.00	
Pitts. No. 8 mine run.....	Cleveland.....	8.50	2.00	1.95	1.75@ 1.90	
Pitts. No. 8 screenings.....	Cleveland.....	8.50	1.30	1.25	1.20@ 1.35	
Midwest		Market Quoted	July 30, 1922	July 16, 1923	July 23, 1923	July 30, 1923†
Franklin, Ill. lump.....	Chicago.....		\$3.90	\$3.65	\$3.00@ \$4.35	
Franklin, Ill. mine run.....	Chicago.....		3.00	3.00	2.75@ 3.00	
Franklin, Ill. screenings.....	Chicago.....		1.65	1.65	1.50@ 1.85	
Central, Ill. lump.....	Chicago.....		2.60	2.60	2.50@ 2.75	
Central, Ill. mine run.....	Chicago.....		2.10	2.10	2.00@ 2.25	
Central, Ill. screenings.....	Chicago.....		1.55	1.45	1.35@ 1.40	
Ind. 4th Vein lump.....	Chicago.....		3.35	3.35	3.25@ 3.50	
Ind. 4th Vein mine run.....	Chicago.....		2.60	2.60	2.50@ 2.75	
Ind. 4th Vein screenings.....	Chicago.....		1.60	1.60	1.50@ 1.75	
Ind. 5th Vein lump.....	Chicago.....		2.85	2.85	2.75@ 3.00	
Ind. 5th Vein mine run.....	Chicago.....		2.10	2.10	2.00@ 2.25	
Ind. 5th Vein screenings.....	Chicago.....		1.45	1.45	1.40@ 1.50	
Mt. Olive lump.....	St. Louis.....		3.00	3.00	3.00	
Mt. Olive mine run.....	St. Louis.....		2.00	2.00	2.00	
Mt. Olive screenings.....	St. Louis.....		1.75	1.75	1.75	
Standard lump.....	St. Louis.....		2.35	2.55	2.40@ 2.75	
Standard mine run.....	St. Louis.....		1.85	1.85	1.85	
Standard screenings.....	St. Louis.....		1.20	.90	.85@ 1.00	
West Ky. lump.....	Louisville.....		7.25	2.30	2.15	2.15@ 2.35
West Ky. mine run.....	Louisville.....		7.25	1.70	1.70	1.35@ 1.85
West Ky. screenings.....	Louisville.....		7.25	1.20	1.05	.85@ 1.25
West Ky. lump.....	Chicago.....		7.60	2.40	2.10	2.00@ 2.25
West Ky. mine run.....	Chicago.....		7.60	1.15	.95	.90@ 1.00
South and Southwest						
Big Seam lump.....	Birmingham.....	4.50	3.25	3.25	3.15@ 3.40	
Big Seam mine run.....	Birmingham.....	4.50	1.95	1.95	1.75@ 2.15	
Big Seam (washed).....	Birmingham.....	4.50	2.35	2.35	2.25@ 2.50	
S. E. Ky. lump.....	Chicago.....	8.00	2.85	2.85	2.75@ 3.00	
S. E. Ky. mine run.....	Chicago.....	8.00	2.10	2.10	2.00@ 2.25	
S. E. Ky. lump.....	Louisville.....	7.75	2.85	2.70	2.85@ 3.00	
S. E. Ky. mine run.....	Louisville.....	7.75	2.00	1.75	1.75@ 2.00	
S. E. Ky. screenings.....	Louisville.....	7.60	1.05	1.00	.75@ 1.25	
S. E. Ky. lump.....	Cincinnati.....	7.75	3.10	3.00	3.00@ 3.25	
S. E. Ky. mine run.....	Cincinnati.....	6.00	1.85	1.50	1.40@ 1.75	
S. E. Ky. screenings.....	Cincinnati.....	5.90	1.00	.90	.75@ 1.00	
Kansas lump.....	Kansas City.....	5.00	4.00	4.00	3.50@ 4.50	
Kansas mine run.....	Kansas City.....	4.75	3.25	3.25	3.00@ 3.50	
Kansas screenings.....	Kansas City.....	4.25	2.60	2.60	2.50@ 2.75	

* Gross tons, f.o.b. vessel, Hampton Roads.

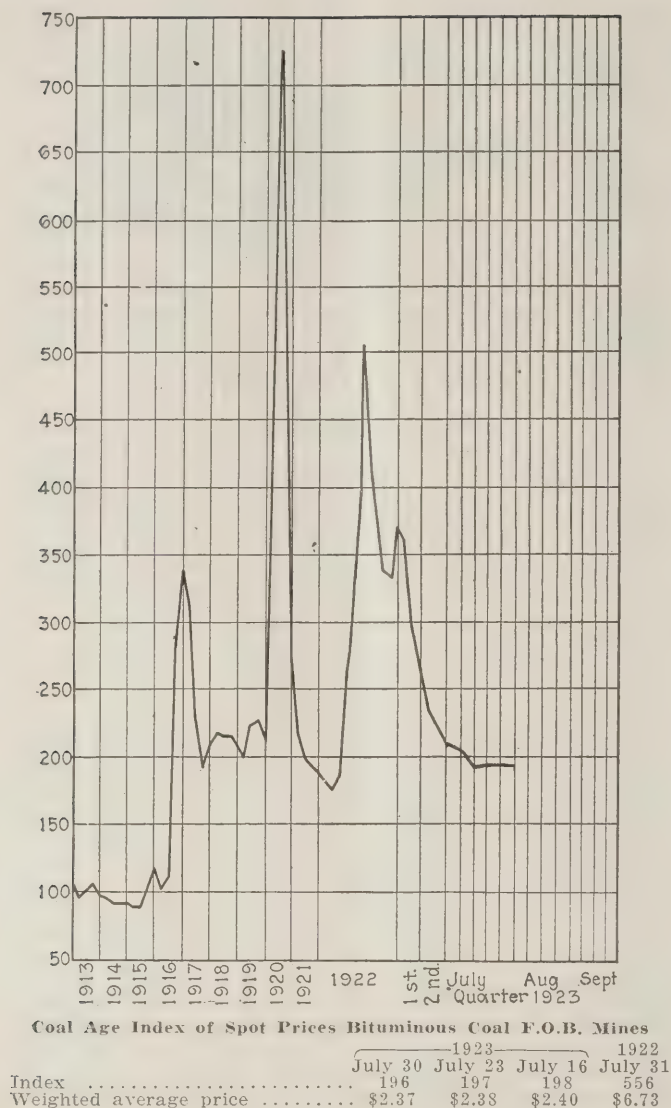
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	July 23, 1923 Independent	July 23, 1923 Company	July 30, 1923† Independent	July 30, 1923† Company
Broken.....	New York.....	\$2.34			\$7.60@ \$7.75	\$7.75@ \$8.35	\$7.75@ \$8.35	\$7.75@ \$8.35	\$7.75@ \$8.35
Broken.....	Philadelphia.....	2.39		\$7.00@ \$7.50	7.75@ 7.85	7.00@ 8.10	7.00@ 8.10	7.90@ 8.10	7.90@ 8.10
Egg.....	New York.....	2.34		7.60@ 7.75	7.60@ 7.85	8.00@ 8.35	8.00@ 8.35	8.00@ 8.35	8.00@ 8.35
Egg.....	Philadelphia.....	2.39		7.25@ 7.75	7.75	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago*.....	5.06		7.50	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34		7.90@ 8.20	7.90@ 8.10	8.50@ 12.00	8.00@ 8.35	8.50@ 12.00	8.00@ 8.35
Stove.....	Philadelphia.....	2.39		7.85@ 8.10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago*.....	5.06		7.75	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34		7.90@ 8.20	7.90@ 8.20	8.50@ 12.00	8.00@ 8.35	8.50@ 12.75	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39		7.85@ 8.10	9.05@ 8.15	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago*.....	5.06		7.75	8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York.....	2.34					8.30		8.30
Pea.....	New York.....	2.22		5.00@ 5.75	7.75@ 6.45	6.75@ 8.00	6.00@ 6.30	6.75@ 8.00	6.00@ 6.30
Pea.....	Philadelphia.....	2.14		5.50@ 6.00	6.10@ 6.25	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago*.....	4.79		6.00	6.25	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22		2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14		2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York.....	2.22		2.00@ 2.50	2.50	1.80@ 2.50	2.50	2.00@ 2.50	2.50
Rice.....	Philadelphia.....	2.14		2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....	2.22		1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia.....	2.14		1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York.....	2.22			2.00@ 2.50		1.60	1.40@ 1.60	1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Kentucky Steam Prices Weaken

Western Kentucky operators while making a hard fight, have been unable to hold prices on steam coal, due to the competition from other fields. Cheap stripper mine-run has been offered at prices as low as \$1.35 a ton. Prepared coals are selling at \$2@\$.75 according to size and quality, except some little nut offered as low as \$1.90 a ton. There has been a very fair demand for egg.

Movement is scattered. There is some domestic business moving South and also North and Northwest, including the Chicago as well as Michigan districts. Moving screenings hasn't been easy, but they have been going to numerous industrial points.

There is some strike talk in southeastern Kentucky where there are a few organized mines. There also is talk of reduction in wage scales in those sections, so that the operators can again enter the market in competition with organized fields, but under a lower production cost.

Northwest Takes Notice

A spotted awakening of domestic business is now to be noted throughout the Northwest. All summer railroads have set a good example by moving a good deal of their coal off the docks to line storage, thus clearing the way for future heavy dock business, and country dealers have fol-

lowed the same plan by taking all the anthracite they could put in. The result is that a slight pick-up in dealer business in anthracite, Pocahontas and high-grade soft coals in the regions around Milwaukee and Minneapolis finds the dealers ready. Around Duluth experts believe business in soft coal would be starting briskly were it not for recent price cuts, especially in Kentucky coals. These have left buyers dubious. They don't want to buy and get pinched by a further drop.

Prices at the Head-of-the-Lakes show another softening of about 25c. on screenings and a general loosening all along the line. Youghiogheny and Hocking screenings are still quoted at \$4, but recently 12,000 tons moved at \$3.85. Lump is \$6.50 and pile run \$5@\$.5.25. Other quotations are: Splint, lump, \$7.25; dock run, \$6.25; screenings, \$4.50. Pocahontas, \$10, \$7.50 and \$6.25. Smithing, \$8. Millers Creek Kentucky lump, \$9.50; screenings, \$5.75. Elkhorn, \$8.50, \$7.50 and \$5. Hard-coal prices are firm thus: Egg, \$12.50; stove, \$12.80; nut, \$12.85; pea, \$11; buckwheat, \$8.50.

West Also Sees Winter Coming

In the mountain regions of the West a slight market pick-up is noticeable. The Aug. 1 advance of 25c. in some Colorado coals and the fact that Colorado farmers and fruit raisers are getting returns from their crops has started some coal buying. Colorado prices are: Canon City and Walsenburg lump, \$5.75; nut, \$5.25; slack, \$2.50. Trinidad lump, \$4.75; nut, \$4.50; slack, \$3.50. Semi-anthracite egg, \$7.50; nut, \$7.25; chestnut, \$2.75.

In Utah there is a slight improvement of market, but conditions are still typical of summer. The Utah Copper Co. bought 200,000 tons with slack at \$1.25 and lump at \$3.75 and \$4. Other industrials also have been buying some. Domestic demand remains almost lifeless. Production, however, is fairly high. June showed an increase over May. The total for the first six months of the year was 2,114,128 tons as compared with 2,100,251 in 1922. Prices are unchanged.

Nothing is doing in the Kansas City region except an advertising campaign by dealers and producers. It is not stimulating domestic buying much. Of those mines that are working few are getting more than two days running time each week.

Mixed Market Situation in Ohio

Further weakness is manifest in the smokeless market around Cincinnati. While there is no move toward price cutting on the surface it is said that there has been some cuts in run-of-mine. Rejections of coal has tended to influence lower prices. West Virginia 2-in. lump was quoted \$2.50@\$.2.75 as compared with \$2.25@\$.2.50 last week and Southeastern Kentucky 2-in. lump \$2.40@\$.2.75, as compared with \$2.25@\$.2.50. Retail prices for August have been announced as follows: Pocahontas lump, \$10@\$.11, run of mine, \$7.50@\$.8, bituminous lump, \$7.50@\$.8.25 and slack, \$4.50@\$.4.75. A slight improvement for domestic sizes at Columbus and central Ohio developed more activity. Steam coals continue slow, however. There was a better demand for Pocahontas and smokeless grades as well as for Ohio-mined domestic coals. A large majority of steam coal users are waiting for bargains on distress coals, but this is not so much in evidence because of mines closing. Utility buying is more brisk while the railroads are taking their usual tonnage.

Reserve stocks are estimated at from forty-five to sixty days in most industries. The Southern Ohio Coal Exchange reports that for the week ended July 4 there were 133,532 tons of coal mined by the 442 mines reporting, with a full time capacity of 721,746 tons. No improvement is noticed in the demand for steam coals at Cleveland, but there is some new activity in the domestic trade, due probably to the fear of labor trouble in the anthracite fields. Inquiries are a trifle more brisk, causing operators and jobbers to believe there is an improved tone in the market.

The market for slack at Pittsburgh has stiffened slightly, due to more mines closing, mines that had to sell most of their product and were obtaining the poorest prices. The steel mills are buying only from hand to mouth. A moderate volume of gas mine-run is moving, but the tonnage is

generally smaller than that of screened. Business is quiet at Buffalo. Youghiogheny gas lump is being quoted at \$2.75@ \$3 f.o.b. mine. Central Pennsylvania operators at Altoona believe the bottom has been reached in prices and that the demand is on the increase. During the week ended July 22 loadings were 17,350 cars, as compared with 18,514 cars the previous week.

Decline in the preparation of egg and lump has resulted in a slight stiffening for slack in northern West Virginia. There was more inquiry from large consumers but the additional orders received so far have failed to change conditions.

Dullness Continues in New England

The market in New England shows little improvement. Consumption is much less than was expected, and more than a few large consumers are trying to hold off shipments on contract. There also are rumors of coal rejected because of poor preparation or because of some defect not looked for at the time of purchase, and this is recognized by the trade as an unflinching indication of a dull market.

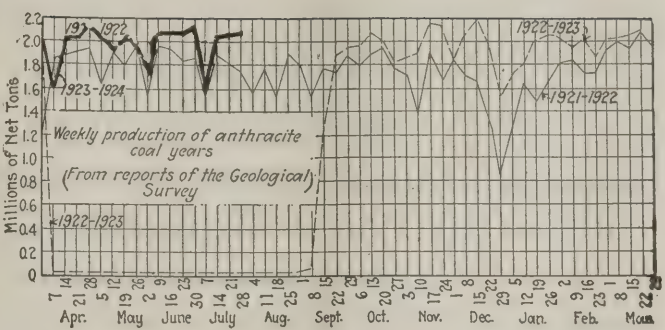
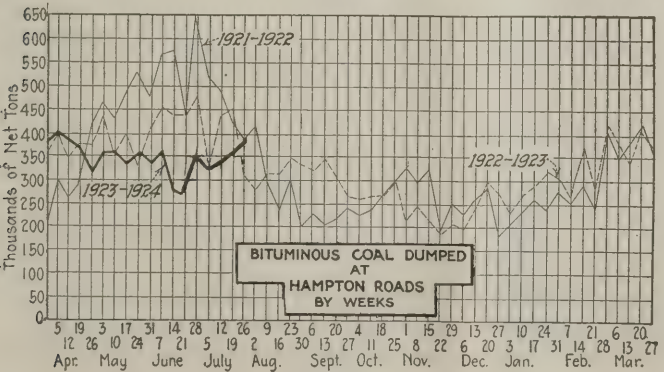
Pocohontas and New River share the dullness. While producers are pursuing an extremely close-hauled policy as to current mining there are enough agencies strenuously soliciting business to make prices rather softer than a fortnight ago. On No. 1 Navy standard grades the range is \$5.35@ \$5.60, with an occasional sale rumored at \$5.25, in each case per gross ton f.o.b. vessel. At this end, for distribution, prices on cars vary from \$6.75 to \$7.25, depending upon the factor and his view of the market. Inquiry is very light, however, and buying power has practically disappeared.

From central Pennsylvania the volume all-rail is much diminished. Except on firm contracts receipts here show a marked falling-off as compared with a month ago and while the territory is being actively canvassed at minimum prices there is little sale for current output. Shipments via the New York and Philadelphia piers also have shrunk materially and there are few today who dare predict any increase in demand during August.

A few operators in central Pennsylvania have orders enough to justify operation on practically full time for August and September. But the bulk of these orders are contracts with staple industries that have not been obliged to relax. The textile mills in New England are suffering seriously from high wage cost and competition from English manufacturers.

Demand Weak in Atlantic Seaboard Markets

Demand for soft coal along the Atlantic seaboard remains dull although some producers believe they discern a slight improvement in inquiries and actual business. Consumers are being advised to purchase coal in anticipation of autumn and winter requirements. Shippers at New York were interested in the bids opened by the War Department at Brooklyn last week for furnishing coal to army posts and arsenals in New England, the prices on which ranged from \$1.97@ \$3.75 f.o.b. mine, according to grade and quality of coal. Dumpings at the New York terminals average around 500 cars daily. Producers and shippers of bituminous domestic coals report a fair number of orders received. At Philadelphia consumers are debating long before adding to their reserve stocks, although being urged to fill their



bins. One reason given for the failure of various industries to accumulate stocks is the uncertain business conditions, particularly in the cotton and woolen goods lines. There is keen competition on some of the better grades at Baltimore. Some of the larger consumers are moving to get supplies against autumn needs, but this movement is not yet sufficient to bolster prices. The market at Birmingham is weak and sluggish with the domestic trade easy on new business. Contract coal is moving to the railroads in a satisfactory manner. Men continue to leave the district, while the mines and industrial plants are recruiting labor from the farms and lumber camps to keep their organization intact.

Last week there were received at Duluth sixty-one cargoes of coal, of which ten were anthracite. There is a fair tonnage moving to the lakes from the Ohio mines, but the movement has slowed down somewhat due to congestion at the lower ports. Loadings of anthracite for the week at Buffalo were 91,900 net tons.

Domestic Anthracite Market Stiffens

Discontinuance of the wage conference at Atlantic City resulted in a stiffening of the market for domestic coals. Shippers of independent coals were rushed with inquiries, but as many operators were already booked with sufficient orders to carry them well into August, not many new orders were accepted. Quotations became stronger. Stove coal is the shortest of the larger sizes and when shipped straight is being quoted at about 25c. more than either egg or chestnut. Some shippers are pushing pea coal in conjunction with the larger sizes, while some retail dealers are taking either bituminous or the buckwheat coals, when given egg, stove or chestnut coals. Baltimore retail dealers are rushed with orders, while few of them have any supplies of importance in their yards. Many are out of stove coal entirely. Receipts of hard coal at Baltimore for the three months ending July 1 totaled 4,098 cars, or approximately 184,000 tons. Retail dealers at Toronto say they have never had such a heavy demand for anthracite during the summer as they are now having.

"Production of anthracite in the week ended July 21 decreased 2 per cent as compared with the week preceding," says the Geological Survey. "On the basis of 38,335 cars loaded, reported by the nine principal anthracite carriers, the total output, including mine fuel, local sales and the product of washeries and dredges, is estimated at 2,005,000 net tons. Early returns on car loadings during the week July 23-28 indicate a slightly higher rate of production and a probable total output of 2,075,000 net tons."

THE RHODES FUEL CORPORATION, of New York City, was awarded a contract by the U. S. Shipping Board at New York for furnishing and delivering alongside vessels New York harbor by Aug. 7 1,600 gross tons Pool 9 coal at a price of \$5.54, or on a basis of about \$2.27 per net ton f.o.b. mine. Other prices submitted ranged from \$5.54 to \$6.25 per gross ton alongside. The bids were opened July 28.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended July 14, 1923.....	1,019,667	193,831		
Previous week.....	854,748	160,218		
Same week in 1922.....	850,667	77,097		
	All Cars	Coal Cars		
July 14, 1923.....	84,210	4,865	5,574	2,700
Same date in 1922.....	233,029	151,727		
July 7, 1923.....	64,067	4,620	6,888	3,867

Foreign Market And Export News

Further Decline in British Coal Production; Export Demand Decreases

Production of coal in Great Britain's mines continues to decline gradually, the output for the week ended July 14 amounting to 5,042,000 tons, says a cable to *Coal Age*. This is 264,000 tons below that of the previous week. A cable dispatch from American Commercial Attaché Tower at London to Washington as of July 20 stated that production was still decreasing slightly and that export demand was light, especially to Germany and France. Congestion due to the dock strikes continued, while price concessions were made when vessels were available.

The Welsh coal trade is quiet, due largely to the strike of dock workers. Operators, however, are confident that business throughout the rest of the year will be satisfactory, and predict that conditions will be considerably firmer from August. The few days' holiday at the beginning of August will mean a shortage of coal during the remainder of the month. Foreign buyers realize that they cannot take risks by postponing orders, and a fair amount of business is being done in spite of the present difficulties. Several contracts have been arranged and a number of inquiries are still open.

During the week ended July 6 exports of coal from the Bristol Channel showed a decline of 105,000 tons and were the lowest weekly shipments this year, excluding holiday weeks. Increased exports were made to Germany, but a severe decline to Italy.

Hampton Roads Market Stronger

The market at Hampton Roads last week was somewhat stronger, with heavier shipments moving and others in immediate prospect. Foreign movement was fairly heavy, high volatile coal being shipped for export in considerable quantities from the Newport News piers.

Coastwise trade showed more life, while bunkers continued heavy. The trade regarded the seasonal slump, which began about thirty days ago, as having been fairly well overcome. The outlook was brighter.

Export Clearances, Week Ended July 28, 1923.

FROM BALTIMORE

For Belgium:	
Belg. SS. Gasconier, (coke)	1,935
For California:	
Am. SS. Eastern Knight	889
For Canada:	
Br. SS. Lord Strathcona	10,593
Br. SS. Knockfierna	7,986
Br. SS. Kamouraska	7,784
Br. SS. Wabana	7,478
For Holland:	
Ital. SS. Salina	8,411
For Italy:	
Ital. SS. M. T. Cicerone	10,636
Br. SS. Cornish City (coke)	4,979
Ital. SS. Gregorio	5,869
For Porto Rico:	
Am. SS. Delisle	1,009

FROM HAMPTON ROADS

For Brazil:	
Dan. SS. Dania, for Buenos Aires ..	3,909
Br. SS. Sant Dunstan, for Rio de Janeiro	6,810
For Canada:	
Amer. Schr. Mary F. Barrett, for St. Johns	2,073
Br. SS. Susan Cameron, for Charlotte-town	1,031
Fr. SS. Capitaine Le Masne, for Montreal	6,251
Br. SS. Manchester Spinner, for Sydney, N. S.	7,667
For Cuba:	
Br. SS. Putney, for Havana	2,203
Br. SS. Ilford, for Havana	6,477
For France:	
Fr. SS. P. L. M. 10, for Rouen	4,274
For Holland:	
Ital. SS. Mazzini, for Rotterdam	7,557
For Italy:	
Ital. SS. Gerty, for Trieste	2,078
Ital. SS. Lanuvium, for Savona	5,974

FROM PHILADELPHIA

For France and Belgium:	
Belg. SS. Gasconier, for Dunkirk and Antwerp	

United States June Coal and Coke Imports

(In Gross Tons)		1922	1923
Anthracite		64	5,716
Bituminous { free		135,343	10,252
{ dutiable			35,068
Totals		135,343	45,320
Imported from:			
United Kingdom		3,889	10,207
Canada		120,111	35,113
Japan		300	
Australia		8,187	
Other countries		2,856	
Coke		4,238	8,779

United States June Exports By Customs Districts

	(In Gross Tons)		
	Anthracite	Bituminous	Coke
Maine and New Hampshire	10	4	196
Vermont	1,246	2,885	1,430
St. Lawrence	127,046	288,609	1,067
Rochester	76,765	72,882	22
Buffalo	193,558	262,973	28,199
New York	9,360	2,657	1,811
Philadelphia	5,334	58,841	1,640
Maryland		340,351	6,050
Virginia		192,438	
South Carolina		30,474	
Florida		500	252
Mobile		6	293
New Orleans		566	79
San Antonio	43	193	74
El Paso	65	3,301	1,057
Arizona		3,482	7,405
Los Angeles	2	3	7
San Francisco	24	1,000	
Washington		114	
Alaska		2	
Dakota	902	2,452	335
Duluth and Superior	257	754	
Michigan	18	126,090	13,677
Ohio	3,964	1,028,192	237
Iowa			10
Totals	418,594	2,418,769	63,841

United States June Coal and Coke Exports

	(In Gross Tons)	
	1922	1923
Anthracite	40,284	418,594
Bituminous	540,550	2,418,769
Exported to—		
France		135,849
Italy	14,359	110,175
Netherlands		14,766
Other Europe		130,293
Canada	427,849	1,822,996
Panama	19,101	
Mexico	5,937	11,560
Br. West Indies	2,349	17,815
Cuba	17,517	39,929
Other West Indies	6,593	21,987
Argentina	12,893	11,632
Brazil	11,050	47,326
Chile	4,697	7,468
Egypt	10,995	
French Africa		27,778
Other countries	7,210	9,195
Coke	29,090	63,841

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:		July 19	July 26
Cars on hand		1,370	1,246
Tons on hand		74,662	72,405
Tons dumped for week		133,344	124,907
Tonnage waiting		19,000	9,850
Virginian Ry. piers, Sewalls Pt.:			
Cars on hand		1,846	1,843
Tons on hand		106,400	108,870
Tons dumped for week		101,443	109,349
Tonnage waiting		3,568	30,653
C. & O. piers, Newport News:			
Cars on hand		1,160	1,334
Tons on hand		60,485	59,100
Tons dumped for week		84,837	115,967
Tonnage waiting		23,340	26,640

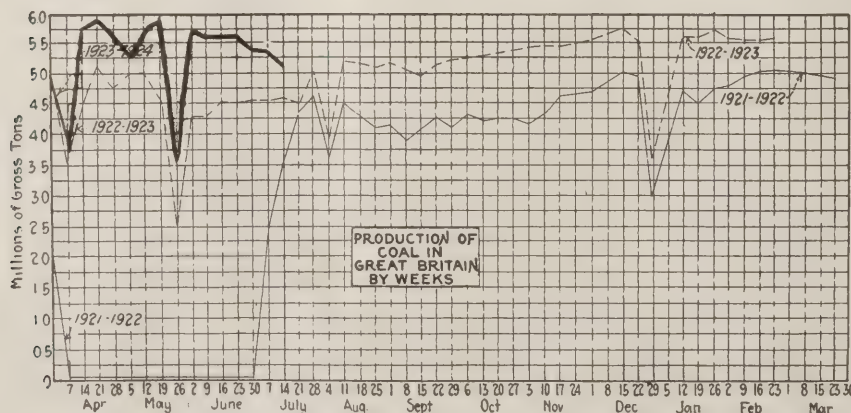
Pier and Bunker Prices, Gross Tons

PIERS		July 21	July 28†
Pool 9, New York	\$5.35@ \$5.85	\$5.25@ \$5.75	
Pool 10, New York	5.00@ 5.40	4.90@ 5.25	
Pool 11, New York	4.50@ 5.00	4.75@ 5.00	
Pool 9, Philadelphia	5.25@ 5.75	5.20@ 5.70	
Pool 10, Philadelphia	4.45@ 5.25	4.35@ 5.20	
Pool 11, Philadelphia	3.70@ 4.35	3.70@ 4.35	
Pool 1, Hamp. Roads	5.50	5.40@ 5.50	
Pools 5-6-7, Hamp. Rds. ..	4.50	4.35@ 4.50	
Pool 2, Hamp. Roads	5.25	5.10@ 5.20	
BUNKERS			
Pool 9, New York	5.65@ 6.15	5.55@ 6.05	
Pool 10, New York	5.30@ 5.70	5.20@ 5.55	
Pool 11, New York	4.80@ 5.30	5.05@ 5.30	
Pool 9, Philadelphia	5.70@ 6.00	5.65@ 5.95	
Pool 10, Philadelphia	4.80@ 5.60	4.75@ 5.55	
Pool 11, Philadelphia	3.90@ 4.65	3.90@ 4.65	
Pool 1, Hamp. Roads	5.50	5.40@ 5.50	
Pool 2, Hamp. Roads	5.25	5.10@ 5.20	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age		July 21	July 28†
Admiralty, large		31s.	30s. @ 31s.
Steam smalls		21s. 6d.	20s. @ 22s.
Newcastle:			
Best steams	26s. @ 26s. 6d.		25s. 9d. @ 26s. 6d.
Best gas	28s.		28s.
Best bunkers	28s.		26s. @ 27s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

R. A. O'Rear and Ed O'Rear have leased their Pratt Warrior coal mine on the Warrior River for five years to the Gulf States Portland Cement Co., with headquarters at Demopolis, which agrees to mine and pay royalty on a minimum of 25,000 tons of coal annually. The O'Rears retain a right to keep a commissary and collect rent for houses at the camp.

ALASKA

E. L. Bedell, president of the Alaska Bituminous Coal Co., announces that 14,000 acres of coal-bearing land situated on Moose Creek are to be exploited by a group of business men of Anchorage; that outside shipments of coal are being deferred until next April because of the necessity of supplying substantial quantities to the Alaskan R.R. in the next three months; that a spur from the Matanuska branch of the railroad to the coal properties will be completed by September, and that, as the coal is of high quality, averaging better than 12,000 B.t.u., with about 12 per cent ash, it is confidently expected that a large market can be built up with Portland and San Francisco on the Pacific coast. The company plans to purchase two ships of not less than 500 tons, one of which will be used for supplying coal to Alaskan coast centers and the other to carry coal to Oregon and California. Twenty thousand tons is said to be blocked out and no difficulty is likely to be experienced in reaching a daily production of 1,000 tons.

COLORADO

R. H. Keays, chief engineer of the Moffat tunnel, which will be under construction within 30 days, has just returned to Denver following an inspection trip. Major L. D. Blauvelt, chief engineer of the State Highway Department, who made the preliminary work on surveying with other engineers, was congratulated on his choice of a site for the tunnel. Mr. Keays, a New York city engineer, was recently appointed by the tunnel commission of five members. The Moffat tunnel will open up a coal field in northwestern Colorado heretofore handicapped by lack of direct transportation facilities.

ILLINOIS

Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co., at West Franklin, is about to install the largest coal-mining hoist in the world. The new hoist will be more than twice as large as any coal-mine hoist in America at the present time, having two motors, one mounted at each end of the drum shaft, each with a capacity of 2,200 hp. at 40 deg. C. rise. Coal will be hoisted in skips, each having a normal capacity of 22,000 lb. and a maximum capacity of 26,000 lb. The depth of the shaft is 607 ft. and the coal will be dumped from the mine cars at the bottom of the shaft by means of rotary dumps. Under normal conditions the output per hour will be 1,500 tons, but it will be possible to increase it to 2,000 tons per hour.

The Brenner-Moxley-Mervis Co., capitalized at \$600,000, has acquired an 8-acre tract in Chicago, where it will manufacture copper rods and drawn copper wire for power transmission. The officers of the new company are: Nathan T. Brenner, president; William J. Moxley and George T. Moxley, vice-president; N. T. Brenner, Jr., treasurer, and Meyer B. Mervis, secretary.

R. E. Fagerburg, who was graduated from the department of mining engineering, University of Illinois, in June, is coal mine inspector for the Chicago, Wilmington & Franklin Coal Co., of Chicago. R. R. Lacy, who also was graduated this spring, is assistant superintendent of the Brewerton Coal Co. at Springfield. O. G. Stewart, who obtained his master's degree in coal mining at Illinois this spring, is with the Nokomis Coal Co. as Engineer at the No. 1 mine at Nokomis.

The following itinerary for the Illinois Miners' Examining Board for the month of August is announced: Collinsville, Aug.

6; Eldorado, Aug. 7; Herrin, Aug. 8; West Frankfort, Aug. 9; Du Quoin, Aug. 10; Centralia, Aug. 11; Litchfield, Aug. 13; Springfield, Aug. 14; Taylorville, Aug. 15; Danville, Aug. 16; La Salle, Aug. 17 and Peoria, Aug. 18.

The Valler Coal Co., operating one of the largest and most up to date collieries in Southern Illinois, has closed down for repairs.

INDIANA

Fourteen persons were injured, some of them probably fatally, when a mine cage upon which they were being lowered into the shaft of the Vermilion mine, fell to the bottom, a distance of 125 ft. All of the men sustained broken legs and arms and some are injured internally. J. E. Padgett, engineer, collapsed after the accident and is in a serious condition.

The Modern Fourth Vein Coal Co., of Jasonville, has been incorporated for \$350,000 by John Williams, T. G. Williams, C. W. Wenner, W. C. Clifford, F. W. Adams, O. H. Finnical and F. B. Grove.

KANSAS

Two hundred miners of the Home Riverside Coal Mining Co. at Leavenworth, went on a strike recently, refusing to load coal from a mine where another miner was ordered to quit work by the district officials because of the conditions existing there.

One-day coal service from the southeastern Kansas coal fields to Kansas City was started July 25 by the Frisco railroad, with its "Kansas City Carbon Special," a fast freight operating between the coal field and Kansas City every night except Sunday. The railroad company promises to move every car of coal routed from the southeastern Kansas field to Kansas City over its lines the night it is billed. The Missouri Pacific has maintained similar service some time. In the case of both roads the specials mean a time saving of from two to as many as eight days in deliveries to the Kansas City market.

KENTUCKY

The Bradbury-Sculin Coal Co. has put down a slope near the ill-fated Lester strip. It has a 200-acre lease and hopes to get out 200 tons daily. The company recently bought the new Prosperity mine at Carterville and also the Doran mine near Hurst. These are all 100 to 300 tons per day mines.

MASSACHUSETTS

Bids opened July 25 by the Quartermaster's Department of the U. S. Army at Brooklyn for furnishing and delivering hard and soft coal to the forts, camps, arsenals and other army buildings in the New England States and part of New York State showed a wide range. Bidders were required to submit an analysis of the coal on which they were bidding, and these with a few exceptions were confined to pool 10 quality. The prices submitted for furnishing 730 net tons of run-of-mine coal to Camp Devens, Mass., ranged from \$1.97 to \$3.75 f.o.b. mines, while bids for furnishing and delivering 1,000 net tons of run-of-mine coal to the Springfield (Mass.) Army ranged from \$1.98 to \$3.25. Prices on 450 net tons of 2-in. lump coal for Camp Devens ranged from \$2.38 to \$4.25. The same range of prices prevailed in the bids received for furnishing run-of-mine coal to the other points. For furnishing and delivering egg, stove and chestnut coal the prices submitted ranged from \$11.16 to \$12.75 per net ton f.o.b. mine, or on a basis of \$12.50 to \$14.28 per gross ton f.o.b. mine.

Agents of Hermann C. Lythgoe, chief of the division of food and drugs of the State Department of Public Health, acting under the pure coal law passed by the General Court early in the year, will dump into the harbor 700 tons of "fireproof" coal which was to have been sold to the householders of Roxbury. A month or two ago the supply of a Roxbury dealer was seized by the state when it was found to be unburnable.

The dealer asked for permission to sort the lot over and reclaim such as was found to be burnable. This request was granted and the 700 tons to be dumped represents the residue. Since the law went into effect the department has condemned also two cars of coal in Holyoke, one in Quincy and one in Haverhill. Seven cars of coal in the yards of a Boston dealer have been examined and pronounced to be not of first class quality, but of a grade which would not warrant the state to condemn it. The dealer has been directed to mix four cars of first-class coal with the seven cars before he sells it.

MINNESOTA

The City of Two Harbors is about the point on Lake Superior in which the operation of a municipal dock will be continued during the coming winter. All other points have dropped out, finding the venture unprofitable and of doubtful benefit to consumers. The City Council of that place has awarded a contract for 5,000 tons of steam coal to the Valley Camp Coal Co. at \$6.54 per ton. It is proposed to sell to consumers at \$10 per ton.

MISSOURI

In the Fulton district the 1922 scale of 10c. a bushel for digging coal in ordinary rooms and 11c. a bushel for "tight rooms" or "turn corners" will prevail for the coming year, beginning Aug. 1. Tom Kite, president of the union, also announced that if the factories and state institutions of the city award contracts to Illinois companies for coal deliveries during the next month and a strike in the Illinois coal field results in shutting off the supply here, the miners will demand a bonus for filling the contracts with Fulton coal. In the last strike the Fulton miners made good money by filling orders in neighboring towns when the mines in the other parts of the country shut down. The Fulton miners declare that there is a prospect of Illinois companies getting contracts around Fulton because they can furnish it cheaper than Fulton companies. A new railroad bridge near that city will soon enable the Chicago & Alton to haul direct to Fulton, whereas heretofore cars had to be reloaded at Mexico, and this expense added to the Illinois price made coal too costly. The Fulton miners have a local union but are not affiliated with the United Mine Workers of America and make their agreements independent of the national body.

NEW YORK

The Virginia Iron, Coal & Coke Co. for the quarter ended June 30, reports net income of \$114,984, after interest and taxes. After preferred dividends, this equals 52c. a share on the \$10,000,000 common stock, which compares with \$243,559, or \$1.81 a share, in the first quarter, and \$95,959, or 33c. a share in the corresponding quarter of last year. The gross operating revenue for the quarter ended June 30 was \$2,241,133, as against \$210,782 for the quarter ended June 30, 1922. The net earnings for the six months ended June 30 were \$358,543, against \$14,912 in the corresponding six months a year ago.

OHIO

The Cincinnati Retail Coal Dealers' Association held its annual outing recently at Tower Hill, on the Little Miami River. David Minten and Tom Bolder were in charge of the affair.

PENNSYLVANIA

An explosion wrecked the bridge of the Baltimore & Ohio R.R., a half mile from Holsopple, Somerset County, Tuesday night, July 17, leaving the ends hanging from either side of the river bank. The bridge is used largely by the Hillman Coal Co., for transporting coal cars from Holsopple to Jerome, a distance of five miles. The explosion occurred at the center of the 200-ft. bridge. The only explanation given was that labor trouble at the Hillman Coal Co. had near Jerome might be responsible. Nine men were arrested at Boswell, charged with destroying the bridge, and eight were given a hearing before Justice of the Peace C. S. Ickes on July 24, held for court trial and placed under \$2,000 bail each. The eight charged with dynamiting the bridge are: Arthur Ramsell, secretary of the Jerome local, United Mine Workers; William Gregory, Michael Reskoffsky, Michael Kelsback, John Labotka, Munzio Pacifico, Clement Accitello and John Goodiska. John Braenzanski, a barber of Jerome, was held as a material witness.

Pacifico, it is alleged, offered damaging evidence against the other seven men when accorded a separate hearing on July 23. Replacement of the bridge will cost \$100,000.

Frank Gibbons, aged 31, who was caught under a fall of rock at the Raub Coal Co.'s mine in Luzerne July 23 and entombed for almost nine hours before being rescued, died from his injuries that evening in the Nesbitt West Side Hospital.

A coal test house situated in No. 5 colliery yard of the Hudson Coal Co. at East End, Wilkes-Barre, was destroyed by fire on July 21. Several cars of coal standing on nearby tracks were destroyed.

Ground was broken July 24 at Scranton for the monument to John Mitchell to be erected by the members of the United Mine Workers. Neil J. Ferry, of McAdoo, an international organizer of the miners, turned the first shovelful of dirt. The monument will be on the east side of Court House Square fronting Adams Avenue and will cost \$65,000.

Robert Johnson, of Pittston, who has been State mine inspector of the eighth inspection district during the last seven years, has tendered his resignation to the State Department of Mines. Under the last appointment Johnson had one more year to serve.

Evan B. Williams, superintendent of the Hudson Coal Co. at Gravity Slope, Archbald, has been transferred to the Pine Ridge colliery, at Miners Mills with charge over Laffin colliery also. Nathaniel Dixon, superintendent at the Clinton colliery in Vandling, will succeed him.

The annual first-aid competitions conducted by the Susquehanna Collieries Co. in the five divisional headquarters will be held as follows: At William Penn, near Shenandoah, Aug. 31, at 6:30 p.m.; at Lytle, near Minersville, Sept. 6, at 7 p.m.; at Lykens, Sept. 7, at 7:30 p.m.; at Nanticoke, Sept. 11, at 7:30 p.m.; at Shamokin, Maysville Park, Sept. 18, at 7 p.m. These will be open-air events with the exception of the meet at Nanticoke, where the first-aid tests will be conducted in the state armory.

The York Farm Washery Co., near Pittsville, so reduced the great pile of culm from which it has been reclaiming coal of domestic and steam sizes, that it will be cleaned up in about six months. The culm bank was started more than a quarter of a century ago when the Lehigh Coal Co. opened the big colliery at York Farm. The company abandoned mining there, because of the gaseous condition of the operation and the great expense of removing the coal.

Eddy Creek breaker of the Hudson Coal Co., at Olyphant, one of the oldest breakers of that company, has ceased to prepare coal for the market and from now on all coal handled from the different openings at this colliery will be shipped to the new Marvine and Olyphant No. 2 breakers. Nearly 100 men and boys will be thrown out of employment, it is estimated. It is reported that these two breakers will handle only the coal from the Eddy Creek colliery openings until a big modern breaker is constructed which will take care of all coal mined by the Hudson company in Olyphant, Dickson, Blakely and Throop.

The Lamoka Coal Co., headed by Walter J. Bennett, of Towanda, and capitalized at \$100,000, has taken over the coal lands recently owned by William Matchett, J. J. Morley, and E. J. Howe, and known as the Cash Coal Lands, in Bradford County. It is understood arrangements have been made for the installation of equipment that will provide for the removal of coal on a much larger scale than has ever before been attempted in this locality.

Six men were badly burned by an explosion of gas in the Avondale colliery of the Glen Alden Co., July 20. The victims were rescued after a battle with the flames that followed the explosion. Alex. Minnick, one of the men injured, died later at the Nanticoke hospital. Two others may not recover. Mine officials state that the explosion was caused by a ventilating door being left open. This allowed a body of gas to sweep into the gangway where the men were working and it was ignited by one of the men lighting a match.

Two electric pumps are to be installed by the Hudson Coal Co. at the No. 3 pump station, Carbondale, which will lift 10,000 gallons of water a minute. Workmen are now engaged in removing the old pumps, which were operated by steam, and it is asserted that hereafter the work will be done during one eight-hour shift instead of two twelve-hour shifts, as at present.

The Pennsylvania Topographic and Geological Survey has completed close field

and office studies of mines, mining conditions and coal waste in every bituminous coal-producing district in the state, begun last December for the U. S. Coal Commission. An estimate of coal reserves in each county which produces bituminous coal also has been completed and is included in the report to the federal commission. It is said the report will be made a part of the report which the Giant Power Commission's survey will make. This commission will soon be named by Governor Pinchot, who has plans for the utilization of the state's power from both coal and water. His plan contemplates the use of fuel near its source for the generation of electric energy and includes anthracite as well as bituminous coal.

Umpire Charles P. Neill rendered six decisions on July 22, five of which were decided in favor of the miners. The case that went against the men was that of certain contract miners at No. 4 shaft colliery against the Lehigh Coal & Navigation Co. in the Panther Creek section. When the 1922 suspension was directed the men left their tools in a storage place in the mines. During the suspension there was a fire in that section of the mines and the tools were either destroyed or taken. Umpire Neill denied the request for an order that the men be paid for their lost tools. Another case was that of contract miners at Audenried colliery No. 4 of Lehigh & Wilkes-Barre Coal Co. In this the terms of a 1917 agreement were in dispute, owing to a penalty of suspension imposed on the miners for refuse in coal he had mined. The decision directs that he be paid for the period of suspension. The decision, however, does not decide contention of either side as to the terms of the 1917 agreement. Furnishing of coal to a family at Audenried by the Lehigh and Wilkes-Barre Coal Company is directed at the usual rates allowed employees. The other three cases involve rates paid the men and in each the workman is directed paid at the rate he sought. The cases are against the Lehigh Coal & Navigation Co.

The Hudson Coal Co. recently entertained the employees of three of its mines at luncheon and an entertainment at which the addresses were illustrated by lantern slides of conditions existing in the mines. On the evening of July 24 upward of 1,000 employees of the Olyphant and Eddy Creek collieries at Olyphant were given a box luncheon by the company at which Sterling E. Van Horn, superintendent, presided. Two days later over 500 miners of the Coalbrook mine were entertained similarly at Carbondale at which William Davison, colliery superintendent, made an address on "Practical Mining Questions." Other speakers were Kenneth Lambert, colliery engineer, and Charles W. Wagner, superintendent of explosives. The employees of the Pine Ridge, Delaware and Laurel collieries at Scranton were entertained on the colliery grounds on July 23. Superintendent J. B. T. Jones, who was the principal speaker, explained new mining methods calculated to make the jobs held by the miners safer and better, declaring the company's aim is greater safety, greater production and a better grade of coal. It is understood that it is the purpose of the company to explain to the miners, by use of slides, both new and better means of drilling for coal, and methods by which black powder might be as effectively used as more expensive dynamite.

SOUTH DAKOTA

The Independent Coal Co., of Huron, has been incorporated for \$300,000 by W. A. Johns, Fred Stoll and William Wilkinson.

WEST VIRGINIA

The Black Hawk Colliery Co., of Detroit, is building a new tippie equipped with Marcus screens at its property at Big Creek.

The Coe Pocahontas Coal Co., of McComas, has contracted with the Roberts & Schaefer Co. for a steel tippie complete with loading booms, to be installed at its mine at Monclo.

E. E. White, president of the E. E. White Coal Co., and of the Winding Gulf Operators Association, plans to sail for Europe during the early part of August. Mr. White will remain abroad until about Oct. 1.

The Dell Coal Co. is the name of a new concern just launched by Charleston people, having a capital stock of \$50,000 and with headquarters at Charleston. Among those having an active part in forming this concern were E. D. Haywood, F. L. Thomas, H. H. Corrie, H. W. Ball, all of Charleston, and J. M. Hopkins, of Danville.

First-aid and mine-rescue contests will be held at Huntington, Aug. 11, according to

an announcement by the Department of Mines of West Virginia. It is expected that teams from all parts of the state will participate, and from the winners representatives will be selected for the national mine-rescue and first-aid contest.

Men prominent in business circles in southern West Virginia have organized the Lopinsky corporation of Welch, with a capital stock of \$300,000, expecting to operate on a large scale in the Pocahontas region. Behind the new company are Eugene Lopinsky, Mary Lopinsky, Morris H. Lopinsky, N. J. Rhodes and Graham Sale, of Welch.

W. L. Lee and associates of Glen Jean have organized the Dun Glen Fuel Co., with a view to operating in the vicinity of the Glen Jean. The new corporation is capitalized at \$50,000. Several large companies, including the McKell Coal & Coke Co., are operating in the same territory. Having an active part in organizing this company were Charles Ash, Belle Ash and C. D. Calloway, of Glen Jean and W. L. Lee and Goldia Fultz of Fayetteville.

The Sandor Coal Co. has been organized with a view to operating in the Harrison County field, being capitalized at \$50,000. The general office of the company is to be at Clarksburg. Leading figures in organizing this concern were J. A. Sandor, of Grafton; J. E. Kennedy and Marie Simpson, of Fairmont; J. A. Hornyak and John Vargo of Farmington.

Officials of the United States Coal & Coke Co. and of the Crystal Block Coal & Coke Co. recently gave a dinner at the club house at Gary in honor of Colonel Edward O'Toole, head of the United States Coal & Coke Company operations in McDowell, and Mrs. O'Toole, who returned a few weeks ago from an extended trip through South America, visiting their son, William O'Toole, U. S. Minister at Paraguay. Others present were W. J. Jenks, general manager of the Norfolk & Western Ry., of Norfolk, Va.; former Congressman and Mrs. Wells Goodykoontz, of Williamson; Mr. and Mrs. I. J. Rhodes, Mr. and Mrs. L. A. Osborn, Mr. and Mrs. J. N. Harman, Dr. and Mrs. Rutherford, Mrs. L. C. Anderson, Rummell Anderson, Mr. and Mrs. W. J. Hatfield and Mr. and Mrs. McGinnis Hatfield, all of Welch.

The following West Virginia coal companies have discontinued their corporate existence: Springdale Coal Co., of Morgantown; Superior Eagle Coal Co., of Huntington; Middle Fork Mining Co., of Huntington; Madne Coal Co., of Huntington; Barnsdall Coal Co., of New York; Madison Coal Co., of Huntington; Procter Eagle Coal Co., of Huntington; Hart's Run Coal & Coke Co., of Uniontown, Pa.; Omar Coal Co.; Carroll Coal Co.; Procter Coal Co., all of Huntington. The Eagle Island Coal Co., of Huntington has decreased its capital stock from \$600,000 to \$200,000. Authority has been granted to the S. J. Patterson Pocahontas Co., of Dayton, Ohio, to withdraw its business interests from the state.

Several West Virginia coal concerns have reduced their capital stock in the amounts specified below: Buffalo Coal & Export Corporation, from \$250,000 to \$50,000; American Land & Mining Company, from \$50,000 to \$5,000; Northern Fuel Co., from \$125,000 to \$100,000; Ranger Coal Co., from \$200,000 to \$50,000; Federal Coal & Coke Co., from \$750,000 to \$50,000; The Fitz Coal Co., from \$200,000 to \$50,000; Eagle Island Coal Co., from \$500,000 to \$200,000.

It is reported that the Coal River Collieries Co., which operates in Boone County, as well as in Kentucky, and controlled by members of the Brotherhood of Locomotive Engineers, has obtained an option on the coal holdings of W. E. Deegans in several counties in southern West Virginia.

The Gage Coal & Coke Co., with headquarters in Pittsburgh, contemplates extensive improvements to its property four miles South of Belington, in Barbour County. The company owns a large acreage on the west side of Tygart Valley River, where it has had a mine in operation for several years. At this point a large power plant is being installed, consisting of three 125-h. p. boilers and a 250-k. w. generator, an aerial tramway of modern type capable of delivering approximately 1,200 tons per day of eight hours, will be installed during this summer, to transport the coal from the tippie to the east side to be loaded on the Western Maryland Ry., after having been converted into coke. Approximately \$40,000 will be spent in making these improvements. This company also has a mine located on the Western Maryland Ry. where they manufacture coke from 60 beehive ovens, modernly equipped, from

which the coke is drawn with a Covington Coke Extractor.

The following West Virginia coal corporations have gone out of business, their charters having been surrendered: Lundale Coal Co., Amherst Fuel Co., Three Forks Coal Co., Elliott Splint Coal Co., National Gas Coal Co., Consumers Fuel Co.

Osman E. Swartz, of Fairmont, whose appointment as general counsel of the Consolidated Coal Co. was recently announced, was the guest of honor at a dinner given by the Consolidation Coal Co. and the Monongahela West Penn. Public Service Co., attended by 73 guests from various sections of the country. Tusca Morris, of Fairmont, of the legal staff of the consolidation company, was toastmaster and among others who responded to toasts were George M. Alexander, president of the Monongahela West Penn Public Service Co., Fairmont; A. M. Lynn, president of the West Penn Co. of Pittsburgh; D. I. Cahill, general counsel of the West Penn Co., Pittsburgh; Hugh H. Snoderly, assistant general auditor of the Consolidation Coal Co., New York; George M. Hoffheimer, of Clarksburg; Judge James A. Meredith of the West Virginia Supreme Court, Charleston. The dinner was given at the Deer Park Hotel, at Deer Park, Md., and signalized the departure of Mr. Swartz for New York, where he will succeed the late Col. S. W. Walker as the head of the legal staff of the Consolidation Coal Co.

Signalizing another important change in the ownership of mining properties in southern West Virginia was the purchase about the end of June of the capital stock of the Red Jacket Consolidated Coal Co. by the W. M. Ritter Lumber Co. The plants of the company on Mate Creek are now producing at the rate of about 4,500 tons daily. In course of construction is plant No. 5 and with its completion in the near future, about 1,000 tons per day will be added to the capacity of the company. It is proposed to build a four-track domestic coal tippie on Mate Creek not far from the present Junior tippie in new territory in the Red Jacket seam where it will be possible to develop a production of 1,200 tons a day. A new plant is to be built in the vicinity of the old Logan tippie on Lower Red Jacket from which by-product coal taken from the Alma seam will be shipped, the company owning a large acreage at this point. A production of 1,000 tons is expected at this plant. At plant No. 2 the old Junior tippie will be rebuilt. Improvements under way and to be made will bring production on Mate Creek alone up to 8,000 tons a day.

WASHINGTON

W. J. Gallagher, of Seattle, has subleased the Superior coal property in Chelalis from A. F. Plant and will operate the mine in the future.

WISCONSIN

The city purchasing board of Milwaukee has decided to continue to favor Eastern coal in the specifications governing the competition for the city's annual fuel supply. Dealers in Western coal claimed that they were being discriminated against and asked a revision of the specifications. A special committee will make a thorough study of the matter before another year. The city now uses 65,000 tons of coal. This amount will be increased by 22,000 tons as soon as a new water pumping station is completed.

WASHINGTON, D. C.

Revenue received by the government from royalties on mineral leases upon public lands and from the sale of such lands has amounted during the past two years to \$24,843,809, according to the Department of the Interior. Of this revenue \$12,981,809 came from royalties on mineral leases. Sales of coal leases totaled \$13,105 and royalties on coal leases in Alaska amounted to \$5,309.

CANADA

Coal production in British Columbia during June totaled 186,160 tons, an increase of 23,848 tons over that of the previous month. The collieries of Vancouver Island produced 129,616 tons last month, which is 32,252 tons in excess of that for May. It is clear, therefore, that the coal business has been improving on the coast and falling off in the interior. The Nicola-Princeton field also shows a slight increase in production, one thousand odd tons, for which the Middlesboro and Coalmont collieries are largely responsible. In the Crow's Nest Pass field there was a drop of 9,507 tons in output for June as compared

with May. The Coal Creek Colliery fell off 8,694 tons, that at Corbin 954 tons, while the Michel Colliery increased its output 141 tons. The poorer showing in this section of British Columbia no doubt is accounted for by the barrier erected by the Fordney tariff, making export to the United States at a profit practically out of the question, and the lack of demand in the Middle West. Following are the production figures for June:

Vancouver Island District	
Canadian Collieries:	
Comox Colliery	Tons
Extension	22,661
South Wellington	20,264
Western Fuel Corporation of Canada:	5,164
No. 1 Mine	27,002
Reserve Mine	17,801
Wakesiah Mine	7,377
Granby M. S. & P. Co.	19,626
Nanoose Wellington Colliery	5,176
East Wellington Colliery	3,723
King & Foster	822
Total	129,616
Nicola-Princeton District	
Middlesboro Collieries	6,397
Coalmont Collieries	9,609
Princeton Collieries	809
Total	16,815
Crow's Nest Pass District	
Coal Creek Colliery	22,254
Michel Colliery	15,388
Corbin	2,087
Total	39,729
Total for province	186,160

On recommendation of Commissioner Chisholm the Toronto Board of Control has decided to use the screenings from last year's supply of Welsh coal for the manufacture of briquets.

A mine-rescue competition was held at Blairmore, Alberta, in July, under the joint auspices of the mines department of the Province of Alberta and the Rocky Mountain branch of the Canadian Mining Institute. In addition to the mine-rescue and first-aid contests for men, there were prizes for the best first-aid demonstrations by women individually and in teams and a shield for juvenile competitors. Each team was given a different problem of a practical nature, such as may easily occur in a coal mine, involving the use of a breathing apparatus and a knowledge of first aid, and the work of the various teams clearly demonstrated the value of constant training with the apparatus in conjunction with organized team work. The work of the competing teams was appraised as follows: First, Michel Team, B.C. and Hy Grade (tie); third, Fernie No. 2; fourth, Bellvue No. 3; fifth, Nordegg; sixth, Fernie No. 1 and Coal Creek (tie); eighth, A.B.C., Drumheller; ninth, Bellevue No. 1; tenth, Blairmore No. 1; eleventh, Blairmore No. 2; twelfth, Lethbridge. The judges were Messrs. Horne, McDonald, Howell and Cranston, inspectors of mines for Alberta, and H. E. Miard and James Dickson, mines department, British Columbia.

Western Canada can hardly sell coal in Ontario. Dr. Charles Camself, deputy minister of mines for the Dominion and who acted as chairman of the committee that went thoroughly into the problem in recent months, recently said that there was nothing to add to the committee's report. Generally it had been found that the coal fields of eastern Canada could take care of the requirements of the maritime provinces, Quebec, and a small part of northern Ontario; that the prairies, from a point near the western limits of the Great Lakes, and British Columbia were independent, having supplies within their boundaries that were adequate, but that there was a gap between the east and the west, comprising the greater part of Ontario, that, under present conditions, must be dependent upon coal imported from the United States. The investigation had served a good purpose in making clear the situation as to the fuel resources and fuel requirements throughout the Dominion, and with a thorough grasp of the problem it should be easier to regulate distribution in the future in the best interests of all consumers should regulation be necessary.

John L. Lewis, president of the International body of the United Mine Workers of America, has instructed William A. Sherman, president of District 18 (Eastern B.C. and Alberta), that it would be well to withdraw the call issued for a general labor conference in western Canada to decide upon a policy for sympathetic action in support of the striking miners of Nova Scotia. Mr. Lewis stated that the miners of District 18 must carry out the rules and

policy of the U. M. W. of A. and fulfill their obligations to the operators under the agreement in force. At the time of writing Mr. Sherman had not withdrawn the call but had promised a statement at a later date.

Output of coal from Canadian mines during April amounted to 1,287,400 net tons, a decrease of 12 per cent from the total for March, but an increase of 38 per cent over the average for the corresponding month of the three preceding years, according to the Dominion Bureau of Statistics. Production for the month showed decreases of 83,000 tons in Alberta, 70,000 tons in British Columbia, 16,000 tons in Saskatchewan and 10,000 tons in New Brunswick. There was an increase of 2,000 tons reported in Nova Scotia. The cumulative output from all mines for the first four months of 1923 amounted to 6,153,600 tons, an increase of 25 per cent over the preceding three-year average for the same period. Imports from the United States and Great Britain amounted to 1,171,200 tons, as compared with 1,817,700 tons in March, a decrease of 36 per cent, but 40 per cent greater than the preceding three-year average for the month. For the first four months of 1923 total importations were 5,956,800 tons, an increase of 35 per cent over the three-year average for the period. Imports of anthracite for April were 415,400 tons, of which 361,100 tons of egg, grate, stove, etc., sizes came from the United States, and 16,400 tons of the same sizes from Great Britain. The balance consisted of buckwheat and rice sizes of which 31,300 tons came from the United States and 6,600 tons from Great Britain. Exports of Canadian coal during April were 128,600 tons, as compared with 234,500 tons in March. Comparison of the April exports with the preceding three-year average showed an increase of 58 per cent.

Imports of about 55,000 tons of Scotch and Welsh anthracite have been received so far this season at Montreal, and if the demand continues the amount probably will be trebled before the close of navigation. Local dealers state that after last year's experience consumers will take every precaution to obtain an adequate supply.

Association Activities

Charles L. Dering, president of American Wholesale Coal Association, has appointed the following committees: Trade relations, Seth W. Morton (chairman), Albany, N. Y.; Charles A. Owen, New York City, and Charles L. Couch, Buffalo, N. Y. Budget, Lyle H. Dayhoff (chairman), E. M. Platt and G. H. Merryweather, all of Chicago, Ill.

Colonel A. C. Earnshaw has been appointed commission of the Chicago Coal Merchants Association. Colonel Earnshaw assumed office Aug. 1, taking the vacancy caused by the resignation of Commissioner Kendall, who joined a coal company sales organization a month or so ago. Colonel Earnshaw comes from the United States Internal Revenue office at Chicago. He is a world war veteran and has been in Chicago two years, coming from New York, where he was with the government in the Post Office Department. It is his first venture in the coal business.

Obituary

Benjamin U. Taylor, leading coal dealer of Olean, N. Y., and one of the wisest known business men of that district, died July 21, at the age of 69 years, leaving a wife and several children.

James R. Brennan, a coal merchant and prominent citizen of Brackville, Ont., died July 25, at the age of 76 years. He was a member of the town council for four years and harbor master of the port of Brockville.

William Leventry, died at his home in Johnstown, Pa., July 23, aged 73 years. For the past eight years he was engaged in the coal business with his brother, Lewis Leventry, under the firm name of Highland Coal Co., of which he was president.

Lafayette Mack Hall, 72, formerly a mine official in the Seco, Ky., district, and well known in southeastern Virginia, where he was formerly manager of the Gladeville Coal Co., died at Wise, Va., July 20.

Recent Patents

Rotation Release for Rock Drills. 1,452,154. Charles C. Hansen, Easton, Pa., assignor to Ingersoll-Rand Co., New York, N. Y. April 17, 1923. Filed July 23, 1920; serial No. 398,372.

Mine-Roof Supporting Method and Apparatus. 1,450,329. Edmund C. Morgan, New York, N. Y. April 3, 1923. Original application filed Jan. 5, 1916; serial No. 70,341. Divided and this application filed Sept. 9, 1922; serial No. 587,188.

Mine Car. 1,450,637. Michael E. Lohr, Johnstown, Pa. April 3, 1923. Filed Feb. 16, 1922; serial No. 536,983.

Coal Jig. 1,451,287. George W. Wilnot and Francis H. Blatch, Hazleton, Pa., assignors to Wilnot Engineering Co., Hazleton, Pa. April 10, 1923. Filed Sept. 26, 1922; serial No. 590,593.

Mine-Car Truck. 1,451,690. James R. Fleming, Scranton, Pa. April 17, 1923. Filed Mar. 30, 1922; serial No. 548,014.

Ball Pulverizing Mill. 1,452,786. Frank A. Brewer and George W. Branson, Vancouver, B. C., Canada. April 24, 1923. Filed Aug. 11, 1921; serial No. 491,414.

Locking Device for Mine Cars. 1,452,923. John P. Miller, Duryea, Pa., assignor of one-half to Herbert S. Woodward, Carbon-dale, Pa. April 24, 1923. Filed Jan. 26, 1920; serial No. 353,940.

Publications Received

The Engineering Foundation, Engineering Societies Building, New York City. Report for the year ended Feb. 8, 1923. Publication No. 6. Pp. 118; 7x10 in.; illus.

Interim Report of the Dominion Fuel Board, Ottawa, Canada. Pp. 25; 6x9 in. Accompanying the report are two maps showing coal fields, estimated reserves and freight rates, origin of coal supply, location of peat bogs and distribution of fuel woods. Included are three charts are giving the annual consumption of coal in Canada from 1901 to 1921, the coal supply by provinces, covering output, distribution, sources and consumption.

Production of Explosives in the United States during the calendar year 1922, by W. W. Adams, Bureau of Mines, Washington, D. C. Tech. paper 340. Pp. 25; 6x9 in.; tables.

Coal-Mine Fatalities in the United States, 1922, by W. W. Adams, Bureau of Mines, Washington, D. C. Tech. paper 339. Pp. 97; 6x9 in.; tables.

The General Electric Co., Schenectady, N. Y., has issued a 34-page booklet to its stockholders covering thirty years' history of its activities. The book is well illustrated, including pictures of some early inventions as well as some of the present day.

Exide Ironclad Batteries for Storage Battery Locomotive. The Electric Storage Battery Co., Philadelphia, Pa. Bulletin No. 195, superseding Bulletin No. 146. Pp. 19; 8x10 in.; illus.

Splices and Tapes. The Okonite Co., Passaic, N. J. Pp. 8; 6x9 in. Describes the importance of, with instructions for making, a perfect splice, and tells of the important properties of tape and how to recognize these properties.

Multistage Series Pumps. De Laval Turbine Co., Trenton, N. J. Catalog H. Pp. 20; 8x11 in.; illus. Double suction impellers and volute diffusers are used in this pump, as in single-stage centrifugal pumps; the connecting passages from stage to stage being included in the pump case casting, as in the ordinary multistage pump. The pumps are made with two or three stages.

"Imperial" Type XPV Duplex Steam-Driven Air and Gas Compressors. Ingersoll-Rand Co., New York City. Pp. 35; 6x9 in.; illus. This compressor is built in a number of different types and sizes. Stress is laid on the steam valve gear and the automatic cutoff governor which regulates the compressor. Other features of design illustrated and described are the Ingersoll-Rand plate air valves, used for both intake and discharge; the unit construction, which requires a simple foundation; and the automatic flood system of lubrication.

The John Crerar Library, Twenty-eighth annual report for the year 1922. Pp. 31; 7x10 in.; tables.

American Mining Congress. Report of the Proceedings of the 25th annual convention at Cleveland, Ohio, Oct. 9-14, 1922. Pp. 776; 6x9 in.; illustrated.

Coke and By-Products in 1921, by R. S. McBride, U. S. Geological Survey, Washington, D. C. Pp. 444; 6x9 in.; illustrated. Contains statistics showing production, distribution and utilization of coke and by-products obtained from coke ovens in the United States in 1921, covering both bee-hive and byproduct coke.

Traffic News

Permission has been granted the **Hocking Valley Ry.** to obligate itself to pay \$5,098,000 for 2,000 70-ton steel hopper-bottom cars.

There are persistent rumors at Chattanooga, Tenn., that Henry Ford and George L. Carter, of Johnson City, Tenn., a financier, will construct a new coal line from the southern West Virginia coal fields through Bland, Wythe and Carroll counties, Virginia, and across North Carolina via Mount Airy to the coast. Reports are that the road is to connect with Mr. Ford's present line, serving his Kentucky coal fields.

The Rockdale, Sandow & Southern R.R. has applied to the Interstate Commerce Commission for authority to construct and operate a line of standard-gauge railroad from Marjorie, on the International Great Northern, to Sandow, twelve miles distant. It is stated that this line will open for immediate development approximately 1,000 acres of proven lignite. In that area the bed is said, in the application, to have an average thickness of 13 ft., providing a recoverable tonnage in excess of 13,000,000 in a territory remote from coal mines, in which the cost of fuel is excessively high. Beyond the proposed terminus of the road an additional 50,000,000 tons of lignite coal is recoverable, the applicant declares.

As the result of a comprehensive and extensive survey and investigation, the Baltimore & Ohio R.R. has announced its new car-rating figures and ratings for the various divisions reaching the coal fields of northern West Virginia, the result being a marked reduction in the aggregate ratings for many of the Baltimore & Ohio divisions. Ratings are made retroactive to July 16, according to the bulletin governing distribution just issued by the B. & O. On the new basis the Monongah Division will be entitled to 1,888 cars, the Connellsville Division to 985 cars, the Charleston Division to 252 cars, the Morgantown & Kingwood, Cumberland, Virginia Northern and Preston railways a combined rating of 236 cars.

H. A. Cochran was appointed coal traffic manager, of the Baltimore & Ohio R.R., Baltimore, Md., effective July 16. He takes the place of H. M. Matthews, who recently died.

The Reading R.R., has been authorized by the Interstate Commerce Commission to assume the obligation of the issuance of \$6,000,000 in equipment certificates to be expended in the purchase of new locomotives and cars. The new equipment includes 25 locomotives at \$38,192 each; 500 70-ton steel hopper coal cars at \$2,072.45 each; 500 70-ton steel hopper coal cars at \$2,135.37 each; 500 60-ton steel hopper coal cars at \$2,067.82 each; 500 70-ton steel hopper coal cars at \$2,075.58 each.

The Unadilla Valley Ry., has been authorized to issue notes to cover, among other things, a coal storage and locomotive fuel station at New Berlin at which engines are to be loaded by gravity, and ten 50-ton hopper coal cars to cost \$2,500 each.

The Interstate Commerce Commission has authorized the Chicago & Northwestern Ry. to assume obligation for \$4,755,000 of equipment certificates to be applied on the purchase of the following property: Forty Mikado-type freight locomotives at \$45,395.06 each; 10 Pacific-type passenger locomotives at \$43,200 each; 140 milk express cars at \$5,804.93 each; 800 50-ton steel ore cars at \$1,673.70; 800 50-ton steel underframe gondola cars at \$1,919.41 each; 200 50-ton steel underframe flat cars at \$1,581.10 each; 40 10,000-gallon steel tankers at \$2,550 each.

As the Interstate Commerce Commission refused to permit the Virginian Ry., to build a spur between Elmore and Mullins, for a distance of about a mile and a quarter down the Guyan River, in order to permit the Pocahontas Fuel Co. to open a new mine, it is now stated that the coal company will build the spur on its own responsibility. Pending such construction, the Virginian will demand a rehearing on

this application and if that is denied then an appeal will be taken to the federal courts, the appeal to be based on the contention that the interstate commerce commission has gone beyond the authority vested in it by law.

Earnings of coal roads cut last year at this time on account of the coal strike, snapped back to normal in June with a substantial net income as against a deficit last year. The Lehigh Valley reported net operating income for June amounting to \$1,012,023, against a deficit of \$32,044 last year. June gross was \$7,052,888, against \$4,694,664, and the balance after taxes was \$1,054,963, against \$20,154. Six months' gross was \$36,280,628, against \$31,017,207, while balance after taxes was \$897,100, against \$2,049,260, and net operating income \$631,720, against \$1,802,808 for the same period last year. The Delaware & Hudson Co. for June showed net operating income of \$1,155,890, against a deficit of \$292,905 last year. Gross was \$4,454,137, against \$2,297,070, and balance after taxes \$1,197,051, against a deficit of \$261,398. For the six months ended June 30 last gross was \$22,961,570, against \$18,866,476; balance after taxes \$2,789,696, against \$1,467,639, and net operating income \$2,510,575, against \$1,494,268 for the same period of the previous year. The Philadelphia & Reading showed a net operating income of \$2,544,385, against \$123,507 last year. Gross was \$8,959,203, against \$5,673,491, and balance after taxes \$2,681,006, against \$382,957. Six months' gross was \$55,077,844, against \$38,260,119; balance after taxes \$17,192,283, against \$6,970,448, and net operating income \$15,938,308, against \$5,582,788. The report of the Norfolk & Western showed net operating income for June amounting to \$1,587,249, against \$3,403,803 last year. Gross was \$7,881,048, against \$9,478,091, and balance after taxes \$1,304,034, against \$3,259,622. Six months' gross was \$44,938,946, against \$46,011,351; balance after taxes, \$6,814,339, against \$12,271,486, and net operating income \$3,892,633, against \$13,574,542 for the corresponding period of 1922.

Coming Meetings

The tenth annual Tennessee First-Aid Contest and Miners' Field Day will be held at Knoxville, Tenn., Aug. 4, in the Knox County Court Yard, under the auspices of the Tennessee coal operators, state mine inspectors and the U. S. Bureau of Mines. R. E. Howe, secretary of the Southern Appalachian Coal Operators Association, secretary-treasurer, J. M. Webb, of the U. S. Bureau of Mines, is instructing the first-aid teams.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the International Safety and First-Aid Meet. Secretary, Benedict Shubart, Denver, Colo.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, AUGUST 9, 1923

Number 6

Death of the President

RECONSTRUCTION after the War or "the return to normalcy," as he preferred to term it, was the task of President Harding and admirably he performed it. With many a European country on the verge of bankruptcy as the result of taking the short and easy way of spending money in excess of yearly income we can appreciate the better the saner and more honest way of President Harding, which avoided inflation and the building of debts as being neither upright nor profitable. Working men and capitalists alike should appreciate the fact that by careful pruning of governmental expenses the Cabinet led by President Harding has kept our dollars from further depreciation in value even though we are a long way from the pre-war basis.

Nor was he less fortunate in his foreign affairs. We had fairly started, about the time he became President, on what we discovered was to be a race of armament. Our big construction had begun to arouse doubts in the mind of another nation, when with the sanity inspired by President Harding and Secretary of State Hughes, international disarmament was provided and a race that would have been expensive and exhausting to the participants and likely to end in another war was definitely halted.

These were two of President Harding's achievements. Too many of his other policies are footballs of politics and therefore cannot be mentioned here. Reference should, however, be made to his quality as a man. Throughout his administration not a breath of scandal was uttered against his actions or his purposes. His quiet dignity, his democracy, that was real without being demonstrative, his patience, his calmness, the sincerity of his smile, his ability to make friends with the Senate and House and his freedom from petty jealousies endeared him to the public.

His Presidential messages were not compositions of literary merit but he proved, as many men before him have done that power of execution often goes with a weakness in the power of expression. The deceased President was before all an executive. He looked well ahead, he got things done, he did them without fluster, he leaves his successor the management of a state, meeting its obligations readily, paying off its debts systematically and free from foreign complications or ill will.

But these labors were not accomplished without a superhuman burden being placed on the man that performed them. Our President is unfortunately for his health and well being both the titular and actual head of our Government. He must do the honors as well as direct the work of the nation. In foreign countries the monarch takes care of the one and the prime minister of the other. But even then, the King is freer than the president. The dignity that hedges a king saves him from having to meet all and sundry, whereas those

who drift to our national capital cannot leave until they have paid their respects to the President. Only after this has been achieved can they go back to Podunk and discuss the warmth of the handshake they received from the great man with their admiring or envious neighbors.

And the prime minister, he is a smaller figure and is surrounded by members of a cabinet any one of whom, owing to the closer accord of parliamentary and cabinet activity abroad, is almost as illustrious as himself. Thus the prime minister can travel from one end of the country to the other without making a single speech. Custom has made it possible for him to disappear from the public eye, but every journey of the President is now a long series of ovations, banquets, handshakings and speeches. He hardly knows night from day.

Mr. Harding, it is true, had in his cabinet two men who were at the time of their appointment better known than himself, but that did not upset the Constitution which makes the President the sole executive or the tradition which makes him the leading figure in our national life.

Much of our trouble comes from custom, and a breaking of precedent and the formation of new customs must cure it. The public must be content to dispense with courtesies and activities that broke the voice of Roosevelt, destroyed the health of Wilson and proved fatal to Harding.

The Anthracite Dispute

MANY things may happen between the first and last weeks of August. Although the anthracite mine workers have thrown down the gauntlet, saying they will not further discuss a contract to work after this one expires on Aug. 31 unless the operators forthwith grant the first of their demands—that for the check-off—they may change their minds. In fact there is a well-grounded belief in the trade and government circles that the men at the mines are more interested in wage increases accruing to their benefit than in the check-off, which is for the ultimate aggrandizement of the union officials. It is quite possible the union, finding the operators in a determined position on this issue, may shift at the last moment and offer to accept a compromise in the way of a wage increase. That, however, is pure speculation, for no one now knows even what the next move is to be. John Lewis has remained at Atlantic City awaiting developments; the operators are near by at Philadelphia. Negotiations can be immediately renewed at the suggestion of either party. Each is waiting for the other to weaken; both are waiting to see if the government will act to bring them back together.

For the time being the check-off is before the country. It is an obscure issue, one on which we may wait a

long time before there is a definite expression of public feeling. The term is familiar to people generally, for it was widely advertised as an issue in the 1922 soft coal strike, but after all a minor issue and one that did not figure in the final settlement last year. The soft coal operators then tried to throw it out and of course failed. They tried to have it rejected in the settlement of the 1919 strike, but the Robinson Commission did not act on it.

The union now professes not to understand why there should be objections on the part of the anthracite operators to granting the check-off in the hard-coal region. It is such a small matter—just deducting \$1 a month from each man's pay. John Lewis in the *New York Times* of Sunday, Aug. 5, puts it thus: "This check-off is merely an arrangement whereby the individual mine worker may have his monthly dues to the union, amounting to \$1, deducted from his earnings in the same manner as the operators deduct money for store bills, explosives, rent, house coal, tools, mine supplies, taxes and funds for beneficiary organizations." On such a simple thing, he says, the operators would plunge the industry into a strike and deprive the people of coal.

That is all there was to the check-off some thirty years ago when the soft-coal operators began its collection in Ohio. If that were all there were to it today, the soft-coal operators would not be opposing it, nor would the union be so keen for it in the anthracite region. The check-off has changed, however, and now is the instrument whereby the United Mine Workers' organization draws millions of dollars each year to finance the most arrogant labor monopoly in this country. For it is not the simple matter of \$1 per man per month that Mr. Lewis states. The check-off agreement covers the collection of special assessments as well, and these in the soft-coal fields have amounted to many times that sum from each man over considerable periods, not for the payment of checkweighman's and union official's salaries and beneficiary payments for miners' families, but for the international organization with which to fight in organizing non-union fields and defending law suits and criminal proceedings, as at Herrin. By collecting the check-off, in amounts as ordered by the union, the operators are handing to the union the sinews of war with which to fight them.

There is no reason why the hard-coal operators should begin the practice now. To refuse it is not a denial of the right to organize. It is not a question of dealing with a union for they do already deal with it in all respects. It is a matter of principle and of policy. The check-off denies to any man the right to work in the coal mines unless he joins the union, and thereby is in violation of the principle that every man should have the unquestioned right to work without joining a union.

The practical operation of extending the check-off to the hard-coal region will be to still further extend the power of the United Mine Worker without in the least adding to its usefulness. Perhaps if the American public would understand and express itself on this as a matter of policy, the issue would not long be obscured or the result in doubt.

TO THE FRENCH R.U.H.R. must stand for Remain Until Huns Remit.—*Quincy Herald*.

LOOKS AS IF CONGRESS is getting ready for a Bloc party.—*Brooklyn Eagle*.

Psychology for the Coal Merchant

PROBLEMS of retail and wholesale distribution will be studied by secretaries of commercial organizations and trade associations at the coming meeting of the National School for Commercial and Trade Executives at Northwestern University in the last half of August. This institution, fostered by the Chamber of Commerce of the United States, seeks to spread the knowledge of sound practice in merchandising and distribution—literally to make better merchants. It is inviting all who may be interested to attend this meeting. Among other matters to be considered are ways and means of accurately surveying the wholesale and purchasing power and capacity of towns and cities. It is not announced that coal will be specifically covered, but it should be.

Retail coal merchants know only too well that their line does not stand as high in the estimation of the public or in the scale of merchandising as most other local enterprises. Coal as a necessity is not sold, it is bought. It is a commodity the retail end of whose distribution is too generally a "come and get it" business. The coal merchant's office more generally than not is a small, dark coop—dirty, dusty, uninviting. Sensing the distrust of the buyer, the dealer, from behind his partition, more forbidding than that of a bank president, armors himself with a frown and growl to forestall the complaints or worse of the customer who risks entrance. The meeting at Northwestern University will give a course in salesmanship and another in psychology that might with advantage be extended to cover the coal trade.

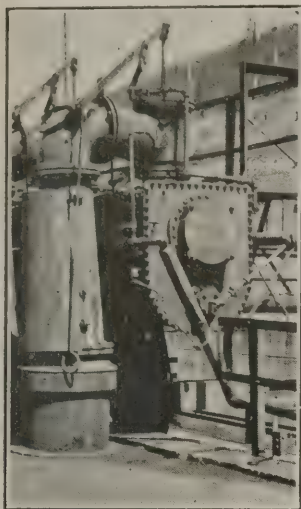
A course in economics such as will be given there would further enlighten the local merchant why business often is so poor. There are too many in the game too poorly financed. The retail coal trade is as overdeveloped as the soft-coal producing industry, and for the same specific reasons. The exceptions to the general run prove the possibilities of what have come in general business to be accepted as sound merchandising practice and it is to be hoped that secretaries of local and other retail coal merchants' associations will participate in the coming sessions of the National School for Commercial and Trade Executives. The coal industry as a whole will benefit by the strengthening of this link between the mine and the consumer—not that the other links are as strong as they might be.

SETTLING A COAL CONTRACT DISPUTE FOR FIVE DOLLARS in a court of law is a happy experience in economics that probably no coal man ever had. Even if only a single car of coal worth \$150 is involved, the cost of litigation mounts to a figure sometimes out of all proportion to the value of the goods. The result is that many a coal shipper takes a crooked deal from a buyer, charges his loss to experience, and remains out of court. But if an arbitration clause were written into every coal contract and a working system of arbitration were set up in the coal industry there is no reason to suppose that costs would be much, if any, greater than the costs in the Commerce Court now settling business arguments in Chicago. There the scale is \$5 where the matter in contest does not exceed \$200; \$7.50 from \$200 to \$1,000, and \$10 from \$1,000 up plus 1 per cent or 1½ per cent per \$1,000 above the first \$1,000. This is cheap justice.

From Coke Oven to Byproduct Market, Rosedale Refinery

Decanting the Tar—Taking Ammonia and Benzol from the Gas—Adding Ammonia to Sulphuric Acid to Make Ammonium Sulphate

BY G. A. RICHARDSON*
Philadelphia, Pa.



Hydraulic Main



Sulphate Storage

AT THE Rosedale plant of the Cambria Steel Co., near Johnstown, Pa., the byproduct-recovery equipment is as follows:

- | | |
|--|---------------------------------|
| 4 Primary coolers | 3 Acid separators |
| 4 Exhausters | 1 Ammonia still |
| | (for weak NH_3 liquor) |
| 2 Gas boosters; one, being inter-changeable, can be used as an exhauster | 3 Final coolers |
| 3 Tar extractors | 3 Absorbers |
| 3 Saturators | 1 Gas holder |
| | 3 Light-oil stills |

At Rosedale the practice is to use all the ammonia produced by the coke ovens for the manufacture of ammonium sulphate, condensing apparatus not having been installed. Room has been provided for it, however, and the procedure, if a plant were supplied, would be the same as that followed at the Franklin plant, which will be described later. Light oil is refined at Franklin, and all that produced at Rosedale is shipped to that plant.

The gas from the ovens enters a drum immediately above them. Here it is brought in contact with a spray of weak ammonia or byproduct-house liquor which washes out a large part of the tar. The gas and liquor then flows across through collector mains into the common foul-gas, or suction, main. Where room permits, the tarry liquor is bypassed into the bottom of the common main with the aid of a butterfly valve. The reason for this is that the water, etc., coming over and into the top of the main with the gas, tends to disturb the suc-

tion. Owing to lack of headroom, the two leads at the upper end of the batteries do not have this bypass.

The common foul-gas main slopes downward toward the primary coolers, increasing in size by sections until it attains a maximum diameter of 78 in. Diaphragm expansion joints are provided, and bleeder valves are placed at various points along the main to take care of excess tar water in case the main should clog.

A tar valve, located close by the primary coolers, is used to drain the tar water from the main into the decanters. These latter are rectangular tanks. By the side of the decanter is a liquor-collecting tank and a tar-collecting tank, both cylindrical.

The weak liquor coming back from the ovens has been increased in volume about 6 to 7 per cent by the moisture in the coal. From the liquor-collecting tank weak liquor is sent back to the ovens, and again sprayed into the mains. Any excess passes off over a weir and is sent to the weak-liquor decanter, where any tar that is still left in it settles and is taken to the dehydrator. The excess weak liquor is pumped to collector tanks and thence to the storage tanks.

The tar overflows from the tar-collecting tank into the tar dehydrator, where steam coils drive off the moisture. From the dehydrator it is pumped into the storage tank, which is in the same group as the liquor tanks. Much of this is used for fuel in the various parts of the steel works and the surplus remaining is sold in the market. No attempt is made to refine it at this place.

Gas from the foul-gas main passes first into the primary coolers. There are four of these connected in parallel. They are filled with wooden grids. Weak

NOTE—This is the fifth of a series of six articles on the mines, ovens and byproduct refineries of the Cambria Steel Co. Earlier articles appeared Aug. 31 and Sept. 7, 1922, Feb. 15 and July 19, 1923.

*Midvale Steel & Ordnance Co. and Cambria Steel Co. Since this article was received these two companies have merged with the Bethlehem Steel Co.

FIG. 1
Rosedale Byproduct Plant

The gas comes to plant in the foul-gas main with water and tar. The treatment consists in separating the ammonia liquor, the tar and the gas and from the ammonia liquor to make ammonium sulphate, and in removing the benzol from the gas.

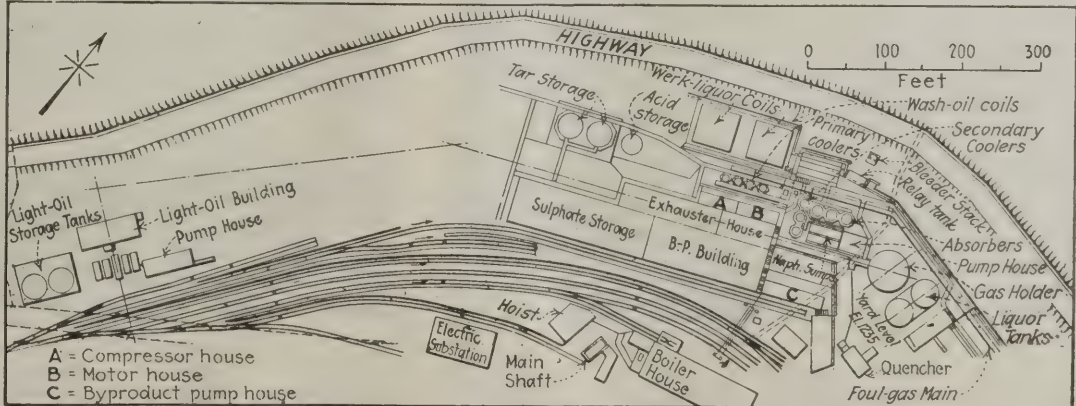




FIG. 2

Panorama of Plant

A shows the four primary coolers; B, one of the final coolers; C, the three absorbers; D, two tar storage tanks; G, one acid storage tank; H, the gas tank; I, the liquor tanks; K, the boiler house; M, the quenching tower; N, the new Hinckston roadway and O, the byproduct building.

ammonia liquor trickles down from the top and washes the excess tar out of the ascending gas and at the same time reduces its temperature. Practically all the tar and naphthalene are separated out in the process. When all the ovens are operating at least three of the coolers are required.

The tar drops down into a reservoir at the base of the coolers, any excess overflowing and draining to the decanters. The circulation of the liquor is continuous. After passing down through the coolers it is pumped back into cooling coils which are sprayed with water, and thence it passes back to the coolers again. There are 120 stacks of 2-in. coils each 30 pipes high.

The Solvay people make the statement that "due to the difference in rate of heat transfer through metals from water to water and from gas to water the efficiency of the Semet-Solvay coolers is approximately 50 times that of the old type of tubular coolers. It also is of interest to note the well-demonstrated facts that under normal operation these grid-type coolers never require cleaning and that during the entire life of the plant there are no repair costs other than occasional renewals of spray nozzles."

When the gas leaves the ovens it has an average tem-

perature of 600 deg. C. It enters the collector mains at about 400 deg. C. and enters the suction main at about 200 deg. C. When it enters the coolers it has lowered in temperature to about 70 deg. C., and in the coolers it is reduced to about 30 deg. C. About 70 per cent of the tar is condensed in the collector mains, 20 per cent in the suction main and about 8 per cent, consisting, of course, of the lighter tars and watery vapors is collected in the primary coolers. Some naphthalene also is condensed at the same time.

To draw the gas through the primary coolers requires a suction of about 130 mm., or 5 in. For this purpose four exhausters are used which are located just beyond the coolers, in a bay of the sulphate building. There also are two blowers, one of which can be used either as a booster or as an exhauster. The exhausters each have a capacity of 83.4 cu.ft. per revolution. Two are driven by 300-hp. motors and two by 15x22-in. steam engines. A bypass with a butterfly valve is used to regulate the suction. Although this is not the most economical method it is the most satisfactory.

From the exhausters the gas passes through three 22,000,000-cu.ft. capacity tar extractors. In these the gas passes through a screen and impinges on flat sur-

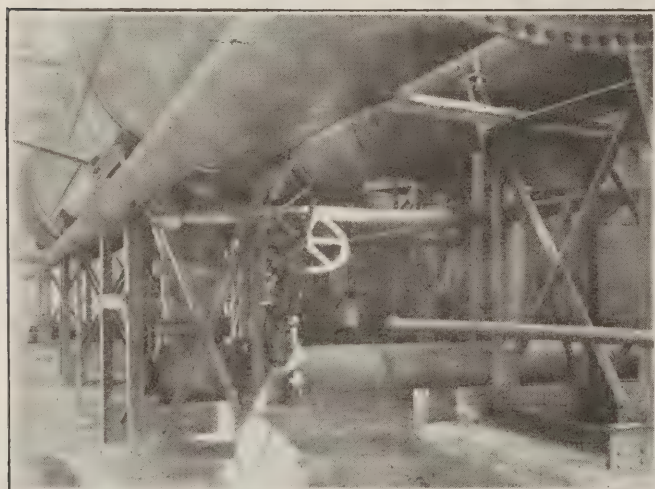


FIG. 3—TAR VALVE REMOVES TAR WATER FROM MAIN

A tar valve located close by the primary coolers is used to drain the tar water from the foul-gas main, the diameter of which at this point is 6 ft. 6 in. The tar water thus leaving the main passes to the decanters.

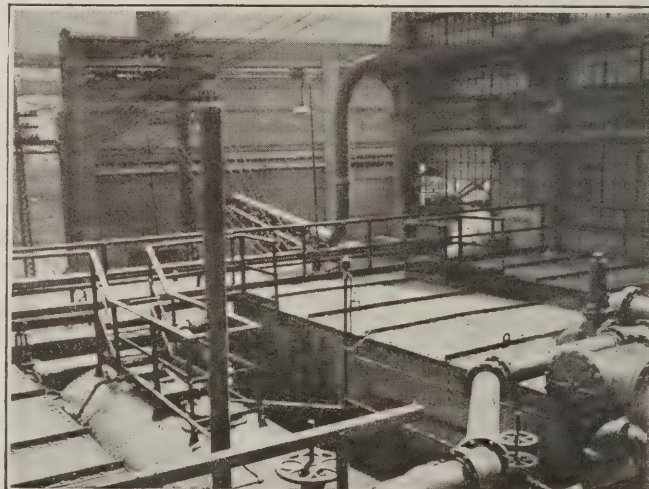


FIG. 4—DECANTERS AND TANK TO HOLD WEAK LIQUOR

In the decanter the weak liquor is separated in a degree from the tar, cylindrical tanks being provided for the reception of both. The weak liquor thus partly purged of its tar is sent back to the ovens to speed the sluggish material in the hydraulic main.

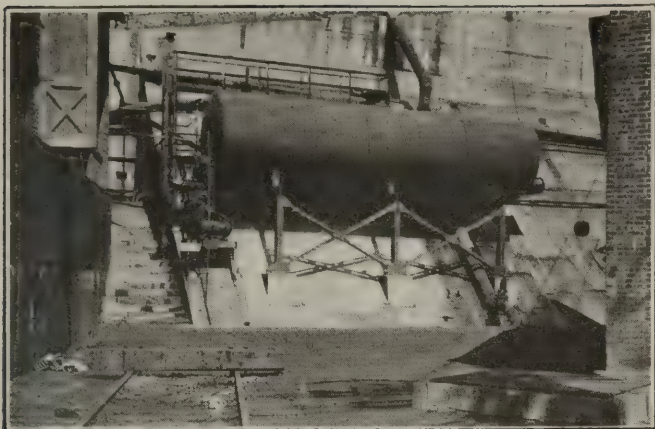


FIG. 5—TAR DEHYDRATOR FOR EVAPORATING WATER

Here steam coils drive off the moisture which went with the tar instead of segregating with the weak liquor. From this point the tar is pumped into one of the storage tanks, two of which can be seen in the plan that accompanies this article.

faces, the tar dropping to the bottom and going direct to the decanters.

The gas itself goes to three ammonia separators, where it enters at the bottom and bubbles up through a bath of sulphuric acid (5 per cent solution). In the resulting reaction ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$, is formed. The gas passes on to acid separators which contain a series of baffles that cause a mechanical precipitation of the acid which has been carried over with the gas.

After the acid bath has become saturated, crystals of ammonium sulphate fall to the bottom and are thrown out with an air ejector to draining tables in which liquid seals are provided to prevent spattering. The mother liquor overflows and is returned to the saturator.

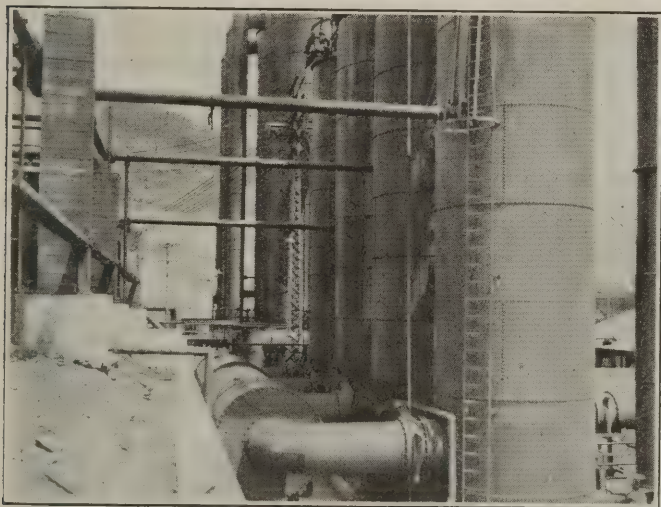


FIG. 6—IN FOREGROUND, FOUR PRIMARY COOLERS

The gas from the foul-gas main passes in parallel from the bottom to the top of these coolers. They are filled with wooden grids. Weak ammonia liquor trickles down from the top and washes excess tar out of the ascending gas. The tar and naphthalene are practically removed, for the temperature is greatly reduced. In the rear are the scrubbers. Note the pipes by which the gas goes in and, on the extreme right, one of the pipes by which the purged gas is withdrawn.

At regular intervals the salt is paddled into centrifugal driers, where it falls into a wire cage and is whirled rapidly.

After the salt has been partly dried it is washed with water, which removes the free acid, the usual practice at Rosedale being to get down to 0.05 per cent moisture. Care is necessary in washing to avoid giving an excess bath to the sulphate. Uniformity in the supply of water

is assured by using a one-gallon tank of water, which is blown into the drier. The drying time is about fifteen minutes. Nine driers are available, there being three for each saturator.

A belt conveyor carries the sulphate, thus dried, to

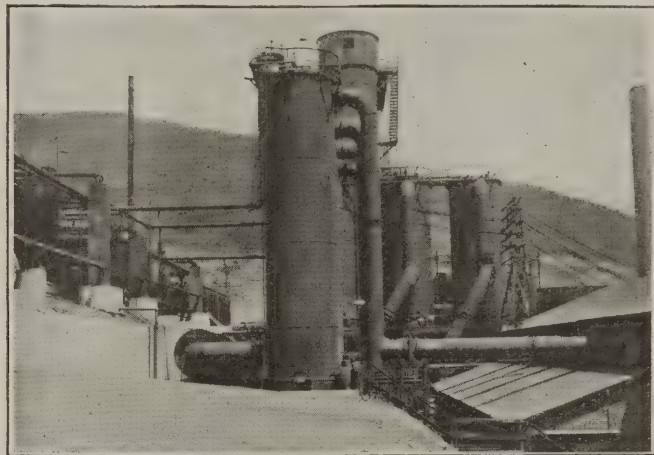


FIG. 7—ANOTHER VIEW OF PRIMARY COOLERS

On the left can be seen the weak-liquor cooling coils and the wash-oil coils. In the middle foreground are the primary coolers (four of them), the top of the scrubbers and the secondary coolers. On the right is the sulphate building.

the sulphate-storage building, which is 176 ft. long by 56 ft. wide and has room for 4,000 tons. The salt is then bagged or loaded into railroad cars in bulk according to requirements.

A feature of the Semet-Solvay system is that ammonia begins to be separated at the collector or hydraulic main, for the liquor which is sprayed at this point, gathers up much of the ammonia and so relieves to a certain extent the load on the coolers and prevents pitch from being deposited in the main. At the same time the fixed ammonia salts are removed. Inasmuch as the overflow from the primary cooler system is returned to the hydraulic-main circulation, it is evident that the overflow from this latter system will contain all the fixed ammonia and but little free ammonia. This, in turn, reduces to a minimum the volume of weak liquor requiring distillation and lowers the cost of ammonia recovery when sulphate is the product desired.

The weak liquor from the storage tanks is brought to a 6-ft. ammonia-tank still, which is large enough to

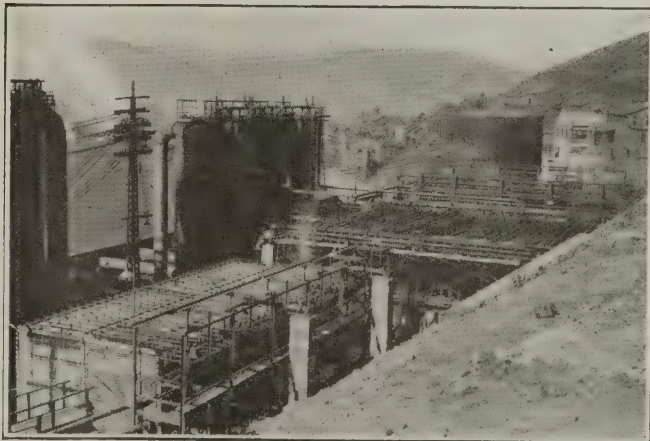


FIG. 8—COILS THAT COOL WASH OIL AND WEAK LIQUOR

The weak-liquor cooling coils are in the right rear. They lower the temperature of the weak liquor so that when it is admitted to the top of the primary coolers it will reduce the temperature of the gas and cause it to discharge its tar and naphthalene. It keeps circulating between the cooling coils and the primary coolers on the left. In the foreground are the wash-oil cooling coils, with the scrubbers on the left.

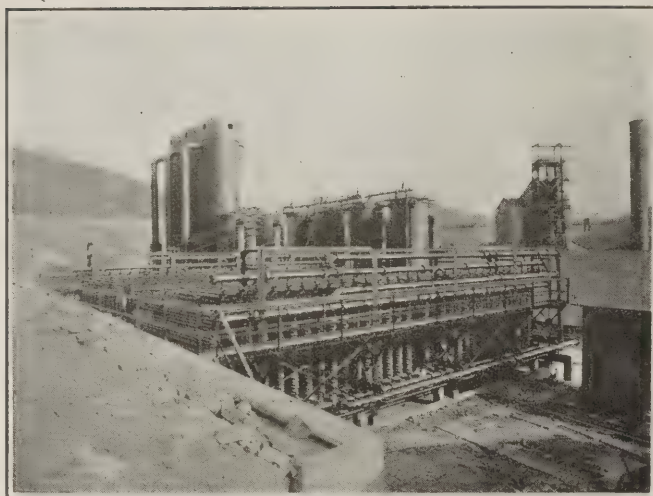


FIG. 9—COOLING COILS FOR PRIMARY COOLERS

On the left can be seen the three tall light-oil absorber towers, two low secondary coolers and in the middle rearground the four primary coolers. In the right rearground is the coal-hoisting shaft.

meet all requirements. The liquor enters a tank at the top of the still and passes down through coils in which it is preheated. From this point it passes through a lime reservoir, where it is mixed with milk of lime and again returned to the still, which it enters at a temperature of about 80 to 85 deg. C.

The mixture then flows downward over a series of superimposed trays and at the same time meets an ascending current of steam. Suitable baffling devices in each tray insure an intimate and efficient contact between the liquor and the steam. The steam liberates the free ammonia and the lime frees the "fixed" ammonia. The ammonia goes back into the saturators together with the gas from the exhausters. The excess lime and condensed steam leave the still at the bottom as "spent liquor," which goes to the quenching system at the ovens, as it cannot be run into the river.

We will now come back again to the consideration of the gas. After leaving the acid separators it passes through three final coolers which are arranged in series. These are of the same construction as the primary coolers, but water is used instead of weak liquor for cooling. This reduces the temperature of the gas to about 20 deg. C.

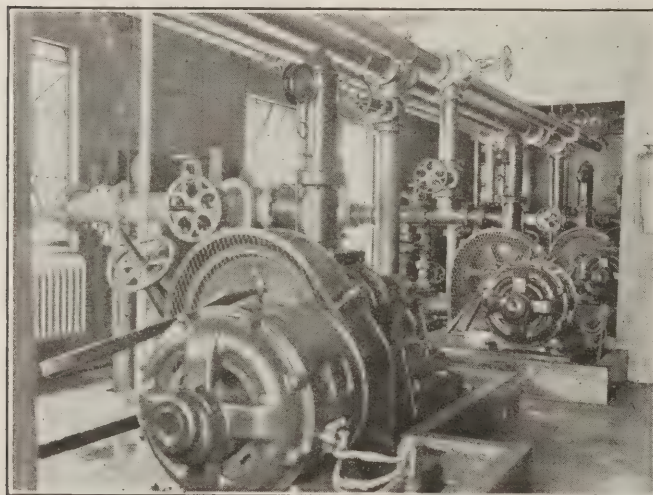


FIG. 10—WASH OIL AND WEAK LIQUOR PUMPS

Centrifugal pumps and their motors, the former being driven through gears. Enough weak liquor has to be passed through the cooling coils and primary coolers to reduce the temperature of the gas in the latter from about 70 deg. to about 30 deg.

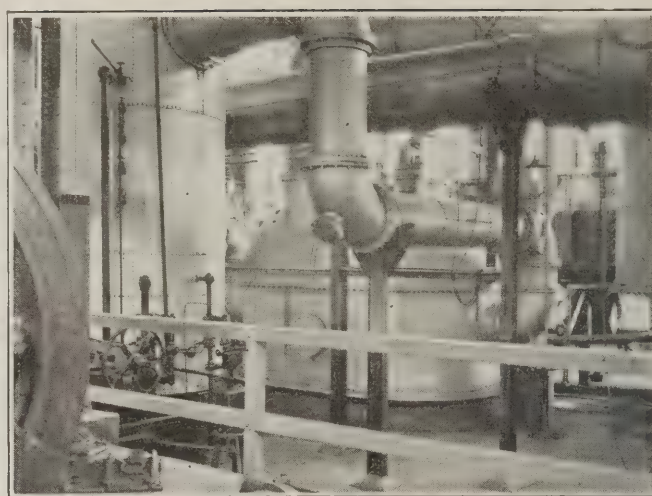


FIG. 11—TAR EXTRACTOR AND SULPHATE SATURATOR

Even after passing through the primary coolers the gas contains tar; consequently in the tar extractor it is passed through a screen and allowed to impinge on a flat surface. As a result the tar is still further removed. The gas then goes to the saturator.

The water, after circulating through the grids, runs into a sump where the small quantity of naphthalene remaining in the gas is deposited and collected, and the water is then pumped under a 200-ft. head to a spray pond located on the side of the hill at a point about 110 ft. above the plant. From this point it returns by gravity to the top of the final coolers. Tests on this spray pond made on favorable days have shown that the water is cooled to a temperature 3 deg. C. below that of the atmosphere.

From the final coolers the gas passes to the scrubbers or absorbers, which are of the same general construction and have a diameter of 16 ft. and a height of 90 ft. Straw oil, which is a light petroleum oil of high boiling point, descends through the scrubbers and meets the gas. The scrubbers are connected in series, two being used at a time and a third being held in reserve.

The gas goes in at the bottom of No. 1 scrubber and rises to the top. It is then taken to the bottom of No. 2 scrubber. The fresh oil, on the other hand, is taken in at the top of the No. 2 scrubber, falls to the bottom, and is raised to the top of No. 1 scrubber. Thus the gas and oil travel in opposite directions, the benzol and its homologues being absorbed by the oil in the process.

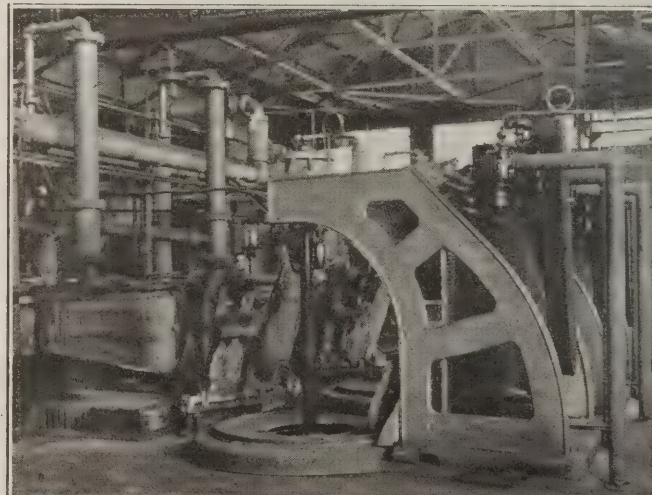


FIG. 12—DRAIN TABLE AND CENTRIFUGAL DRIER

Crystals of ammonium sulphate which fall in the saturator are thrown out by an air ejector onto draining tables. The liquid mixed with the crystals overflows and is returned to the saturator. At regular intervals the salt is paddled into the centrifugal driers

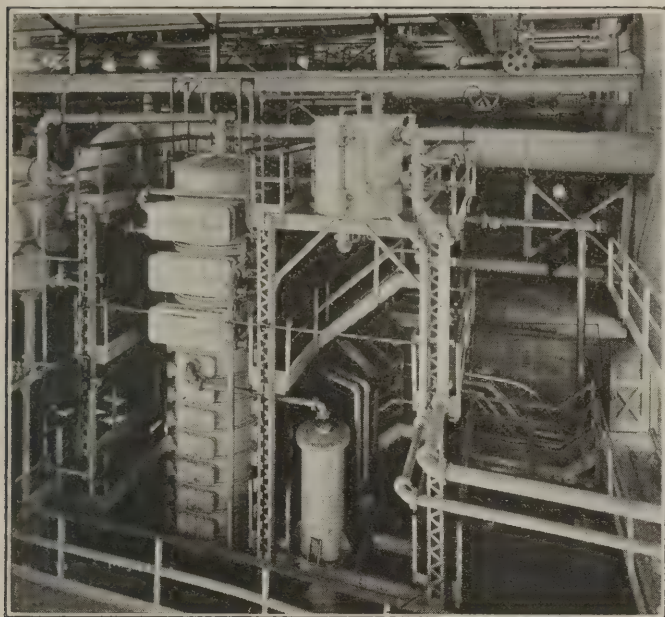


FIG. 13—AMMONIA STILL IN SULPHATE BUILDING

The saturators are fed only with "free ammonia" and sulphuric acid. The weak liquor of the primary coolers is mostly water with fixed ammonia, for conditions are favorable for the escape with the gas of whatever free ammonia may be present. To free the ammonia in the weak liquor the latter is run into the still at the top, passes down through heated coils and is circulated through a lime reservoir, where it is mixed with milk of lime. Returning to the still it falls over a series of superimposed trays, meeting on its way an ascending current of steam. The steam liberates the free ammonia, and the lime frees the fixed ammonia. The ammonia is then taken to the saturator.

When the wash oil comes from the wash-oil collector tank it is pumped into a wash-oil cooler, where it is cooled to about 22 to 24 deg. C. By having the flow of oil and gas come from opposite ends the fresh oil comes in contact with the leanest gas at a time when its absorbing powers are greatest. According to whether the oil is just entering, is part way or all the way through, it

is known as debenzolized, partly benzolized or benzolized oil respectively.

Thus, 90 to 96 per cent of all the benzol vapors are extracted from the gas, and the oil has a saturation of $2\frac{1}{2}$ to 3 per cent of benzol and its homologues. An important consideration is the quality of the wash oil, and periodical tests are made to insure that the desired standard is maintained. A portion of the oil is re-

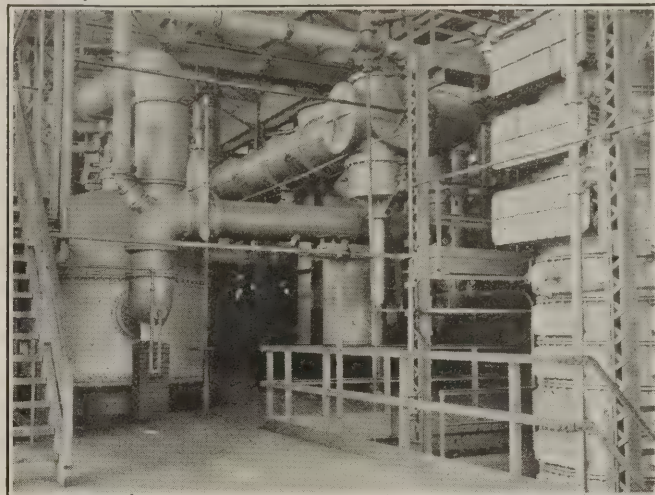


FIG. 14—SATURATOR FLOOR IN SULPHATE BUILDING

This shows the saturator on the left, the tar extractor in the middle and the ammonia still on the right.

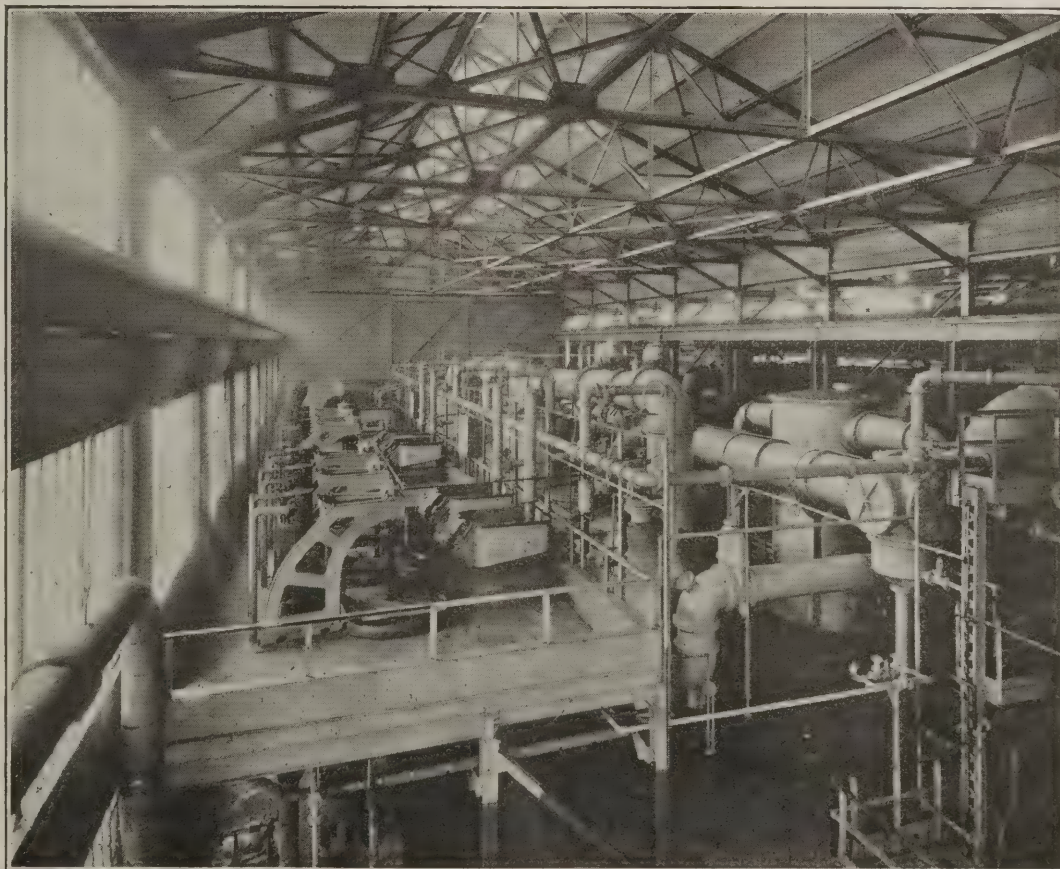
moved from circulation from time to time and replaced by fresh oil, as it has a tendency to thicken, which causes a deterioration in its absorbing powers. There is an average loss of 5 gallons of wash oil per 100 gallons of light oil produced.

The benzolized oil is pumped to the light-oil plant from light-oil absorber No. 1. Here a continuous process of distillation is used with enclosed and open steam

FIG. 15

Sulphate Building

On the right can be seen the tar extractors and separators and on the mezzanine floor the centrifugal driers, which remove the surplus acid from the sulphate. Each saturator has three driers. There are therefore nine driers to match the three saturators. Water is added during the drying process to remove still further the acid which adheres to the sulphate.



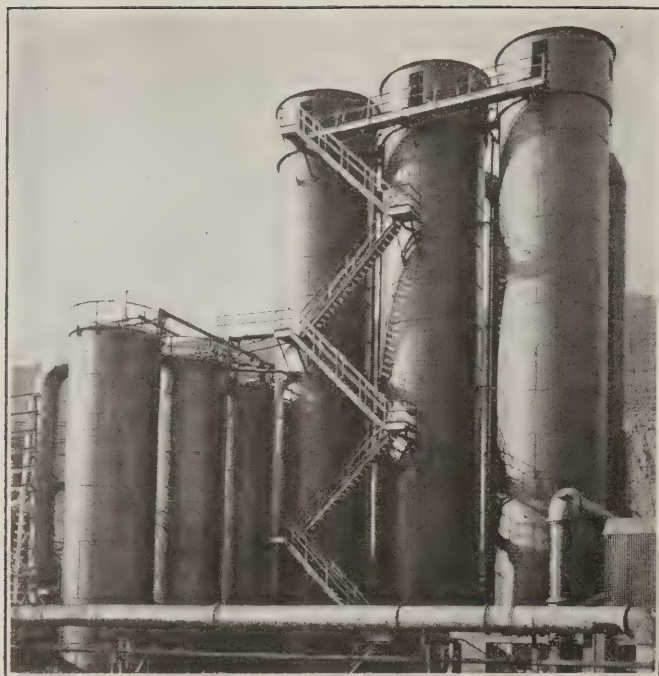


FIG. 16—FINAL COOLERS AND ABSORBERS

The final coolers bring the gas down to 20 deg. C. They are like the primary coolers but they use water instead of weak liquor and this water is cooled in a spray pond. The gas then goes to the scrubbers or absorbers, which it goes through in series, in contradistinction to the practice with coolers. Straw oil is used in place of water, the fresh oil entering where the gas leaves and leaving where the gas enters, so that the unsatisfied oil meets gas that has been almost deprived of its benzol and the almost saturated oil meets gas that has a maximum of benzol.

as the heating agent. The oil first enters an oil-to-oil heat exchanger, where it is raised in temperature about 10 deg. C. Then it passes into a tubular preheater, where it circulates through coils in indirect contact with steam which is forced into the top of the preheater and raises the temperature of the benzolized oil to about 130 deg. C. From the top of the preheater the oil is run off into the light-oil stills.

There are three stripping stills, which have been made of ample capacity to meet all needs. These are 6 ft. in diameter and have a capacity of 20,000 gallons per hour. They are divided into two parts, the lower being the stripping and the upper the fractionating section. Live steam is forced into the bottom of the still and separates the light oil from the straw oil in the form of vapor which rises to the upper section, where water is introduced direct to cool it to 100 deg. C. This removes any heavy oil that might be carried over.

The straw oil flows by gravity to the bottom of the



FIG. 17—SPRAY POND FOR FINAL COOLERS

Water, unlike weak liquor, can be cooled in the open air and consequently is more effectually cooled and more effective as a cooler. The pond is 110 ft. above the plant, and the water is pumped up at a 200-ft. head.

still, from which point it is taken to the decanter. Water from the light oil also comes to the decanter. The straw oil is separated from the water at this place and runs back to the wash-oil collector tank, where it is then ready to be used again. The water is pumped to a spray pond for cooling and is then of low enough temperature for pumping back into the top of the light-oil still.

The vaporized light oil passes out of the still into condenser coils, from which the resultant mixture of light oil and water goes to the light-oil separator. In the separator the water is siphoned from the bottom and sent back to the light-oil decanter, and the light oil, which is known as crude light oil at this stage, goes to the light-oil receiving tanks to be measured, and thence to the light-oil storage plant. As no provision is made for further treatment at Rosedale the crude light oil is shipped to the Franklin plant, which will be described later.

The Solvay people claim a high heat efficiency in their light-oil separating system and also emphasize the fact that the separation of light oil and absorbing oil is so complete that the light oil needs no intermediate redistillation before being worked up into motor fuel or pure benzol, toluol and solvent.

The gas from the scrubbers has had all the byproducts removed and is ready for distribution as fuel gas. All of it goes to the gas holders and from these the gas



FIG. 18—SULPHATE OF AMMONIA IN STORAGE

This salt is readily handled by small portable conveyors, part of one of which can be seen in the right corner of the photograph.

required for the ovens is drawn, the excess gas being pumped to the steel mills by "boosters." About 30 to 35 per cent of the gas is used for the ovens. The remainder is pumped to the mills with the aid of two 150-cu.ft. exhausters, each driven by a 425-hp. twin engine. The surplus gas, estimated at 25 million cubic feet per day, will replace in the mills approximately 500 tons of coal, or 100,000 gallons of fuel oil, or 13,000,000 cu.ft. of natural gas, or 100,000,000 cu.ft. of producer gas.

Some of the auxiliary equipment at Rosedale is of interest. The boiler house contains three 768-hp. water-tube boilers, each of which is equipped with a chain-grate stoker for burning coke breeze. The boiler plant is provided with a track hopper, elevator, crusher, belt distributor and fuel bins for handling either breeze or coal. Ashes are removed by a traveling bucket and skip hoist.

Two air compressors, each direct-connected to a 225-

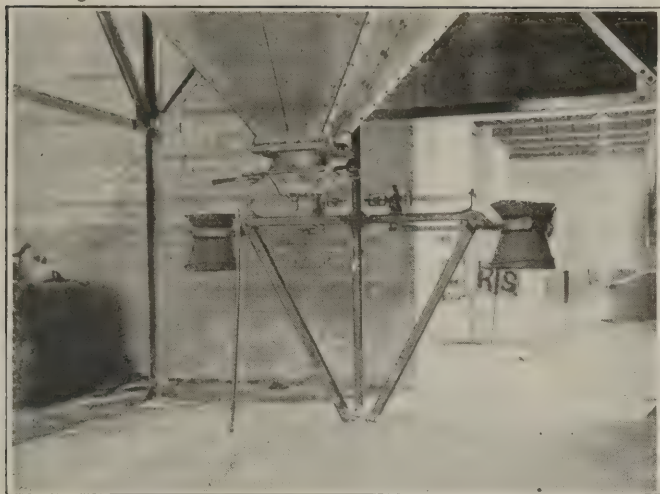


FIG. 19—BAGGING AND WEIGHING SULPHATE

A revolving frame with two containers and two steel yards makes it easy to load the containers with sulphate and weigh the contents, dropping the necessary quantity into bags, ready for market.

Indo-China Has Many Strippings In Coal 100 Ft. Thick

Excellent Anthracite and Low-Volatile
Bituminous in Lower Beds and Lignite
in Upper—Add Japanese Coal for Coke

THE production of the coal mines of Indo-China has been steadily growing since 1906, when the production was 2,297 net tons. In 1920 it was 770,000 tons and in 1921 it had reached 1,013,000 tons, showing a remarkable contrast with the mines producing non-combustible minerals. The production of these commenced to decrease in 1916, when the output was 55,770 tons; in 1921 it had fallen to 13,178 tons. The demand for coal, says *L'Indochine Minière* a publication of *La Vie Technique Industrielle, Agricole et*

hp. motor and having a combined capacity of 2,000 cu.ft. of free air per minute, take care of the various needs of the plant.

The main source of power throughout the plant is electrical, more than three hundred motors of various kinds being in operation. The current is generated in the steel company's power house and brought to the Rosedale transformer station in which there are (1) two 500-kw. 250-volt direct-current motor-generator sets and one 500-kw. 275-volt synchronous converter for supplying the direct current required, (2) three 1,000-kva. transformers for taking care of the alternating-current requirements.

The method of unloading and storing acid is of interest. The acid is blown from the tank car with the aid of compressed air into a tank of the same capacity. From this tank it passes into a small high-pressure tank of about 800-gallons capacity from which it is forced up into the main storage tank.

Every attention has been paid to making the plant as safe and satisfactory to work in as possible.

Coloniale, to which we are indebted for the information which follows, is steady and rapidly increasing.

Of the five divisions (*pays*) of the Indo-Chinese Union, Tonkin has been the most completely explored and appears actually to be the richest in mines of all sorts. The workmen are mostly Anamese from the delta plains and Chinese. The mountain peoples supply coolies, but they are little inclined to work steadily. They are above all useful to prospectors when making their examinations of the lands to be developed. The wages paid are roughly 50c. a day to Chinese, 35c. a day for Anamese and 27c. a day to native women.

The principal coal basin, which is of the Rhaetian (or Upper Trias) sub-era, a part of the secondary or Mesozoic period, was first mined in 1884. It contains low-volatile, almost anthracitic, coal (*charbon maigre*) and lies in the arc of a circle 112 miles long, extending from Moncav in the east to the Seven Pagodas in the

Monplanet Stripping

Note the various tramming levels and the inclined roadways from level to level up which coolies can travel, also the long inclines running under the various levels. Do not fail to observe that in the rear is another stripping of like character. Judging by the relation of the pit to the sloping surface of the ground the work is only just barely commenced. The Hatou and Campha strippings are equally impressive. Monplanet is one of the collieries of Hongay.



west. The usual proximate analysis will run: Volatile matter, 8 to 12 per cent; ash, 2½ to 7 per cent; fixed carbon, 87 to 88 per cent and sulphur, less than 1 per cent. The calorific power of the fuel will run from 12,600 to 15,120 B.t.u.

It is an excellent fuel that burns without smoke and produces no clinker. With the aid of forced draft it can be used without admixture for boiler furnaces even as mine-run or in a case of necessity as nut coal. Mixed with a high-volatile coal it becomes a good steaming fuel which can be burned by locomotives and sea-going

boats of 110 tons burden, being brought down the streams from the principal mines. The freightage costs 73c. per net ton. More than half the coal is exported, the points of shipment being Hongkong, Japan, China and the Far East.

The largest producer is the *Société Française des Charbonnages du Tonkin*, which mined at Hongay in 1921 792,000 net tons. These mines were worked by the Chinese in 1865. The beds discovered appear to group themselves in two series, those of Hatou and of Nagotna. The first consists of four beds, one, the Big



On Left

Port of Hongay Collieries

Where coal is received and loaded. This port opens into the bay of Along or Ha-long.

On Right

Stock of Briquets

The walls on the right are built of briquetted coal. On the left is a village for natives. This is part of the property of the Hongay Collieries.



vessels. Before the discovery in Tonkin of coal having a larger quantity of volatile matter, Japanese coal was mixed with the anthracite for steam purposes, but today the large navigation companies are beginning to stock their bunkers at Haiphong with a mixture of 60 per cent of the low-volatile coal of Hongay and 40 per cent of the higher volatile coal of other parts of Tonkin.

The mines in that part of the basin which is adjacent to the bay of Along are principally strippings and are close to natural ports accessible to ships of 4,400 to 6,600 tons burden—Hongay, Port Courbet and Port Wallut. The output of the basin in the region of the Dong-Trieu can readily be brought to Haiphong by

Bed, 164 to 197 ft. in total thickness, of which about 98 ft. is coal. The other beds have a total commercial thickness of 49 ft. The second series has ten beds 3 ft. 3 in. to 19 ft. 8 in. thick.

At Hatou the Big Bed is worked in three strippings, and the coal is transported by a railroad of 3 ft. 3 in. gage. The Big Bed at Campha likewise is stripped and the coal from these pits is transported to Hongay by lighters or junks of 66 to 110 tons weight. The conditions are exceptionally favorable, for this operation is close to the sea. The thickness of the bed is about 492 ft., of which 262 ft. is coal.

At Hongay the coal arriving from different operations

is screened into the following sizes: 0x0.4 in.; 0.4x1.07 in.; 1.07x1.95 in., and larger. The size 0.4x1.07 in. is washed. At the side of the washery is placed a briquet factory which has four presses and has a capacity of 143,000 to 165,000 tons per year. Seventy per cent of Hongay coal and 30 per cent of high-volatile Japanese coal is mixed in the manufacture of these briquets. The briquets are of two kinds—ordinary briquets and those for war vessels.

	Ordinary Briquets Per Cent	Briquets for War Vessels Per Cent
Volatile matter (less moisture).....	17.5 to 18	18 to 18.25
Fixed carbon.....	76 to 77	78 to 81
Sulphur.....	0.90 to 0.95	0.70 to 0.75
Ash.....	7 to 8	5 to 6
Calorific power (B.t.u.).....	13,500 to 13,680	14,130 to 14,580

The factory also has a boulet press which can manufacture 22 tons per shift. A battery of nine coke ovens also is provided. It can produce 27½ to 33 tons of coke per day. It actually produces 1,100 tons a year. The coking mixture is 30 per cent of Hongay coal and 60 per cent (?) of Japanese high-volatile coal. The *Société des Charbonnages du Tonkin* employs 800 Chinese and 7,000 Anamese, but it is estimated that the Hongay mines support a population of about 40,000 natives, including the families of workmen and traders. [Probably this 7,800 men includes the lightermen. It is interesting to notice that these men produce in a year

792,000 tons yearly, or 102 tons per man per year, which, under the favorable conditions is a small quantity, even for Oriental labor.]

Other mines are those of Dong-Trieu. Here are ten beds, of which four are worked. The coal has a usable thickness of 49 ft. to 65 ft. and is of hard anthracite, containing 3 per cent of volatile matter. At Phan-Me is a coal averaging 22 per cent volatile matter, 18 per cent ash and 1 to 1½ per cent of sulphur. It is an excellent combustible, mixing well with the dry coal to make a light and strong coke which has been proved suitable for metallurgical uses. In the basin of Phu-Nho-Quan et Chine is a coal consisting of 20 per cent volatile matter, 7.5 per cent ash and 4.2 per cent sulphur.

Not only is there Upper Trias coal but some that is of Tertiary age. This is lignite. That from the Tuyen-Quang mine has 35 to 40 per cent of volatile matter, 12 per cent of ash and 1.5 to 2 per cent sulphur. At Dong-Giao this Tertiary coal is 29½ ft. thick and at Tuyen-Quang only 8½ ft. thick.

With zinc, tin, tungsten, copper, iron, gold in quartz and placer workings, mercury, phosphate of lime, graphite and sapphires in Indo-China to furnish a market what more could a coal man wish, especially as at present an operator apparently is looked upon as a benefactor and not as someone to be tolerated, unduly taxed and closely regulated.

Disastrous Inflammation of Coal Dust In Excavating a Mine Dump

BY C. A. HERBERT

Mining engineer, U. S. Bureau of Mines

WITHIN the past three years two very serious accidents, under almost identical circumstances, have occurred on the surface at two different coal mines in southeastern Iowa, due in each case to the sudden ignition of a cloud of fine coal dust. The first accident resulted in the burning of six men, three of them fatally; the second burned eleven, three men dying as a result of their burns.

The mines in the southeastern part of Iowa, where these two disasters occurred, are operating in a coal bed the thickness of which averages about 3 ft. They are worked on a longwall advancing system similar to that of northern Illinois.

The miners in this section are paid on a screened-coal basis; in other words, they receive no pay for the fine coal. As a result they use forks in loading the coal into the mine cars, and naturally much coal is left along the roadways. Subsequently this fine coal, together with the roof rock that is taken down to give sufficient height on the roadways, is loaded into cars and dumped in piles on the surface. This roof rock is a black, oily shale, and the combination of fine coal and oil shale gives ample combustible. Consequently the dump pile when it catches fire burns the rock thoroughly as it is dumped. These rock piles, or dirt piles, as they are called, take fire spontaneously and continue to burn as long as fresh material is dumped on them.

This rock, after having burned itself out, makes an excellent material for road building and also for railway track ballast. Because of this latter fact the railroads serving these mines were in each instance loading out the burned material from the side of the rock pile with a steam shovel. Having cleaned up all the loose material along the side of the pile next to the track, leaving a

nearly perpendicular face, shots were placed in this straight face to bring down additional material for the shovel. In each case a slide took place following the dynamite shots. These slides brought down with them a large quantity of the recently dumped and as yet unburned fine coal from the top of the dump; this fine coal being light, naturally separated from the heavier rock material and thus formed a dust cloud.

As some of this fine coal was already burning along the outside of the pile where the air could get to it and all of it was heated nearly to the ignition point, it was in just the right condition to flash into flame as soon as it was thrown into the air. The combined force of the slide and the rapid burning of the fine coal threw this burning dust cloud several hundred feet from the foot of the rock pile and across the railway tracks, burning those who were unfortunate enough to be in its path.

In the latter accident the steam-shovel crew saw the slide take place and shut themselves in the steam-shovel cab to escape what they thought was a dust cloud, and thus escaped injury. The others who escaped were those who were fortunate enough to have run in a direction at right angles to the path of the flame.

One of the lessons learned from the study of dust explosions in coal mines is to keep the dust thoroughly moistened at the point where ignition is likely to occur. This acts in two ways to prevent a serious inflammation of the dust: First, the water tends to compact and bind the dust and prevent dust clouds from forming, and second, if sufficient water is added it will cool the flame of any incipient inflammation sufficiently to extinguish it.

With the above lesson in mind it would be advisable for the railway companies engaged in loading up these old dirt dumps to thoroughly wet down the freshly dumped combustible material at the top of the dump for several days prior to its being disturbed. This could be done best by using fire hose with a pipe 5 or 6 ft. long for a nozzle, which should be forced down into the material on the top of the dump to make sure that the water reaches below the surface of the heated material.

Testing Lightning Arresters and Important Features of Design and Construction

Equipment for Laboratory Testing—Properly Interpreting Laboratory Results—Use of High-Frequency Oscillator for Tests—High-Powered Condenser Discharge—Importance of Wave Form

BY V. E. GOODWIN

General Electric Co., Pittsfield, Mass.

OCCASIONALLY users of lightning arresters think it advisable to make laboratory tests on lightning arresters. In the case of a new type of arrester there may be a laudable desire on the part of a prospective user to determine the characteristics of the arrester, but whatever the motive, few if any companies could economically afford to maintain or have the equipment and technique to make the tests, or the knowledge to properly interpret the results. Years of experience with arresters in service and in the laboratory are necessary to understand and interpret the relationship between results in service and results in the laboratory.

The testing of a well-established arrester, like the compression chamber or oxide film arrester, is simply a waste of time, not only for the reasons just given but also because service tests, which if properly made are better than laboratory tests, have already demonstrated the effectiveness of the arrester.

In order that the problem of testing arresters may be better understood, and hence a waste of time and money avoided, it may be interesting to outline several of the methods employed in the laboratory, and the difficulties encountered.

VARIETY OF PARTS TESTED BY ELECTRICITY

Routine factory testing consists in testing insulators, bushings and other insulations to make sure that they have the necessary dielectric and flashover characteristics, and that they meet the specifications of the American Institute's standardization rules. All chemicals and compounds are given special electrical and chemical tests. Completed parts, like the oxide film cell, and, where necessary, arresters, like the compression chamber arrester, are electrically tested to determine whether the device has been properly assembled. Such tests simply insure that the product is in accordance with the ideas of the designers.

In research and development work, models of the proposed designs are tested according to certain standards established by experience. Fundamentally, the arrester must protect apparatus against lightning disturbances and must do so without being itself damaged or causing an interruption to service. It is not always appreciated that it is extremely easy to make a device that will protect, that it is extremely easy to make one that will be safe against self-destruction and that will not interrupt service, but that it is extremely difficult to make one that will combine both characteristics. More in detail, the arrester is tested to determine the following characteristics:

(1) *Sensitiveness*.—This determines at what value of the abnormal voltage the discharge begins. It is a function of the gap setting, and of the shape and material of the gap electrodes. The last two determine the "speed"

of the gap—that is, the dielectric spark lag under impulses of steep wave front.

(2) *Discharge Rate*.—Probably the most important characteristic. It is largely a function of the internal impedance of the arrester. It is a measure of the arrester's ability to discharge quickly large quantities of electricity.

(3) *Reseal*.—This is a measure of the recovery of the arrester after the passage of the lightning discharge. The line current that follows the lightning current might damage the arrester, and hence it must be interrupted in two or three cycles or less. It is a function of the principle on which the design of the arrester is based, as oxide film cells, aluminum cell, multigap, magnetic blowout, solenoid, or other mechanical means. In this character is also included the ability of the arrester to withstand quickly recurring disturbances. It also determines whether the arrester will function without causing such a large current to flow as to trip circuit breakers or interrupt service.

(4) *Life and Endurance*.—Tests are made to show whether the arresters will have a life comparable with that of other electrical apparatus.

In making laboratory tests it is kept in mind that a lightning arrester is a device for handling transients of short duration. These are superimposed on the normal voltage of the system and their duration is measured in micro-seconds (millionth of a second). When making laboratory tests, and also in service, the dynamic (generator or line) voltage never should exceed the normal rating of the arrester, as otherwise the cells or similar parts may be instantly damaged. Sometimes in making tests, double dynamic or some intermediate voltage is applied while a fuse is blown, but this is only done to get an idea of the current rate at which a transient or similar voltage would be discharged as the oscillograph is not fast enough to record transient currents of the speed of lightning. This, however, is not an operating condition and the tester is not alarmed even if the parts of the arrester are impaired by the test.

Another point kept in mind in making tests of this nature is that transient voltages occur across any arrester during the time it is discharging. These are due to several conditions which will be discussed later, but the point is the fact that they may or may not be detrimental. The function of the arrester is to protect the insulation of that part of the system adjacent to the arrester. This insulation is tested at 60 cycles for a period varying from 30 seconds to 5 minutes. This test is applied between terminals or between line and ground. Under transient voltages the conditions are quite different. This same insulation may safely stand four or even ten times as much voltage for this shorter time.

Again, under transient conditions the voltage distribution may be entirely different. Hence, an experi-

menter on lightning arresters should be thoroughly versed in the effect of these transients on the insulation of the apparatus and devices on electric systems. When making tests he should apply transients of various wave fronts to these arresters and at the same time should study their effect on the other apparatus to be used on the system. This is a difficult research problem, and for this reason the General Electric Co. considers it necessary to confirm these tests with two or more years of actual operating experience before putting a new lightning arrester on the general market.

Coming back to the question of transient voltage tests, with an arrester having a series gap there are two transient voltages in which we are interested. Assuming the extreme case of a rectangular voltage wave which has a vertical wave front, we would have the full voltage of the wave impressed upon both arrester and apparatus until the gap sparks over. Where sphere gaps are used this time interval is extremely short. After the gap has sparked the voltage drops to a value depending upon the quantity of electricity in this wave and the internal impedance of the arrester.

INTERNAL RESISTANCE VARIES WITH VOLTAGE

The internal resistance of an arrester of the valve type, like the aluminum or oxide film, is a variable factor, depending upon the applied voltage. It is high for voltages below the critical value and rapidly decreases for higher voltages. Thus for the oxide film arrester it is 10,000 to 40,000 ohms for voltages below the critical value and decreases rapidly to only a fraction of an ohm as the voltage is further increased. The capacitance of the cells also affects the impedance of the cells, and likewise the voltage across the arrester. High capacitance, as a general rule, is a desirable feature, but a gap in series with such cells counteracts or nullifies this quality to a great extent.

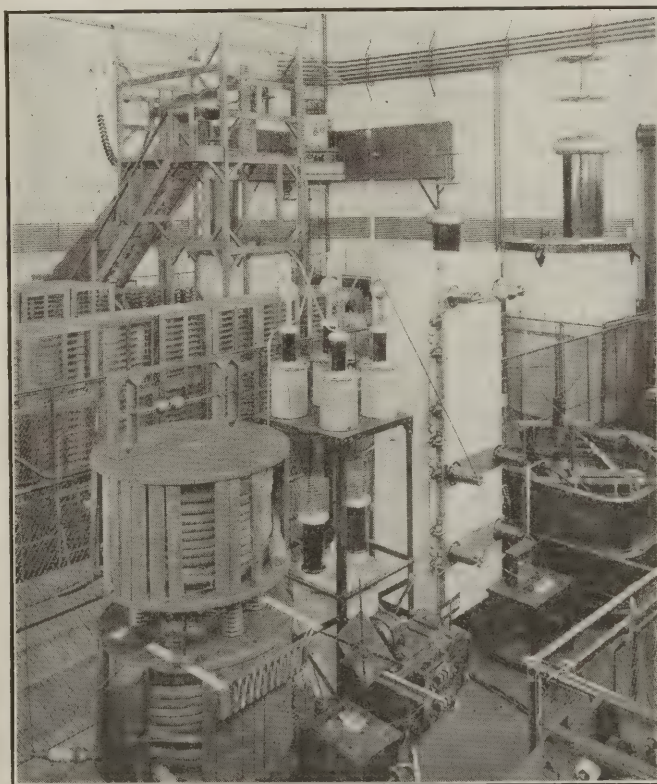
Hence, when an arrester discharges, we have first a momentarily high voltage impression until the gaps spark. This is followed by a rapidly decreasing voltage, which, as described, above, depends upon the quantity of electricity in the charge on the line and the internal impedance of the arrester. We find that this latter voltage and the rate at which it decreases is the important factor in the gap types of arresters—speaking of disturbances that may rise to the maximum value and decay to harmlessness in twenty-five micro-seconds or less. The time involved in this decay of voltage should be short so as not to stress the insulation of the system which is in parallel with the arrester. This is where the term “discharge rate” of an arrester comes in. It is a measure of the admittance of the arrester circuit at any selected super-voltage. As a general rule, it is expressed in terms of the instantaneous current which flows through the cells when double normal voltage is applied, as this is the accepted minimum test voltage for electrical apparatus.

The discharge rate of an oxide film or aluminum arrester is 600 amp. or over, and of a 2,500-volt compression chamber about 100 amp. Discharge rates of arresters are taken in various ways. The most common is to apply double voltage sixty cycle for a moment and take an oscillographic record of the current flow. This test is not a duplication of any operating condition, and, as mentioned above, is only made in order to get an accurate current record. Another and more comparable method is to pass transients through the arrester and measure the voltage drop across the arrester by means

of measuring gaps. These transient discharges are obtained by charging a condenser by high voltage, direct current, and discharging it through a circuit containing the cells and variable amounts of resistance and inductance, thus obtaining a range of wave fronts and wave characteristics.

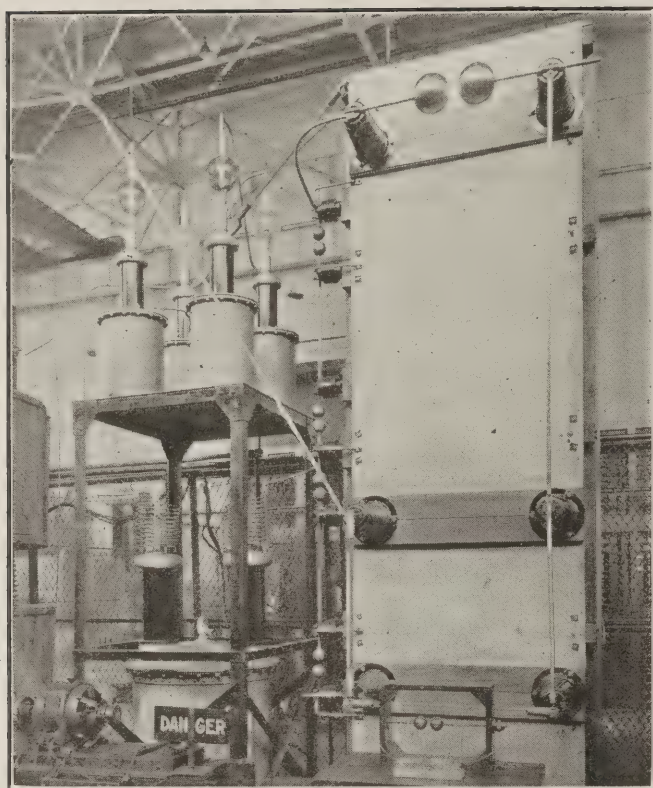
The size of the condenser can be varied to represent the capacity of different electric circuits. The high voltage, direct current, can be obtained from either a static machine or suitable kenetrons. We generally use from 100 to 120 kv. for these tests. The current may be of the order of 10,000 amp. The kenetron testing outfit is described in the *General Electric Review*, November, 1921, by Messrs. Hayden and Lougee. Tests of this kind should be made with condensers of fairly large capacity, as otherwise the power involved in the transient is not comparable at all with heavier lightning conditions on an average circuit. Tests made with small condensers or at lower voltage often give misleading data on the protectability of an arrester.

A common mistake in testing arresters, and particularly in comparing one type with another, is to use a high-frequency oscillator. This device has a place in a lightning arrester testing laboratory, but some experimenters, evidently not thoroughly understanding the phenomena involved, have used the oscillator to demonstrate conditions that could not possibly be attained with such a device. It is easy to obtain any desired voltage with the high-frequency oscillator, but it is not possible to obtain the desired current. Ordinarily, the current will be in the neighborhood of half an ampere and is in the form of recurrent trains of oscillations. With such a low-powered testing device it is not possible to determine the relative speed of gaps or the discharge rates of arresters. With such a test circuit it is easy for an inexperienced



SECTION OF HIGH-VOLTAGE TESTING LABORATORY

Such equipment as this is necessary for the testing of electrical equipment used on high-voltage lines, also to test apparatus for lightning protection. An important attribute of the apparatus used in these tests is that it makes it possible to obtain, discharge and dissipate large amounts of current and electrical energy.



LIGHTNING-ARRESTER TESTING APPARATUS

Studies of the effects produced by transient wave surges of various forms are necessary in making arrester tests. By the use of resistances and impedance the wave forms may be varied over a wide range.

tester to conclude that needle gaps are faster than spheres or to make other equally unscientific deductions.

Referring again to the tests with a high-powered condenser discharge, the discharge rate and protective value of the arrester cells are obtained indirectly by measuring the voltage drop across the cells by means of sphere gaps when the condenser discharges. This test is known as the equivalent-sphere gap or E.S.G. test. The rate of decay of the voltage is the really important factor in this test and is the most difficult factor to determine, as up to present date no reliable instruments have been devised to record accurately the wave form of these short transients. It is desirable to have this rate of decay as rapid as possible and at the same time avoid an oscillation of any great magnitude. The sphere gap is extremely fast and indicates the highest values of equivalent spark gap. Slower gaps also are substituted for the spheres in order to study this rate of decay of voltage during the discharge. Needle gaps are slower than spheres and gaps under oil likewise are slower. Again this decay of voltage is studied by substituting various kinds of insulations for the measuring gaps.

A common error in making E. S. G. tests is to neglect the current capacity of the testing generator. Such tests made with a high-frequency oscillator illustrate this point. The current is so small with respect to what the arrester is called upon to discharge in a lightning disturbance, and the effect of capacity may be so great as to make the results worthless. A measure of the protection afforded is the voltage across the arrester (and hence across the apparatus) when the arrester is discharging, and the voltage can be measured only by putting through the arrester an amount of current that would be comparable with the current during a lightning discharge.

The reseal properties of an arrester are studied by applying normal 60-cycle voltage and superimposing

impulses of different intensities on the circuit. The impulse is timed to occur at a predetermined point in the 60-cycle wave, and the dynamic current flow is recorded by the oscillograph, which also shows the reseal characteristics. The time of a reseal in a high-grade arrester varies from a micro-second to about four-hundredths of a second. In lower grade arresters the reseal is longer, requiring in some cases several seconds.

Life and endurance tests are made in several ways, depending on the type of arrester. In general a 3,000-volt section of an arrester is subjected to condenser discharges from a static machine at a rate of one discharge in fifteen seconds. The equivalent sphere gap of the arrester section is taken from time to time.

Another endurance test is to apply normal sixty cycles to the arrester and superimpose different impulses at definite intervals. These impulses are timed, by means of a synchronous switch, to occur at a specified point in the 60-cycle wave to give the most severe operating conditions and to avoid the otherwise hit-and-miss tests. This point varies for different arresters but lies between 30 deg. and 90 deg. after the voltage passes through zero. Secondary life and endurance tests also are made with surges or recurrent oscillations, in order to study the operation and characteristics of each type of arrester. These tests are not true representations of any line conditions, but are made in the further study of the arrester.

The testing of lightning arresters at first sight seems a simple problem, but the lack of supersensitive instruments for accurately recording wave forms of single impulses makes the problem a very difficult one, and roundabout methods must be employed.

Will Erect Exhibition Mine in England

AT THE British Empire Exhibition, to be held at Wembley, near London, the Mining Association of Great Britain will erect a colliery that will enable the public to realize what a mine is like above and below ground. The director of the mining exhibit is H. M. Crankshaw, who while he was in this country and general manager of the Cranberry Coal Co., a subsidiary of the Lehigh Coal & Navigation Co., was a frequent contributor to *Coal Age* and also to the proceedings of the American Institute of Mining and Metallurgical Engineers.

He writes that he will have a quarter of a mile of underground workings which will show longwall and pillar-and-stall methods of operation with all the general mine equipment such as pumps, haulage, coal cutters and stables. It is said that the exhibit, including the machinery shown, will represent about \$500,000. Arrangements are being made to lower a thousand people per hour into the shaft, which will be 15 ft. in diameter and 40 ft. deep. About twenty persons will be lowered at a time.

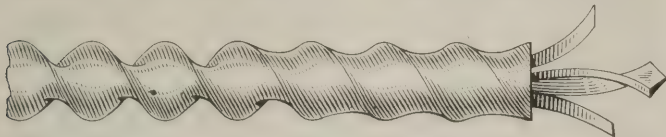
The headframe and tippie will be of steel 70 ft. high. It will have all the regular equipment, scales, car hoist, rotary dumps, screens and a washery. A lamp room and a fan also will be installed.

The exhibition will be held in May of next year and has been planned in collaboration with representatives of the Institution of Mining Engineers, the Miners' Federation of Great Britain and the Mines Department. Correspondence should be addressed to H. M. Crankshaw, Director, Mining Exhibit, General Buildings, Aldwych, London, W. C. 2.

New Equipment

Small Coal Auger Bit with Two Reamers

WITHOUT a single bolt to come loose in the hole and cause trouble, the Bache'der & Conner Manufacturing Co., of Decatur, Ill., has devised a coal auger with a central twisted straight-ahead bit and two side reamers, all three about 8 in. long. They slide in a



COAL BIT THAT MAKES SMALL HOLE AND REAMS IT

The small bit leads the way, one reamer then enlarges the hole and the other brings it to standard. The manufacturers are meeting a species of general demand, recently arisen, for small detachable bits that can be carried without adding too noticeably to the miners' burden.

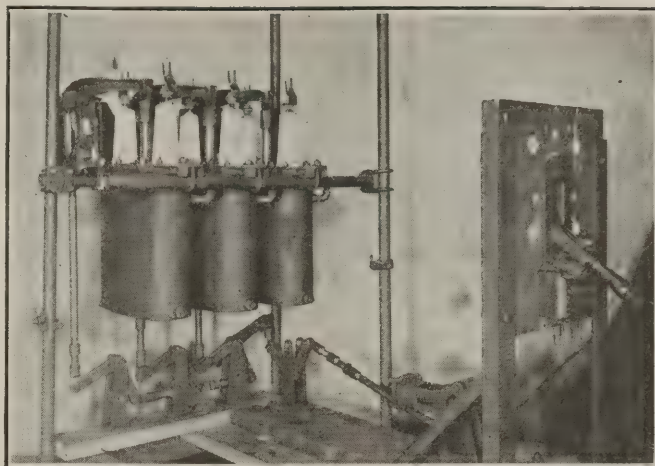
slot in the bit head. The center bit is about 1 in. in the lead of the inner reamer, and the point of this in turn is about $\frac{1}{4}$ in. ahead of the point of the outer reamer. The center bit cuts a small hole ahead, the inner reamer enlarges it to about $1\frac{1}{2}$ in. and then the outer reamer increases its diameter to the size the miner desires up to a 4-in. hole. It is claimed that the auger drills easily and that as the actual cutting bits are small the miner can carry them to the shop in his pocket when he wants them sharpened.

New Oil Circuit Breaker of Unit Type

A NEW oil circuit breaker, the type F-33, in capacities of 400, 600 and 800 amp. at 15,000 volts, has been placed on the market by the Westinghouse Electric & Manufacturing Co. This breaker has an interrupting capacity of 1,900 amperes at its rated voltage and is applicable wherever a breaker of that capacity is needed. It is made in the remote-control form only to conform to the recommendations of the Electric Power Club oil circuit-breaker standard practice rules limiting the service of panel mounting breakers to voltages not exceeding 2,500. A separate pole per frame construction makes it particularly applicable wherever it is desired to have the phases isolated.

The type F-33 breakers are supplied for either manual or electrical automatic or non-automatic operation and in single-, two-, three- or four-pole units. Each pole unit is entirely separate with its own frame, mechanism and tank. The heavy cast-iron framework is arranged for either wall or pipe mounting. The mechanism of the breaker is provided with a toggle which permits the breaker to be adapted readily for upward, downward, or horizontal pull without the use of any additional material. A highly efficient form of wedge and finger contact is used with an auxiliary arcing contact on the moving element. The stationary contact is so shaped and located that different portions of the same contact surface act as the main current-carrying contact and as the arcing contact, thus preventing arcing on the main contact surface. The sheet-steel tanks have all seams lap-welded and are lined with micarta.

The electric operating mechanism has a solenoid with a 3-in. diameter core and consists of a cast-iron frame



TYPE F-33 MANUALLY OPERATED CIRCUIT BREAKER

Frequently four-pole units should be purchased and installed for 3-wire systems. This arrangement makes readily available the spare unit in the event of trouble; a feature of importance where continuity of service is essential.

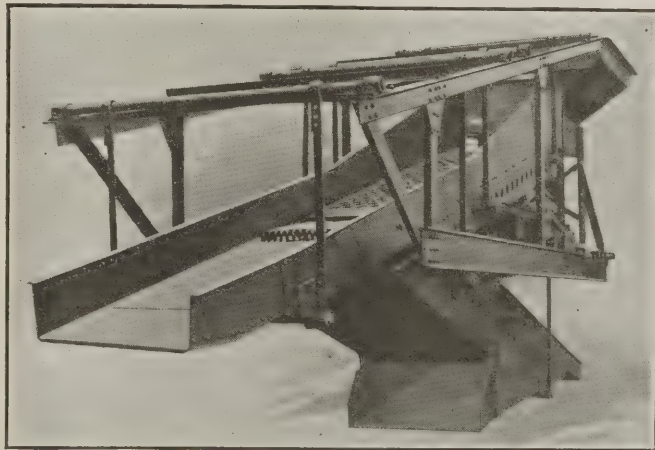
with spaces for closing and trip coils. The moving core of the closing solenoid pulls the main lever down to the closed position, where it is latched, and the trip coil disengages the latch. The mechanism is provided with springs to make the breaker open more rapidly. A two-pole double-throw auxiliary switch is used for cutting out trip-coil currents and controlling indicating lamps.

Simple Standardized Coal Screen for Use At Thousand-Ton Per Day Plants

LUMP, egg and slack are made in a compact, uncomplicated screen designed and constructed by the Morrow Manufacturing Co., of Wellston, Ohio. It is built on a conservative rating of 125 tons per hour, so that it will serve the purposes of the numerous plants producing 1,000 tons per day or less. It is known as the Morrow Junior.

The feeder hopper in the rear receives the coal, and a reciprocating feeder causes it to flow evenly onto the shaking screen. This screen separates the egg and slack from the lump coal. The latter passes finally over a bar rescreen which takes out all the slack that may remain delivering clean coal to the loading boom or other loading device.

The egg and slack pass through the perforations to a



WHY NOT STANDARDIZE SCREENS AND TIPPLES?

When one would buy an engine for ordinary work one inquires what types are being built on a quantitative basis. Engines, like most other things, are now but rarely custom-made. Screens and tipples, where not unusually large, might equally well be standardized, except, of course, that the approaches to tipples must be fitted to the hill.

lower screen, where, after separation, the egg goes to the third track and the slack to the center, or second, track. The lower screen is provided with two slide valves which may be adjusted to mix all or any part of the egg with the slack, which is loaded on the center track.

In two or three minutes the bar screen in the upper section may be adjusted to permit any size of "big lump" to be loaded, leaving the "depleted run-of-mine," which is loaded on the center track. The "depleted run-of-mine" may be deprived of any or all the egg coal, which may be loaded on the regular egg track. Thus big lump, depleted mine-run and egg can be loaded at the same time. If necessary a rack and pinion or a fly valve can be placed in the hopper so that run-of-mine can be bypassed directly to the railroad car without operating any of the machinery.

Standardization makes it possible to construct these screens inexpensively, and it is asserted that being solid units they absorb most of the vibration, shaking the screen rather than the tipple and making the operation less noisy than is customary with shaker screens. Standard tipple plans have been prepared to go with the screen so as to make it easy to prepare for its reception and to install it.

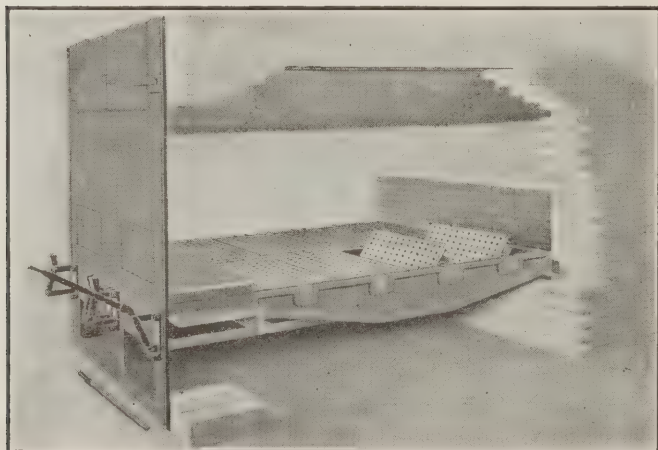
Grate for Burning Small Sizes of Coal

WITH increased interest in the consumption of pulverized coal many operators and consumers will find it advantageous to consider the adoption of a grate suitable for burning fuel of small size.

The Marion forced-draft grate, made by the Marion Machine, Foundry & Supply Co., of Marion, Ind., is designed to burn all kinds of fine or dusty fuel, such as anthracite culm, coke breeze, bituminous slack, lignite coals or sawdust, or any fuel that is so fine that it cannot be burned on the regular form of grate.

The grate-bar construction is that of a cradle into which is cast the steel-bearing trunnions. The perforated top plates are bolted to these cradles. The top plates are made in sections, using two or more plates to each cradle. These plates are bolted to the cradles and are easily replaced when burned out.

The joints between all the grate bars and the side frames are beveled to fit closely enough so that the fuel cannot sift through into the ashpit.



MARION FORCED DRAFT GRATE

The grates are made up in one or more sections in width, as may be required, and of the proper depth to fit the firebox. The grates may be so arranged that on a long set the front and back sections may be dumped separately.

The grate bar tops are perforated with either $\frac{1}{8}$ -, $\frac{1}{4}$ -, $\frac{3}{8}$ -in. holes, spaced $\frac{1}{2}$ in. apart. This gives an even distribution of the air to all parts of the fuel bed. These holes are so small that the air coming up through them prevents any fuel wasting into the ashpit.

The ashpit is closed, and a forced draft is provided by means of a turbine or steam draft blower installed in the furnace wall. This insures the strong draft necessary to force the air up through the dense fuel bed.

Automatic Mine Car Coupler

THIS device is designed with the idea of efficiently filling the need for a safe automatic coupler. Its inventor, A. J. Baldwin of Pikeville, Ky., asserts that it has more than twice as many good points as it has

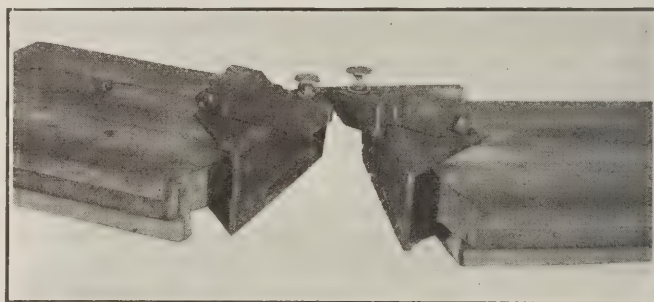


FIG. 1—READY TO COUPLE

The model shows the construction details and how the jaws align before coupling.

parts. Briefly some of the advantages are: It will save time, eliminate wrecks, cannot accidentally uncouple, can be released or uncoupled quickly and easily, is adaptable to any car, is rugged in construction, safe and relatively inexpensive.

This new device is called the Bulldog Automatic Mine-Car Coupler. When the cars are bumped together they couple automatically and require no human effort.

Loss of coal is greatly eliminated by this coupling device because the coupler holds the cars closer together and there is less bumping of one car against another, with the attendant loss of coal from the top of the car.

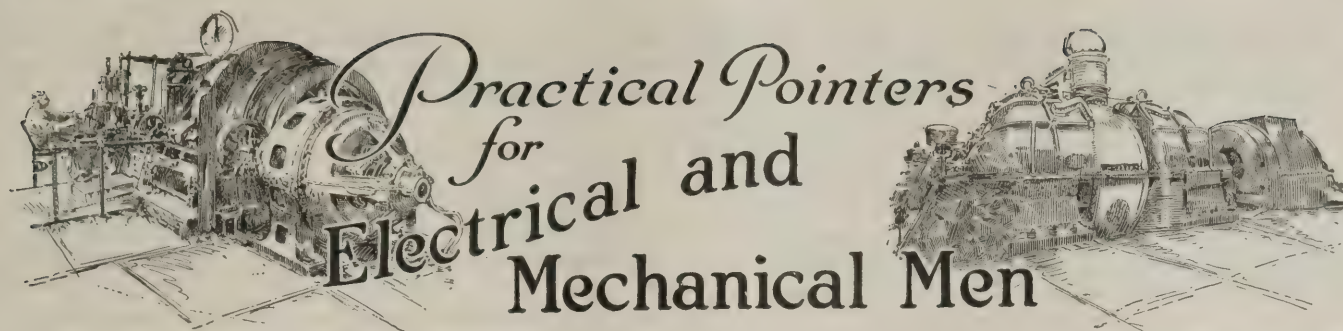
Fig. 1 shows the relative position of the dogs of the



FIG. 2—HOW TO UNCOUPLE

One hand is all that is used in uncoupling and there is no slack space between cars for the workman to be caught and squeezed.

coupler just before they are linked or fastened together. Fig. 2 shows how the coupling may be easily and safely opened with far less danger to the trip runner or dump man than is usual with present-day links and pins.



Testing Polarity of Field Coils

THE object of this test is to determine whether the main and commutating-pole field coils are properly connected. This test should be made whenever field coils are replaced, because coils sometimes are placed over the poles of the frame inverted or reversed, and wrong connections thus made show up in faulty operation of the motor. This test will reveal conditions which might cause an armature to run hot because of an unbalanced magnetic field circuit caused by a reversed main field coil. It also will indicate conditions which might cause poor commutation and flashing in a commutating-pole motor because of a reversed commutating coil.

The following apparatus is required: A polarity detector, such as a small compass; a switch and several sets of grid resistors. A circuit is arranged as shown in Figs. 1 and 2. At least five or six sets of resistors should be put in the circuit at first. If a readable deflection on the polarity indicator is not obtained, part of the grids can be omitted. If one is available, an ammeter in the circuit will indicate whether the current is large enough to be likely to cause damage.

A very satisfactory polarity indicator can be made from a piece of steel banding wire about 3 in. long, with one end bent over about $\frac{1}{4}$ in. to distinguish it. This is suspended at the middle by a short thread. When this is first used it should be held at the pole for at least one minute, when it will become magnetized; then it is ready for use.

The motor can be either on the machine or out on the floor. It can have the armature in or out of the frame, and if it be a split frame, it can be open or closed. With the coils all connected in series, connect the two field leads to the test circuit, as shown in Fig. 1. When the switch is closed, current passes through the field coils, and if they are connected properly, by holding the polarity indicator close to the ends of the coil or to the

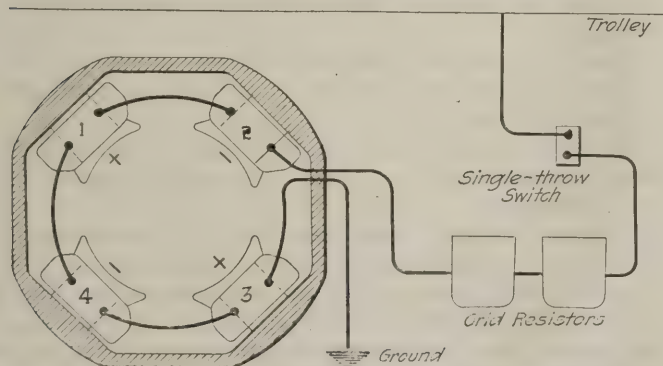


FIG. 1—CONNECTIONS FOR TESTING MAIN FIELD COILS

With the main field coils connected in series with a resistance between the trolley and ground the field polarities should alternate as the circuit is followed around the frame.

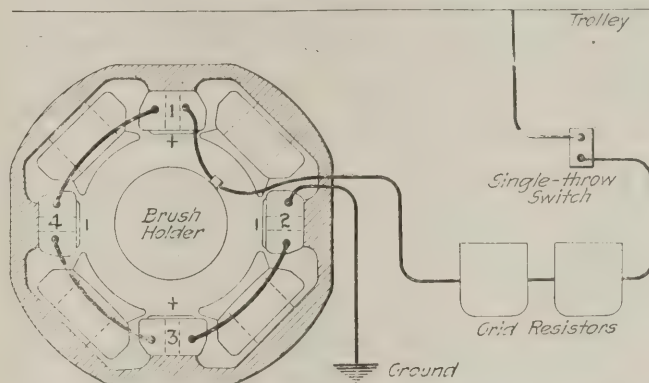


FIG. 2—TESTING COMMUTATING FIELD POLES

Here the commutating fields are connected in series with a resistance and connected between the trolley and ground while the polarity of the coils is tested.

pole stud bolts on the outside of the frame the polarity indicator will reverse at alternate poles; i.e., if No. 1 pole attracts the positive end of the polarity indicator, No. 2 should attract the negative end, No. 3 the positive end and No. 4 the negative end. If these conditions are not obtained the field winding connections should be changed.

If the frame tested has commutating poles, two separate tests should be made, one on the main field coils, as previously described, and the other on the commutating-pole coils, which is made in the same manner, with connections as shown in Fig. 2. In this case only one of the motor leads (the negative armature lead) can be used, as the other lead from the commutating coils goes to one of the brush-holders. Four-pole railway motors used in mine locomotives with only two commutating coils, which are located directly opposite each other; also four-pole motors with three commutating coils, are tested in the same manner. In the case of the two-pole machine the polarity of both coils should be the same; in the three-pole machine the two coils on diametrically opposite poles should be of the same polarity, while the intervening coil should have the opposite polarity.

In making this test:

(1) Hold the pivoted compass in a horizontal position or the suspended polarity indicator by the free end of the suspension thread.

(2) Test for polarity at the same end of all coils—either the commutator or the pinion end, whichever is more convenient.

(3) Never consider results final until they have been checked the second time, as there is a possibility of the needle of the indicator having its polarity reversed.

(4) It is not necessary that a certain pole have a definite polarity of either + or -, but it is essential that the polarity of adjacent poles be different.

In the case of a commutating-pole machine it is im-

portant to have the proper relation of polarity between the main and commutating field poles. To check this connect the negative (—) armature lead of the motor to the positive (+) field lead, the positive (+) armature lead to the trolley side of the test circuit, and the negative (—) field lead to the ground side of the test circuit, and close the switch. If the armature is in the frame and the brushes are making contact on the commutator, current will flow through all the windings; if the armature is not in the frame, then it will be necessary to short-circuit the brush-holders. With these conditions, the polarity of a main pole should be the same as the polarity of the commutating pole next to it in a clockwise direction when facing the commutator end of the motor.

Question on Maximum Demand

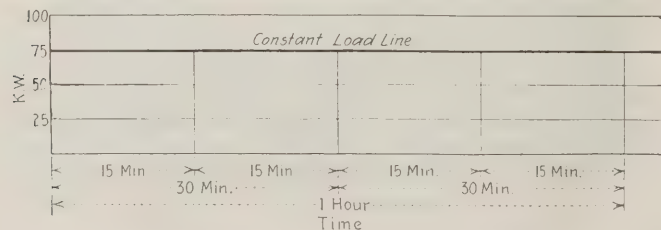
WITH reference to an article appearing in *Coal Age*, July 26, page 144, on the subject of maximum demand, which I read with much interest, I found, on looking up some of the catalogs of manufacturers selling demand meters, that there seems to be some confusion on the subject. Referring to the type R.A. demand meter description in the Westinghouse catalog I find the statement: "If the reset wheel is set for one-hour intervals, three offset marks give indications from which the 15- or 30-minute demands during the one-hour interval may be obtained." If this is true, then it would appear that the shorter the time interval the lower would be the maximum demand.

This statement does not agree with the article referred to above and it seems to me that there should be some further explanation. PENNA. READER.

Let us assume three maximum demand meters operating on the same circuit and measuring the 15-minute, 30-minute and one-hour maximum demand of a constant load. According to our definition the maximum demand is the average demand established over a given time interval. From this we see that the maximum demand on each meter must be the same. This is shown in the figure. The 15-minute demand meter would indicate 75 kw. maximum demand four times in the hour, the 30-minute demand meter would indicate 75 kw. twice in the hour and the one-hour demand meter would indicate 75 kw. once in one hour.

Note that the one-hour demand meter would be only half through registering in one-half hour and would therefore indicate 37.5 kw. Taking this halfway point and multiplying it by 2 gives the correct maximum demand and multiplying the quarter-hour registration on the one-hour demand meter by 4 gives the correct maximum demand. This is true only when the load is constant, which is a rare case.

From the chart referred to it is not correct to assume that the 30-minute offset gives the true maximum



EXPLANATION OF MAXIMUM DEMAND

It is apparent that the average demand for either the 15-minute, 30-minute or one-hour period must be the same and are all equal to 75 kw.

demand. Only when the load is constant is it possible to multiply this point by 2 to obtain the correct one-hour maximum demand.

Safety in Gas Welding and Cutting

ADDITIONAL suggestions for safety in gas welding and cutting were brought out as follows in a paper on the subject prepared by C. F. Worfolk, for the National Safety Council meeting recently held at Detroit. The first section of the paper appeared in the July 19 issue of *Coal Age*.

A properly trained welder will protect the other fellow from the "hot" metal. The green hand does not know enough to do so. He costs the employer a lot of money. Just because the first-aid department handles the burn case it probably is charged against the general cost of doing business and not against the person responsible. Employers know that they will need welders from time to time. There are many places where welders can learn the trade properly. It would seem good policy for the employers to encourage their men to take up trades of this nature when such excellent facilities are available as there are in most big cities. Schools like the technical public schools, the Y. M. C. A. schools and the institution that I represent, the Michigan State Automobile School, offer thorough courses under expert instructors.

Next to burns come injuries to the eyes. Most of them are absolutely preventable. Employers should compel their torch men and attendants to wear suitable goggles. It sounds easy and it is easy if the employer insists upon it. The torch flame looks harmless, but from it, as you know, constantly emanate rays which are destructive to the delicate mechanism of the human eye. A suitable goggle intercepts these rays. It also intercepts particles of rust and scale exploded from the surface of rapidly heated metal.

I remember asking a garage proprietor not long ago why he was willing to risk his eyesight by using a torch and not wearing goggles. He politely invited me to get out and mind my own business. Not many employers or boss welders are as inconsiderate and careless as he was and yet you will find plenty of welders at work with absolutely no protection for their eyes.

All sorts of helmets, goggles, body-protecting devices, asbestos shoes and so forth are today available to the welder. Make him use them. Make it easy for the welder to carry on his trade in comparative safety. When he gets hurt it costs money.

Important points summarized in conclusion are:

Insist on frequent and adequate inspection of all apparatus.

Insist that all hot articles be suitably marked.

Force the workmen to wear proper goggles and protecting devices.

Properly ventilate the welding shop to carry away any escaping gases, thus minimizing the danger of a shop explosion.

If tanks are used keep them out of direct sunlight and in a cool place, away from high temperatures.

Insist that none of your money goes to pay wages to a welder unless he is properly trained. If you refuse to employ the untrained green man he will manage to get proper training to fit himself for the job.

Properly instruct every employee who in any way comes in contact with the welding shop in regard to the hazards found in that shop.



Problems of Operating Men

Edited by
James T. Beard



Approving Use of Miner's Electric Cap Lamp by Firebosses

Fireboss' Duties Not Limited to Testing for Gas—Examination for Other Dangers Requires Better Light Than Afforded by Safety Lamp

HAVING read with interest the letters of the various correspondents appearing in *Coal Age*, it is my privilege to say that I entirely disagree with the stand taken in the letters of O. G. Sharrer, in the issue of Nov. 30, p. 879, and William Dickinson in the issue of March 29, p. 530. The former states as follows: "Any official whose duties require him to test for gas in the mine should carry no other lamp than an approved testing lamp."

It is true the electric cap lamp has no value for making a test for gas; but it is of great value in examining the condition of the roof and timbering. Mine officials have more duties than simply making tests for gas. They must examine the state of the roadways and the roof at the working faces, as well as make tests for gas.

It appears to me that it would be an easy matter to make a cap to cover the headlight when making tests. Any fireboss could make such a cap for himself out of a piece of old leather or rubber and cover the headlight on the electric lamp without losing any time.

ELECTRIC CAP LAMP AN AID NOT A HINDRANCE

Surely no correspondent has given this matter any careful consideration, who can make the statement that the carrying of an electric cap lamp would delay a fireboss in his examination, or in any way prove a menace to safety. How much of a fireboss' time is actually spent in making tests for gas? Is it not a fact that a good deal more of his time is taken up in examining the roof and timbering?

Again, no one who has ever performed that work would suggest that a fireboss can travel as fast by the light of an ordinary flame safety lamp, as he can by the light of an electric cap lamp. In my opinion, any time that would be lost by a fireboss in shielding the glare of his electric cap lamp when making a test would be more than offset by enabling him to examine the roof and coal more quickly and by giving him better light for traveling from place to place on his round.

Speaking of the limited time of the fireboss, Mr. Dickinson says, "Many firebosses will take chances under such conditions and not make any effort to screen their electric lamps, which thus become a menace to safety." Let me remark that any fireboss who will take chances is not fit to be employed in that capacity. By not screening his electric lamp, the fireboss becomes the "menace to safety" and not the electric lamp.

When a fireboss has to make his examination at the

speed described by Mr. Dickinson, no doubt many times he will lose his light. My belief is, therefore that it is a great benefit to a fireboss to have an electric light so that he will not be in the dark when he loses his flame light from any cause. Then, instead of stumbling about and bumping his head and body, he can walk out with a good light and reach a point where he can relight his flame lamp with safety.

Again, in the extraction of pillars where a fireboss must examine high falls and travel in the broken, an electric lamp should be a boon to him. Any one who has performed these duties by the light of a safety lamp, knows the difficulty and the danger of the situation.

I recall many experiences of twenty-five years ago, when firebossing in a mine where nothing but naked lights were used. It was imperative that the fireboss reach the top of all caves or get as near the top as was possible. Many a time did I bump my head and cut my hands and knees in getting out of a tight corner, after losing my light. Flame safety lamps, in those days, were not equipped with self-contained relighters and an electric cap lamp would have been considered a blessing by every fireboss.

MAKE ELECTRIC CAP LAMP COMPULSORY

Allow me to suggest that, instead of mine officials who make tests for gas being debarred from carrying electric cap lamps, they should be compelled to carry them. Also, I would say that the flame safety lamp should be so regulated with a reduced flame that it can only be used for testing purposes and not as a working lamp. This would make the lamp much safer for testing purposes.

In his letter Mr. Sharrer says:

"How often do we observe, assistant foremen and firebosses; yes and foremen and superintendents also, for that matter, traveling about the mine and carrying a lamp, having one side of the glass covered with soot. We must naturally conclude that if the glass is dirty, the gauze is also dirty, and the lamp for that reason unsafe. Yet there are hundreds of lamps used every day in that condition."

In that respect, let me say, if those officials each carried an electric cap lamp for a working lamp, and their safety lamps were so regulated that only a reduced flame could be obtained, their lamps could not get in the condition he describes. The same writer also thinks it would be an indication of old age and incapacity for the work, not to be able, by the light of his safety lamp, to see a crack existing in the roof. I doubt if our friend has ever looked at a crack in the roof by the light of a safety lamp, and then observed the same crack by the light of an electric cap lamp, or he would not offer such an argument.

Let the person be young or old, he will see the crack much better by the light of the electric lamp than by the glimmer of a safety. The same is true in regard to reading the vernier on a transit.

L'INCONNU.

Victoria, B. C.

Give the Fireboss the Best Possible Light

Electric cap lamp a Godsend to the fireboss—Need of a device other than the safety lamp for detecting gas—Advantage of a relighter in the safety lamp.

FOR the last thirteen years. I have worked as a safety inspector and assistant foreman. Naturally, the safety lamp was the most important part of my equipment in that work. In connection with my duties, let me say, I have spent many profitable moments recently, in reading the letters in *Coal Age*, under the heading "Problems of Operating Men."

Any one whose duties have been the examination of a mine, cannot fail to appreciate the stand taken by James Roberts of Frontier, Wyo., whose letter appeared in the issue for May 31, p. 902. Like Mr. Roberts, I have found the electric cap lamp a great advantage in my work. I regard this lamp as a Godsend to the fireboss whose greatest need will often be a good light.

More than once have I traveled to the face of a breast and there been caught in the dark and obliged to return to the gangway without a light, before being able to relight my safety lamp. Today, there is no need for a fireboss to stumble about in the dark when he has lost his light. The electric cap lamp enables him to retrace his steps in safety.

NEED OF SIMPLE DEVICE FOR DETECTING GAS

Just here, I wish to endorse the suggestion of James Hynd who, writing on the Wakesiah explosion, *Coal Age*, June 7, p. 940, asks, "Why does not the present inventive age produce a universal means of detecting gas that will eliminate the present hazard?"

As Mr. Hynd says, "We are still using the modified devices of one hundred years ago for this purpose." He refers, no doubt, to our use of the flame safety lamp, as there has not as yet been produced a testing lamp, or other device devoid of flame that will indicate the presence of explosive gas.

While recognizing the need of some device other than the safety lamp for detecting the presence of gas in the mine, I want to say that I have found the Koehler safety lamp a most efficient means for making the test for gas. My lamp is of aluminum, has a double gauze and is equipped with a flint relighter. The lamp admits the air below the glass, which greatly improves the light.

ADVANTAGE OF RELIGHTER IN SAFETY LAMP

No fireboss will deny the advantage of having a relighter in his lamp. He is bound to get in the dark some time and this device avoids the necessity of his going back to the gangway to relight his lamp. All he needs to do is to retreat a short distance and give the flint a few turns to restore the light in his lamp.

An instance illustrating this point occurred a short time since when, with two other firebosses, I entered a gangway where gas had been fired and the men had gone out leaving a mule behind. It being the duty of the firebosses to extinguish the fire, we were doing so when the gas fired again putting out all our lights.

The two firebosses had Davy lamps and but for the relighter in my Koehler lamp we would have had to travel a long distance in the dark. As it was, however, I withdrew a short distance and with a turn of the flint relighted my lamp, after which we extinguished the fire and rescued the mule.

In my opinion, when a fireboss is equipped with an approved safety lamp, such as the Koehler, and an electric cap lamp he is able to accomplish his rounds in less time and with less fatigue, than where he must work with his safety alone. Moreover, his examination of the mine will be more efficient, because of the bright light, which will reveal a dangerous condition of the roof that might pass unobserved in the use of a safety lamp.

While a good mechanic can work with inferior tools, he can do far better work with good tools at his command. The same is true in firebossing. A competent fireboss may even lose his life for want of a good light. Therefore, let me say in closing: Give the fireboss all the light possible. WILLIAM E. TRUSCOTT.

Minersville, Pa.

Obeying the Spirit of the Law and Not the Letter Only

Danger in creating too many and too stringent laws—Enforce faithfully existing laws—Instances cited where the company fulfilled the letter but not the spirit of the law.

IN TWO recent letters, C. W. Atkins has referred to the inadequacy of mining laws, in a way that should arouse attention and call for remedial action. What Mr. Atkins has said applies particularly to his own state, Pennsylvania. My remarks must not be taken as applying especially to that state more than to other coal-producing states. The situation is quite a general one. What I want to say fits many of our mining states, if not all of them.

There is little doubt but that our mining laws can and some day will be improved. In the meantime, however, by systematic, unceasing and earnest application of the laws we have, we can get a great deal closer to the goal we aim to reach than we are at present. The goal of our endeavors is to reduce mine accidents to a minimum.

ENFORCE PRESENT LAWS TO MAKE MINES SAFER

Certainly, it is not right to ask our legislators to make new laws for us so long as we fail to give a thorough trial to those now on the statute books. If at any time it may seem advisable to reinforce existing laws or replace them by others, we must be cautious lest we create a situation where too many laws or laws of too stringent a character would hamper our coal industry without making it any safer.

By willingly conforming to the spirit as well as the word of our laws as they stand to-day, operators have it in their power to make their mines so much safer that the cry for more laws will cease to be heard. Some operators deceive themselves into believing they have done all that is expected of them when they have placed a few warning signs about their mines and posted a set of rules and regulations on the bulletin board at the mine entrance. To a large number these signs mean little so long as the operator does not make it his regular and daily business to see that they are obeyed by every man in the mine.

Suppose, for example, that an old heading, partly caved and in places not more than two feet wide, is used to take several high-tension cables into the mine. At either end notice is posted forbidding men to go in or out that way. But of what use are those notices when it is known to the foreman and his assistants that a

number of men are using the heading twice daily, because it shortens the distance home and nothing is said to stop them?

A case of this kind was recently brought to the attention of a certain mine manager who, after investigating, refused to interfere on the ground that men were scarce and if they were not allowed to use the short cut in going to and from work, they would probably find work in another nearby mine which is close to their homes.

Considering the circumstances, how much better would it have been to repair the old heading and make it safe to be used as a traveling road and a cable way at the same time. Instead, however, the manager decided that posting the notice at either end of the place, the company's responsibility under the law ceased, which was true considering the word and not the spirit of the law.

In another instance two men were killed, in a single month by being thrown off the loaded cars they were riding out of the mine. Here, again, notices had been posted warning all men against riding the cars. In the opinion of the superintendent and his foreman,

this absolved them of all blame, although both freely admitted that they knew the men generally rode on the cars both going in and coming out of the mine. Yet no effort was made to stop the practice.

In this case as before, the company complied with the letter of the law, but not a single thought was given to its spirit. I could cite from memory a score of similar examples where the operators were deceiving themselves as to the extent of their duties to their fellow men either through fear of losing their miners or from a reluctance to spend money for the sake of safety alone.

There are operators, both large and small, who obey the spirit as well as the letter of the law and sometimes go much further in an effort to make their mines as safe as is reasonably possible. Too often, however, the argument is advanced that, unless the law is obeyed to the same degree by all, those obeying it fully and ungrudgingly will find themselves at a disadvantage, in respect to operating costs, as compared with those who adopt only such safety measures and practices as they cannot possibly avoid.

F. C. CORNET.

New York City.

Inquiries Of General Interest

Working Three Feet of Coal with Slate and Shale Partings

Combined Thickness of Three Seams and
Partings Ranges from 12 to 15 Ft.—
Thickness of Coal Approximates 7 or 7½ Ft.

A FEW days ago, the president of a recently organized coal company, asked my opinion as to what would be the best method to develop a tract of coal land consisting of one hundred acres and underlaid by three seams of bituminous coal of a fairly good quality, two of the seams being of the nature of splint coal. At my request, he gave the following as the approximate cross-section of the three seams and the intervening partings of slate and shale. Reading from top to bottom, the section is:

Roof,	Hard sandstone
Top seam,	Hard splint coal, 42 in.
Parting,	Hard sandy shale, 48-72 in.
Middle seam,	Hard splint coal, 30-36 in.
Parting,	Medium hard slate, 18-24 in.
Bottom seam,	Rather soft clean coal, 12 in.
Footwall,	Hard sandy shale.

It was stated that the intention of the company was to work these seams by some method that would give a high percentage of production, per man, per day, and mine the coal in as large size as possible, consistent with the requirements in the several seams. It was expected to shoot all the coal off the solid, the desire being to avoid the necessity of installing mining machines, for a considerable time to come.

After carefully considering the proposition and assuming a practically level formation, I suggested open-

ing up the property on the plan of a double-entry system, provided there was no gas generated in quantities that would make advisable driving the main entries three or four abreast, this being a small tract.

My general plan was to drive double or triple rooms, say from 60 to 90 ft. in width. The main and cross entries, together with these rooms, were to be opened in the middle seam where the coal has a thickness of 2½ to 3 ft. The two or three tracks in each double or triple room would reduce the distance the coal had to be handled at the face to not more than 15 ft. The roads were to be brushed for a width of 10 ft., by lifting the parting and bottom seam of coal down to the footwall, which would provide good floor and roof on the roads.

These double or triple rooms were to be separated by pillars of solid coal, 50 ft. in thickness, that would permit each pillar to be split with another room 20 ft. wide when retreating and bringing back the 15-ft. pillars on either side. This plan appealed to me as affording a long range of working face that would greatly facilitate the mining of the coal, particularly in respect to blasting. The holes could then be drilled to better advantage than in a narrow place. A favorable feature of the plan is the promise of a larger percentage of lump coal and a minimum cost of explosives in blasting.

When the rooms in the middle seam, which is only 2½ to 3 ft. in thickness, have advanced sufficiently to cause a little weighting and settlement of the roof, my plan would be to break through the parting forming the roof and having a thickness of from 4 to 6 ft., dropping this material and storing it between the roads and, at the same time, taking down the top coal. A line of posts would have to be set on each side of the tracks. The main roof being a very hard massive sandstone suggests that it will require very little timbering.

Another suggestion made at the same time was that it might be found that the proposition could be worked out successfully on a system of longwall advancing, in panels 300 ft. in width. The large amount of material in the partings would furnish good building for the packwalls. I would like to see this proposition dis-

cussed by the readers of *Coal Age*, giving us the benefit of their experience under similar conditions.

Glen White, W. Va.

PRESTO.

We are pleased to submit the above proposition and proposed plan of working to the practical readers of *Coal Age* for their criticism and suggestions and hope for a hearty response.

Examination Questions Answered

Miscellaneous Questions

(Answered By Request)

QUESTION—*The length of a main-and-tail-rope haulage is 7,000 ft. (no grade); the weight of the main rope is 0.8 lb. per ft., and the weight of the tail rope 0.6 lb. per foot; the full cars weighed 6,000 lb. and the empty cars 1,800 lb., each; the train consists of 15 cars. What are the tensions on the main and tail ropes? If the average speed is 10 miles per hour, what is the horsepower due to the maximum tension of the rope?*

Review of reply made July 12, where a decimal point was unfortunately misplaced.

ANSWER—In the general arrangement of a main-and-tail-rope haulage, the main rope hauls the loaded trip from the inby parting to the shaft or slope bottom, or the tippie, as the case may be, at the same time dragging the tail rope which is attached to the rear end of the trip. The weight of this loaded trip is $15(6,000 \div 2,000) = 45$ tons; and that of the empty trip $15(1,800 \div 2,000) = 13.5$ tons. The average weight of the two ropes being 0.7 lb. per ft., the entire weight of rope, extending in and out of the mine (14,000 ft.), is $0.7(14,000 \div 2,000) = 4.9$, say 5 tons. Then, when hauling the loaded trip out of the mine, the entire moving load is $45 + 5 = 50$ tons. Assuming an average track resistance of, say 20 lb. per ton, including the drag of the rope, the average tension on the main rope is $20 \times 50 = 1,000$ lb.

On the other hand, when hauling the empty trip into the mine, the average weight of the entire moving load is $13.5 + 5 = 18.5$ tons and, for the same track resistance, the average tension on the tail rope is $20 \times 18.5 = 370$ lb.

At a speed of 10 miles per hour ($5,280 \times 10 \div 60 = 880$ ft. per min.), the horsepower due to the maximum tension on the main rope is $(1,000 \times 880) \div 33,000 = 26\frac{2}{3}$, say 27 hp., which is the power due to the maximum tension on the rope and takes no account of the efficiency of the engine. The resistance of rope and track depends on many factors not given and is liable to be more than 20 lb. per ton, the power required being increased proportionately.

QUESTION—*The fan produces 76,300 cu.ft. of air per minute, in an airway 7x10 ft. in section; (a) what is the velocity of the air current, in feet per minute? (b) What is the horsepower if the water gage is 1 in.?*

ANSWER—(a) The sectional area of the airway is $7 \times 10 = 70$ sq.ft. and the average velocity of the air current at that point is, therefore, $76,300 \div 70 = 1,090$ ft. per min.

(b) A water gage of 1 in. corresponds to a pressure

of 5.2 lb. per sq.ft., which makes the total pressure producing circulation in this airway, $70 \times 5.2 = 364$ lb. This total pressure moving at a velocity of 1,090 ft. per min., gives $1,090 \times 364 = 396,760$ ft.-lb. per min. The horsepower on the air is, therefore, $396,760 \div 33,000 = 12.02$, say 12 hp.

QUESTION—*What instructions should a mine foreman give to a miner in regard to the following: (a) The precautions he should take on first entering his working place? (b) What he should do to insure his safety while at work? (c) What he should do if his working place becomes dangerous? (d) In case of a miner firing his own shots, what precautions should he take for his own and other persons' safety? (e) What precautions should he take while traveling into and out of the mine?*

ANSWER—(a) The foreman should instruct the miner to examine carefully his place before beginning to work and reset any props that may have been dislodged by shots fired the night before. He must also be told to take down any loose slate or roof and examine carefully for loose coal that may be ready to fall. He must be told to look for the mark of the fireboss showing that the place has been examined that morning and found to be safe. In addition, he must at once set any timbers required to make his roof safe before proceeding to load coal or do other work.

(b) While at work, the miner must be instructed to keep a careful watch for any change that may take place in the roof and to sprag his coal as it is mined. When working with safety lamps, the miners must be instructed to observe the flame of their lamps at frequent short intervals to detect any increase in the gas in their places.

(c) The miner must be instructed to withdraw from his place, at once, on observing any dangerous condition and report the same to the mine foreman or one of his assistants. He should be told to fence off his room or place a suitable danger signal at the entrance and at the open crosscut or breakthrough leading to an adjoining place, and to warn the men working in adjoining places, before he leaves his own place.

(d) Each miner must be instructed to make sure, before firing a shot, that he has complied with all rules and requirements in respect to blasting, including the proper mining of the shot, the charging and tamping of the hole and the manner of firing. He must also give the necessary warning to men working in adjoining places and receive their response, giving him the right to fire his shot. He must sound the alarm in such a manner that any person approaching the place will be duly warned of his danger. After firing the shot and allowing sufficient time for the air current to sweep away the smoke and gases produced, the miner must examine the condition of the roof and timbers before again starting to work.

(e) The foreman should instruct all miners to enter and leave the mine by the travelingways used for that purpose. Every miner must hang his check in its proper place on the board provided for that purpose at the entrance of the mine, before he leaves for home. On returning to work the following morning, the miner must take his check from the board, which is the guarantee that he can proceed to work in his place with safety. Not finding his check on the board, the miner knows that he is forbidden to enter his place until the same has been examined and made safe for work.

Coal Situation Fraught with New Seriousness Because of President Harding's Death

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

The President cannot die without affecting all industries and most individuals. The death of Mr. Harding comes at the worst possible time in so far as it affects the coal situation. It is certain to have a direct bearing on labor relations, which are now in such an acute stage.

While those who are in a position best to appraise the situation are convinced that there will be no strike, they must admit that the situation is one in which a crisis might develop at any time. Government intervention is more likely now than ever before in peace time, due to the fact that the public is not inclined, after the experiences of the last few years, to endure suspense as to its fuel supply.

Enough has been learned in the last few years of government intervention to make it clear that it is a diplomatic rather than an executive undertaking. To undertake to mediate in such a situation as exists today in the anthracite region means the employment of diplomacy such as is implied by the better sense of the word—the use of sympathy and understanding. Such a task can be undertaken only by a person in whom both sides have confidence.

Whatever may be said about Mr. Harding's greatness as an executive, no single individual in the land will dispute that he was a man of friendship—a man with an intense desire to do the right thing. He commanded the respect of capital and labor alike because they knew he was big-hearted and would do his best to be fair. Furthermore, the public would have been satisfied with his mediation. People generally do not have an opportunity to go into the details of issues. They would have been willing to abide by his conclusions. The man so amply fitted to undertake mediation has been removed suddenly.

It is true that the country is to be spared the aimless drifting which marked the administration's policy just before and during the strike of 1919. At that time there was great uncertainty as to the extent of President Wilson's incapacity. No one was sure whether or not the pronouncements coming from the White House were those of the President or of someone else. Later it was established that some of these pronouncements, at least, did not come from the President himself.

In the present situation the uncertainty is of a different character. There naturally will be delay before the new helmsman will feel confident to take the ship of state into the main channel. The situation is complicated by lack of knowledge as to what the new President may do. The outstanding achievement of his career is his handling of a labor matter. His action at Boston in connection with the strike of policemen brought him into national prominence and obtained for him the praise and support of those who believe a firm stand must be made against the exactions of labor unions. That act, however, antagonized labor.

It is certain the United Mine Workers would hesitate a long time before they would agree to accept President Coolidge as final arbiter of questions which to them seem vital. Unquestionably labor unions are not at all sure but that one of the principal opponents of their policies has been elevated to the Presidency. They must recognize that since Mr. Coolidge first came to national notice because of his stand against unionism it would be only natural if he were to be of the opinion that the public approves of such a policy. His experience in Boston may have convinced him that unionism must be curbed and that nothing can be gained by temporizing with it. In such a case he might conclude that the anthracite situation offers a splendid opportunity to put his views into effect.

On the other hand, many think Mr. Coolidge will take this opportunity to demonstrate that he is not opposed to labor unions when properly conducted. He may admit the right of the United Mine Workers to demand all that they have and to strike if they do not get what they ask. At best, however, it is admitted on all sides that the prospect

of agreement is less auspicious today than it was yesterday.

Many doubt that the check-off is the real objective of the United Mine Workers. The rank and file of that organization is so much more interested in wage than in any of the collateral issues, that it is not probable that the necessary support will be forthcoming to insist upon the check-off. The check-off means a great deal to those who are responsible for the financing of the International union but it means much less to the member of a local. The heads of labor unions are like political leaders or the heads of European states in that they can go only so far in persuading their people to accept solutions which are distasteful to them.

Signs are multiplying that the anthracite workers are ready to insist on the increase. Apparently the more conservative leaders, like the heads of the International union, will have great difficulty in avoiding a suspension unless they can promise a wage increase. During the last strike it was asserted at first that the anthracite workers were being held out to win for the bituminous workers, and that if they were left to themselves they would return to work. Exactly the reverse proved to be the case. It was nearly a month after the Cleveland agreement before work was resumed, and even then the terms of settlement were all but rejected when the ratification convention met in Wilkes-Barre. Steam-roller tactics had to be employed to get ratification through, and even then it carried by a small margin.

New factors have entered since then to bolster up the determination of anthracite workers. They elected Capellini. They not only elected him but they did it by a large majority. For a time after his election Capellini seemed to have joined hands with the conservative leaders, but now that he has been accepted as a member of the negotiating committee he has come out with a statement that he will not surrender any demand and that he will press each one of them. With the death of the President and with unmistakable signs of increased determination on the part of the mine workers the prevalent opinion in Washington is that the situation has taken on new seriousness.

Coal Commission Resolution Expresses Deep Loss in Passing of President

The only business transacted by the U. S. Coal Commission at its meeting last Friday was the adoption of the following significant resolution:

"The United States Coal Commission places upon its records the unanimous regrets of its members at the sudden death of Warren G. Harding, President of the United States. This is not the usual and perfunctory expression of regret at the passing away of the nation's Chief Executive. It has a personal and intimate side connected with it, which should be known by the American people.

"Every member wholeheartedly pays tribute to the patriotic and honest purpose which President Harding had in the appointment of this Commission. It is constituted of men of all grades of political thought and was manifestly so constituted by the President in the hope that out of these political and economic views the facts might be found and conservative recommendations given with reference to the coal industry. It is due, also, to his memory to say that having once made up his mind as to the membership of the Commission, from that time forward neither by word, sign nor gesture did he ever intimate to the Commission any personal or political desire with reference to the investigation, finding of facts, or recommendations of the Commission. He left it free and untrammelled, and his memory must not be smirched by any false suggestion that he had

in view any political ends to serve either by the appointment or by the report of this Commission.

"From the personal standpoint it regrets the departure of a warm-hearted personal friend. It pays him the tribute of saying that he was a worthy President of the United States; that from the standpoint of his views, he honestly and fearlessly sought to administer the laws of this country and to direct its destinies along lines which he believed would be for the best interest of the American people.

"He has been a great example that might well be imitated in the political and economic life of America. He held his views, but without bitterness or malice, and granted the right of others to differ with him. He argued; he never vilified. He had malice toward none and charity for all. After life's fitful fever, the Commission confidently believes that his soul is at rest with his God."

The early part of the week was a very active one for the Commission, as a result of the appearance of a Special Committee of Bituminous Operators. Apparently, the Commission is much pleased at having received so much constructive material. The Commission obviously is glad to have the bituminous operators meet in advance the recommendation contained in the Commission's anthracite report. It is understood in association circles that the action favorable to publicity was unanimous. It is said to bind practically every worth-while coal man in the business. Some observers believe that this voluntary action is intended to obviate the necessity for legislation.

Coal-Mine Fatalities in June Gain Slightly In Number and Ratio to Output

Accidents at coal mines during June, 1923, caused the death of 172 men, according to reports received from state mine inspectors by the U. S. Bureau of Mines. The fatality rate for the month, based upon a production of 54,155,000 tons, therefore was 3.18 per million tons. For the corresponding month last year the rate was 4.91, based on 110 fatalities and an output of 22,393,000 tons. The small amount of coal mined in June, 1922, was due to the coal strike at that time. An average of 4.28 deaths per mil-

lion tons is shown by the record for June during the past ten years. In May, 1923, the fatality rate was 3.11 per million tons produced.

The fatalities in June, 1923, have brought the total deaths for the first half of the current year to 1,221, indicating a fatality rate of 3.76 per million tons, as against 868 fatalities in the same period last year, representing a rate of 4.14. Thus the fatality rate for the present year represents a reduction of more than 9 per cent.

The year's record to date for all fatalities from all causes shows a reduction in the fatality rates per million tons for haulage accidents and for falls of roof and coal, a slight increase for explosions of gas and dust, and no material change in the rate for explosives and electricity.

Wentz Acquires New River Collieries

Purchase of the mines of the New River Collieries Co., located at Sun and Eccles, W. Va., by the Stonega Coal & Coke Co., of Big Stone Gap, Va., gives the latter company an additional output of approximately 1,000,000 tons of high-grade low-volatile smokeless coals. The mines taken over by the new owners are Sun Nos. 1 and 2, located at Sun, and Eccles mines Nos. 3, 5 and 6, located at Eccles, W. Va. The Sun and Eccles No. 6 mines operate the Sewell seam, while the other openings operate the Beckley seam. During 1921 these mines produced about 831,169 tons of coal.

The Stonega company mines have a possible production of about 5,000,000 tons of steam and gas coals and in 1921 produced between 2,500,000 and 3,000,000 tons. Its properties consist of the Arno mine, at Arno, Va.; Dunbar mine, at Roaring Fork; Exeter mine, at Exeter; Imboden mine, at Imboden; Keokee mine, at Keokee; Osaka mine, at Osaka; Roda mine, at Roda, and the Stonega mine, at Stonega.

Colonel D. B. Wentz, of Philadelphia, is president of the Stonega company; Otia Mauser, vice-president, and R. E. Taggart, general manager, both located at Big Stone Gap. J. K. McGowan is president of the New River Collieries Co.

The newly acquired mines are served by the Chesapeake & Ohio and Virginian Rys. with terminals at Hampton Roads.

COAL-MINE FATALITIES DURING JUNE, 1923, BY CAUSES AND STATES
(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground											Shaft				Surface					Total by States					
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	6		3										9												10	3
Alaska.....																									0	0
Arkansas.....								1					1												1	5
Colorado.....				1																					1	3
Illinois.....	8		8										16												16	2
Indiana.....	2		3									2	7												7	0
Iowa.....	2												2												2	0
Kansas.....																									0	0
Kentucky.....	3							1				1	5												5	10
Maryland.....																									0	0
Michigan.....																									0	0
Missouri.....	1												1												1	0
Montana.....	2												2												2	0
New Mexico.....	1							1					2												2	1
North Dakota.....																									1	0
Ohio.....	7		2										9												9	4
Oklahoma.....	1												1												1	0
Pennsylvania (bituminous).....	17	3	3				3	1				1	28										2		30	25
South Dakota.....																									0	0
Tennessee.....	2												2												2	0
Texas.....																									0	0
Utah.....	1		1										2												2	2
Virginia.....			1										1												1	3
Washington.....	2						1					1	4												4	4
West Virginia.....	15	1	8	2		1							27			1							1	3	33	42
Wyoming.....	1												1												1	1
Total (bituminous).....	71	4	29	3		5	1	4					122			1		1	1				4	3	8	131
Pennsylvania (anthracite).....	19		5	4		7							38										2	3		41
Total, June, 1923.....	90	4	34	7		12	1	4				8	160			1		1	1	1	2	3		6	3	172
Total, June, 1922.....	47	8	14	5		4	6	7	1			2	94			2		2	3				2	4		110

Bituminous Coal Stocks Gain 3,000,000 Tons in June— Industrials Have 46 Days' Supply on July 1

On July 1, 1923, commercial consumers had in storage approximately 45,000,000 net tons of soft coal, according to a report just issued jointly by the Bureau of the Census, Geological Survey, and the Federal Fuel Distributor. This was an increase over the revised figures of stocks on June 1, 1923, of 3,000,000 tons. Except in the month of February stocks have steadily risen since September 1, 1922, and there is now in storage twice the quantity that was on hand on that date. The supply on July 1, 1923, was larger than on any date since the spring of 1922, when exceptionally heavy supplies had been accumulated in anticipation of the strike on April 1, 1922. Stocks on July 1 exceeded those on August 1, 1921, by 4,000,000 tons, and were nearly 5,000,000 tons larger than on April 1, 1919. Measured in terms of tons, stocks increased 7 per cent during June. Measured in terms of days' supply, the increase was 23 per cent. The larger increase in days' supply was due to the fact that the rate of consumption decreased perceptibly in June. At the rate of consumption in June the stocks on July 1 were sufficient to last 37 days on the average.

Stocks on the Lake docks at Duluth-Superior and Ashland-Washburn on July 1, 1923, were about 2,850,000 net tons. Records for the Lake Michigan docks are not available. A group of producers who store coal at mines or intermediate points had 688,000 tons in storage on July 1.

Retail dealers in anthracite received more of that coal than they delivered in June, and their total stocks on July 1 were 13 per cent larger than on June 1. Incomplete reports on the quantity of anthracite on the Duluth-Superior

total stocks on hand for all dates for which statistics are available, since October 1, 1916.

The total quantity of soft coal in the hands of commercial consumers on July 1, 1923, was between 43,000,000 and 47,000,000 net tons—probably 45,000,000 tons. This esti-

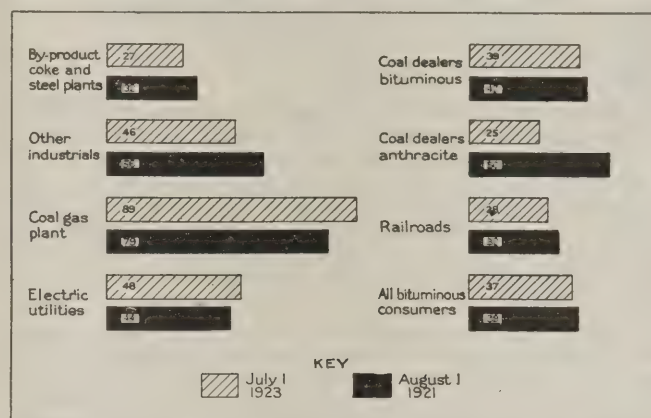


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON JULY 1, 1923, AND AUGUST 1, 1921

At the rate soft coal was burned during June, 1923, the total stocks on July 1 were sufficient to last 37 days, an increase of 7 days over the supply on June 1. The stocks on August 1, 1921, were sufficient to last 39 days at the low rate of consumption then prevailing. An important factor in the increase in days' supply on July 1 was an appreciable decline in the rate of consumption in June.

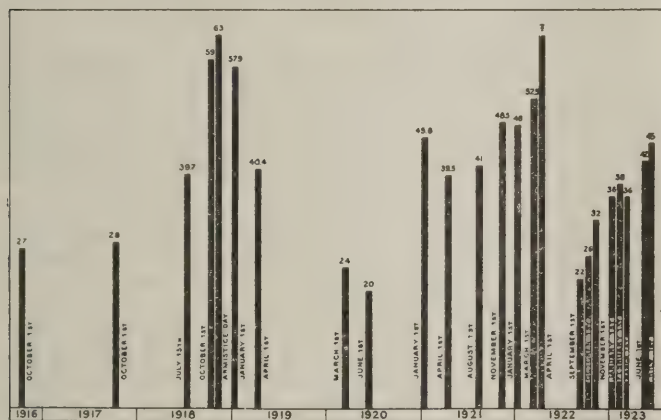


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916 TO JULY 1, 1923

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities, and retail dealers. Coal for steamship fuel, lake docks, in transit, and in the bins of householders is not included. The figures for 1923 are subject to revision.

and Ashland-Washburn docks indicate that the total on hand July 1 was in the neighborhood of 250,000 net tons. No data are available for the Lake Michigan docks.

The accompanying diagram (Fig. 1) shows the estimated

mate does not take into consideration coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which item is classed as coal in transit. The progress in accumulation of reserves has been such that the supply on July 1, 1923, compares favorably with that during preceding summers.

Consumption, on the contrary, decreased in June. The reports furnished by consumers, supplemented by other available records, indicate that the total consumption, including exports, was approximately 41,000,000 net tons, or 9,500,000 tons per 7-day week.

Figure II, which is based upon the data in the table below, offers a comparison of the days' supply held by the seven principle classes of consumers on July 1, 1923, with that on August 1, 1921, the date which most nearly corresponds with that now under observation, for which records are available. In using that date for comparative purposes it should be carefully noted that in actual tonnage stocks were less then than now, but owing to the low rate of consumption in the summer of 1921, due to the severe industrial depression, the days' supply was larger. The average stocks on July 1 were sufficient to last 37 days at the rate of consumption in June, whereas those on August 1, 1921, were sufficient to last 39 days at the rate of consumption from August 1 to November 1 of that year. At the rate of consumption from March 1 to May 31, 1923, the supply on June 1 would have lasted 30 days.

General industrial establishments, excluding steel and by-

DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF CONSUMERS (i)

(Figures represent number of days' supply would last at current rate of consumption at time of stock-taking)

Consumer	Jan. 1, 1919	Apr. 1, 1919	June 1, 1920	Apr. 1, 1921	Aug. 1, 1921	Sept. 1, 1922	Nov. 1, 1922	Jan. 1, 1923	Feb. 1, 1923	Mar. 1, 1923	June 1, 1923	July 1, 1923
By-product coke plants	32	23	8	28	31	11	18	22	22	21	25	27
Steel plants	42	35	11	38	46	12	21	40	36	34	39	46
Other industrials	65	47	24	47	56	32	39	60	62	58	75	89
Coal-gas plants	81	58	22	66	79	34	55	33	35	34	45	48
Electric utilities	49	48	22	48	44	26	32	16	15	11	27	39
Coal dealers, bituminous	39	25	10	26	42	11	21	16	15	16	21	28
Railroads	32	(c)	10	24	(c)	13	13	16	18	16	21	28
Total bituminous	42	31	15	36	39	17	23	26 (d)	24 (d)	22 (d)	30 (d)	37 (d)

(a) The figures in this table are estimates based on incomplete data. (b) See text for rate of consumption at which these figures were calculated. (c) No data (d) Subject to revision.

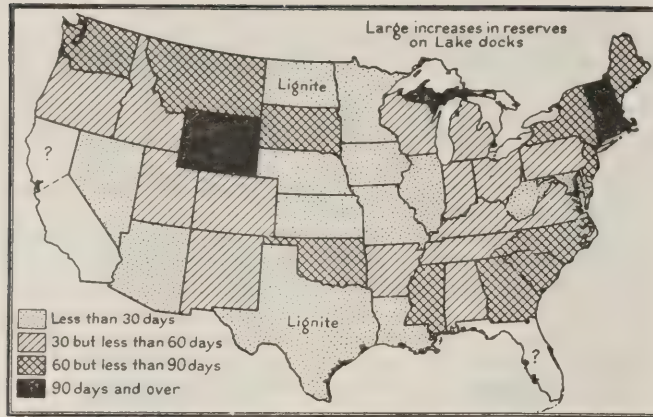


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON JULY 1, 1923

At the average rate of consumption that prevailed during June, 1923, reserve stocks at industrial plants other than steel and by-product coke would last on the average 46 days. The map shows how the supply varied from State to State. Changes in business activity which affect coal consumption are quickly reflected in the days' supply. Based on reports from 2,107 plants.

product coke plants, form the largest group of consumers and the one that shows best the geographical distribution of stocks. Changes in activity in this group are quickly reflected in the coal market, and changes in the coal market soon become apparent in the reserve stocks of industrials.

Over the country as a whole the stocks held by general industrials were sufficient to last 46 days on the average. This was an increase of 7 days over the supply on June 1, but was 10 days less than that on August 1, 1921. In comparison with dates on which stocks held by industrials were large, July 1, 1923, was 19 days behind January 1, 1919, 18 days behind January 1, 1922, 21 days behind November 1, 1921, and 5 days behind January 1, 1922. On the other hand, stocks on July 1 were 14 days ahead of September 1, 1922, and 22 days ahead of June 1, 1920, on which dates the supply was at the lowest points on record.

Practically all the States on the Atlantic seaboard, except those in which coal is produced, the Northern Peninsula of Michigan, and scattered states in the South and Northwest, had supplies sufficient for more than 60 days. Maryland, West Virginia, and Illinois as usual had small reserves, owing to the presence of mines within their boundaries. All other States east of the Mississippi had stocks sufficient for 30 but less than 60 days' consumption. Of the States west of the Mississippi, 10 had less than a 30-days' supply, 6 had less than a 60-days' supply, and 5 had more than a 60-days' supply.

Electric-utility plants had stocks on hand on July 1 sufficient for 48 days, against 45 days' supply on June 1.

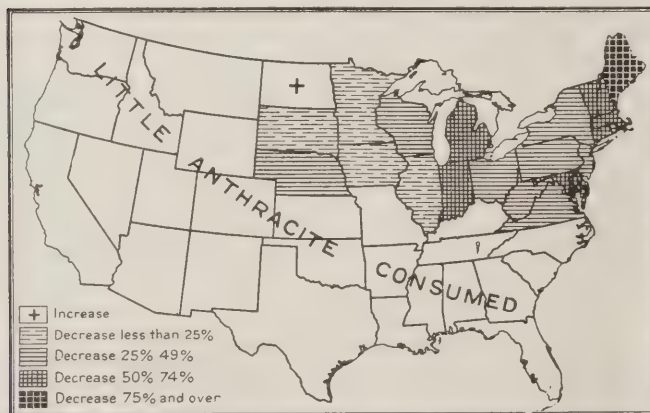


FIG. 4—HOW RETAILERS' STOCKS OF ANTHRACITE ON JULY 1, 1923, COMPARED WITH THOSE ON AUGUST 1, 1921

Stocks of anthracite in retail yards were 13 per cent larger on July 1 than on June 1, 1923. The supply was sufficient to last on the average 25 days at the rate of delivery in June. The map shows how stocks on July 1 1923, compared with those on August 1, 1921. In only one of the anthracite-consuming States was the supply greater than it was 2 years ago.

The stocks at coal-gas plants increased from a 75-days' supply on June 1 to 89 days' on July 1, 1923. Incomplete returns from byproduct coke and steel plants indicate that the reserve coal tonnage on hand at such plants on July 1, 1923, was about 5 per cent larger than on June 1. Operations at such plants were curtailed somewhat during June and the days' supply on July 1 was 27, against 25 on June 1, an increase of 8 per cent. The stocks held by these important groups of consumers are now twice those on hand September 1, 1922, but in spite of this progress in replacing stocks that were so nearly exhausted during the miners' strike last summer, reserves on July 1 were below those on other dates when stocks were large.

Estimates of railroad-fuel stocks place the total in stockpiles, cars, and chutes, on July 1, at 10,550,000 tons, a supply sufficient for 28 days, an increase over June 1 of 33 per cent.

Deliveries of soft coal by retail dealers decreased in June, the average rate being 22 per cent less than that during the three months preceding. On July 1, 1923, retailers had a supply sufficient to last 39 days, as against 27 days' supply on June 1.

All available information indicates that during June there was a comparatively small increase in the quantity of coal in transit which probably did not exceed 5,000,000 tons.

Information available indicates that the total soft coal on all Lake docks must have been at least 4,000,000 tons on July 1. On August 1, 1921, a month later, the total was 8,189,000 tons. The quantity of unbilled coal in cars standing at the mines increased from 421,000 tons on June 1, to 550,000 tons on July 1. The tonnage at junction points and terminals underwent practically no change in June, and totaled 35,000 tons on July 1.

Owing to the duplication of reports from one large producer who stores coal at the mines, the figures of mine storage recently published have been too high. The total held on July 1, by the producers that reported was 688,000 tons, against a revised figure of 779,000 tons on June 1, a decrease of 12 per cent.

Surplus stocks of by-product coke were accumulated in June, and the total on hand on July 1 was 308,000 tons, an increase of 52.5 per cent over the supply on June 1. Despite this increase, however, stocks of by-product coke were less than half those on March 1, 1922, when the reserve was heaviest.

The stocks of anthracite in retail coal yards on July 1, 1923, though 13 per cent larger than on June 1, were much lower than during the spring and summer of preceding years. It has not been possible for the Government to make a complete count, but a selected list of 418 dealers from whom reports have been received since 1919, shows total stocks of 787,426 tons on July 1, against 694,922 tons on June 1, 1923. These plants had 49 per cent less anthracite on hand on July 1 than on August 1, 1921, and 17 per cent less than on January 1, 1919. How much anthracite all dealers had is not known, but it is possible that the relation between stocks held by this group on different dates, might approximately represent all dealers.

Kanawha the Belgium of Coal Industry Operators Tell Coal Commission

Charging that the Kanawha coal fields of West Virginia have been made the battle ground of union activities, the Kanawha Coal Operators' Association in a brief filed with the United States Coal Commission on Aug. 6 declares that the public cannot be assured of an adequate supply of coal at a low price until some means is found for preventing nationwide strikes in the coal and transportation industries.

Stimulated unrest in the Kanawha district, charged to the machinations of the United Mine Workers, the brief states, is directly responsible for some of the acute suffering among consumers of coal during the national strike. It is contended that while the Kanawha fields were providing fuel for those sections of the country affected by the strike, the United Mine Workers centered their activities on that zone in an effort to decrease even that production.

"From the beginning the Kanawha district of West

Virginia has been the Belgium of the coal industry," the brief states. "It has repeatedly been a battle-ground in struggles which properly involved only the Central Competitive Field. Every time there was a strike in Ohio or any of the other unionized states, organizers were sent to West Virginia to create dissatisfaction and cause strikes, in order that coal mines in the Kanawha district should not supply the markets of the unionized districts and thereby render less acute the shortage of coal to the public which the union leaders hoped to create."

After pointing out certain of the evils, the Association makes several recommendations whereby it claims these evils can be eliminated. Some of these are that no further extension of the labor monopoly of the United Mine Workers of America should be permitted; the right of non-union men to work without discrimination and without fear of physical violence should and must be preserved; the United Mine Workers of America should be made legally responsible for the fulfillment of the contracts into which they enter; the Sherman Anti-Trust Law and the other laws governing monopolies and contracts and combinations in restraint of trade should be enforced against attempted monopolies of labor as well as against attempted monopolies of capital; some means must be found for preventing nation-wide strikes in the coal industry and in transportation as well; measures must be taken to restore the impaired credit of the railroads and thereby make it possible for them to obtain funds for needed improvements and extensions, and some method of insuring the prompt returns of coal-carrying equipment to the coal-originating roads must be devised.

Examiner Kephart Recommends Revision of Docks and Illinois Coal Rates

The Northwest coal rate case about which so much interest was centered in the past six months was reported on by C. I. Kephart, an examiner of the Interstate Commerce Commission on Aug. 3. He recommends modification of the Holmes and Hallowell scale from Lake Superior docks to points in Minnesota, North Dakota and South Dakota reducing the scale on rates up to 350 miles. The reductions range from 10c. (present rate 85c. to proposed rate of 75c. for distances of 35 miles or less) to a reduction of 1c. from \$3.10 to \$3.09 for distances of 300 to 325 miles. It is further recommended that rates on bituminous coal from Lake Superior docks to Marshalltown, Lacey, and Oscaloosa, Iowa, be considered unreasonable to the extent that they exceed \$3.10, \$3.35 and \$3.35 and to other related points in the same territory on the same basis. This represents reductions of 18c. and 17c. below rates.

The rates on bituminous coal and anthracite from Lake Superior docks to Sioux City, Iowa, are held to be unreasonable to the extent that they exceed \$3.35 and \$3.53 per ton, respectively. Present rates are \$3.59 on bituminous coal and \$3.89 on anthracite and the reductions recommended are 24c. and 36c. respectively. Rates on coal from all the Illinois mines to Sioux City are held to be unreasonable, unduly prejudicial to Sioux City and preferential of Minnesota, Nebraska, and other Iowa points to the extent that they exceed \$3.45 from Northern Illinois and Fulton-Peoria, \$3.83 from Springfield, \$4.08 from Belleville and \$4.20 from Southern Illinois. Reductions per ton range from 22c. to 35c.

The rates on soft coal from Lake Michigan docks and the various Illinois districts to South Dakota points west of the Aberdeen-Mitchell-Yankton line of the Milwaukee are held to be unreasonable to the extent that they exceed the Aberdeen-Redfield-Mitchell-Yankton rates by amounts ranging from 38c. at Chamberlin to \$2.00 at Rapid City; also to the extent that the rate at Winner exceeds \$5.20 from Michigan docks, Northern Illinois, and Fulton-Peoria, and that amount plus existing differentials from Southern Illinois groups.

The examiner finds that rates from Southern Illinois and Lake Michigan docks to Wisconsin points are unduly prejudicial to the dock shippers and preferential of shippers in Southern Illinois "to the extent that the difference between the rates from the two sources of supply to the same point

depart from the difference that results from the application of the scale set out before and in the matter stated from Herrin as a representative Southern Illinois shipping point." The scale referred to recommends rates from Herrin as a representative point ranging upwards from \$1.40 on lump coal for distances of 100 to 125 miles to \$4.04 for distances of 675 to 700 miles.

The existing relationship between Lake Michigan docks under the Wisconsin rate structure should not be disrupted on this record according to the examiner.

Uncertain Political Situation Reacts On German Coal Importation

BY H. O. HERZOG

BERLIN, July 13: Importation of coal into Germany is becoming more and more affected by impending political developments. Despite a marked improvement in business and the shortage of domestic production due to labor unrest, coal dealers maintain a strong reserve with regard to new import contracts. This is partly due to the difficulties of financing, increased by the restraint the government has put on the money market against exchanging German paper money into foreign money, restricting purchases to such as can be paid from export proceeds. The main factor, however, is that the Ruhr occupation has visibly entered into its last stage and the end is within sight although the issue is still entirely in the dark. Whether it will be unconditional surrender or an equitable settlement, the outcome must be that mining in the Ruhr will be resumed in the near future.

Whether the end of passive resistance in the Ruhr will immediately relieve the coal situation of the German interior is uncertain, but if the terms of surrender are such that it will not, it will be a severe blow to German industry. In any event the coal boom on the import market has, in the common opinion come to an end. Import contracts will hardly be permitted to exceed the demand of the immediate future. Strenuous efforts are being made by Germany's immediate neighbors, Poland and Czechoslovakia to increase their share of coal exports to Germany. Poland is striving to increase her surplus, employing such drastic measures to this end as fining mines for shortage of production. Czechoslovakia has reduced freight rates to promote the movement of coal. Any increase of imports from these two sources would chiefly be at the expense of the British market.

Union Gets Herrin Mine Aug. 20

Acquisition by officials of District 12, United Mine Workers, of the Lester strip mine at Herrin, Ill., the cause and scene of the bloody battle between organized and unorganized labor a year ago, has given rise to much conjecture.

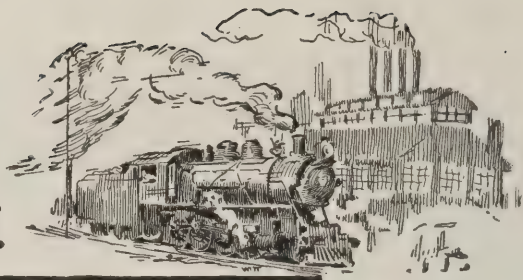
What is the miners' union going to do with the mine now that it has bought it? Frank Farrington, president of the Illinois Mine Workers' organization, frankly says he does not know. He intimates that they may sell it or lease it. A report that the purchase was not in complete accord with the sympathies of the executive board is denied by Farrington, who says that there has never been a question about the wisdom of buying the mine.

Why did the union buy the mine? President Farrington says the purchase was made because the organization thought it would be advantageous to buy it, for reasons which he does not care to explain. From anthracite sources it has been learned that the mine workers' organization was in danger of damage suits totalling more than \$1,000,000, which would and could be collected without difficulty if the Lester interests cared to bring the suits. If the organization owned and controlled the mine there would be no suits.

The property was bought from the Southern Illinois Coal Co. for \$726,000. The entire capital stock of the mine was bought outright and it is now running full blast, with a daily output of between 1,200 and 1,500 tons. The miners' organization will get possession on Aug. 20, and indications are that the mine will run as usual, with the profits going into the treasury of the United Mine Workers.



Production and the Market



Weekly Review

In the absence of other than nominal car shortage, the soft coal market continues in its mid-summer slump. Production of bituminous coal is being maintained a little short of 11,000,000 tons per week of which a million tons is being stocked by consumers or exported. Distress coal is not uncommon and the level of spot prices is steadily but slowly dropping, having fallen 20c. in the last eight weeks.

Buyers are in position to pick and choose and are exercising judgment in the coal they are buying. The Geological Survey estimates that 3,000,000 tons of soft coal were added to the consumers' stockpiles in June, bringing the total in the country on July 1 to 45,000,000 tons, equivalent to 37 days' supply at the June rate of consumption.

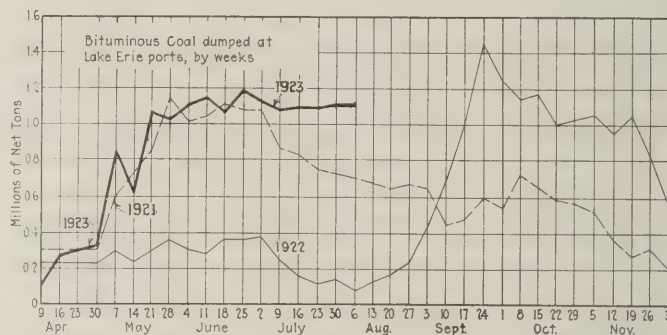
Coal Age Index of spot prices dropped one point last week to 195 on Aug. 6, which corresponds to an average price of \$2.36 at the mines. The heaviest decline was in Pocahontas coal which recorded an average drop of 30c., the result mainly of material declines in both mine-run and prepared coals on the Chicago market. In the West, Mt. Olive and Standard quotations declined and Hocking dropped in the East. Pittsburgh, Cambria, Somerset, Kanawha, eastern Ohio, and eastern Kentucky prices gained slightly.

ANTHRACITE CONSUMERS WANT COAL

So far there is no evidence of excitement in the trade over the prospect of a suspension of anthracite mining on Sept. 1. Consumers are no more insistent now than in June that their winter supply be delivered. Receipts of domestic sizes of anthracite by retail dealers have overtaken their deliveries and dealers' stocks are increasing. The demand for substitutes is picking up and coke producers report the receipt of many inquiries and some orders. Byproduct coke plants are reported to be accumulating stocks of coke. Bituminous

coal is finding some market as a substitute for anthracite.

The outlook for steam coal demand is improving as the textile industries in New England show signs of revival and the steel industry begins to talk about going back on heavy schedule as soon as the hot weather is over. Buying of steam coal picked up last week in Ohio and Pittsburgh but demand is so quiet and so carefully limited to low-priced, high-grade coals that mines are being closed for lack of profitable outlets for their product. In the Middle West the number of



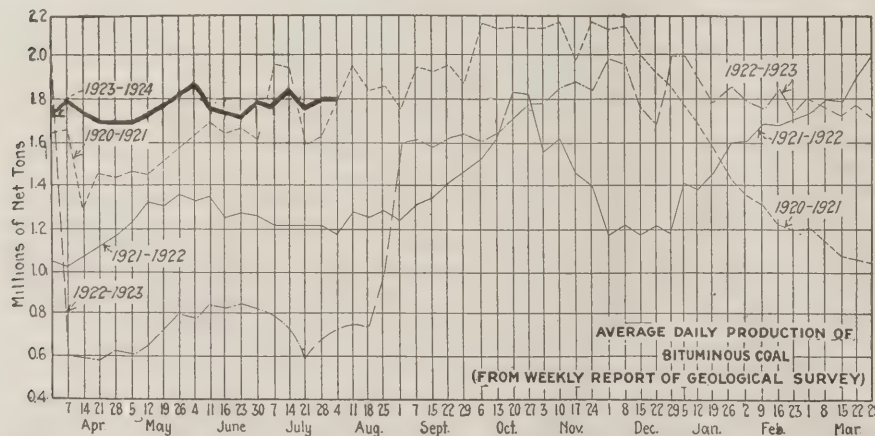
LAKE COAL DUMPED
(Net Tons)

	Week Ended July 30	Season to July 30
Cargo	1,071,044	13,928,694
Fuel	56,773	704,390
Total	1,127,817	14,633,084

Compiled from Weekly Report of Geological Survey.

inquiries is increasing. Dealers have begun to take on small lots of domestic coal.

The exceptional rate of production of anthracite of 2,000,000 net tons per week is being maintained without a break. Independent prices are holding up to the high level of July and there is every indication that by the end of August a new high record for production



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
July 14 (6)	4,123,000	10,925,000
July 21 (6)	3,692,000	10,676,000
July 28 (a)	3,952,000	10,789,000
Daily average	659,000	1,798,000
Calendar year	203,295,000	314,404,000
Daily av. cal. year	1,145,000	1,776,000

ANTHRACITE

July 14	32,000	2,051,000
July 21	28,000	2,005,000
July 28	27,000	2,080,000
Calendar year	23,435,000	58,885,000

COKE

July 21 (b)	104,000	360,000
July 28 (a)	111,000	361,000
Calendar year	3,627,000	11,543,000

(a) Subject to revision. (b) Revised from last report.

will be established for five consecutive summer months.

The Lake demand is unabated and dumpings continue at the rate of 1,000,000 tons a week or better. Dumpings at Hampton Roads for all accounts during the week of Aug. 2, were 438,733 net tons compared with 392,249 tons the previous week. Having been for the past four months below the rate for the previous two years, tidewater movement through this port is now expected to exceed the records of either 1921 or 1922 for August and September.

Midwest Feels an Upturn

The market as viewed from Chicago during the past week had no high lights. A gradual but extremely slow upturn was noticeable. Inquiries are getting thicker and small purchases by dealers are putting a little bottom into a heretofore bottomless domestic market. Steam buyers, many of them with stocks on hand, are demanding nothing but there is just enough call to absorb the small volume of high grade screenings produced in Illinois and Indiana. The

number of Central Illinois operations has been a little larger during the past two weeks but some of the operators who reopened early in July are having hard sledding to place anything with their best lump ranging from \$2.50 to \$2.75 and with screenings at \$1.35@1.40.

Little business in eastern or southern soft coals is done around Chicago just now, except in smokeless. High grade West Virginia smokeless mine run has been in some demand because the price dropped to \$2.50@3 and dealers have been stocking all they could get. Lump and egg did not tumble as far because very little of it is being made, but the old \$6 price is not so well maintained now. Some distress coal has been offered in Chicago as low as \$5.25.

Trade Picks Up in St. Louis

A little activity in domestic coal is the only change in St. Louis. This is principally for good coals at a moderate price. The dealers are pretty well loaded up. It is estimated there must be about 15,000 tons of anthracite stored in the retail yards locally and movement in this is easy. Very little coke and no smokeless is selling. Mt. Olive domestic trade

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Aug. 7, July 23, July 30, 1922 1923 1923				Midwest	Market Quoted	Aug. 7, July 23, July 30, 1922 1923 1923			
		Aug. 7, 1922	July 23, 1923	July 30, 1923	Aug. 6, 1923†			Aug. 7, 1922	July 23, 1923	July 30, 1923	Aug. 6, 1923†
Smokeless lump.....	Columbus.....	\$5.60	\$6.00	\$5.85	\$5.75@ \$6.00	Franklin, Ill. lump.....	Chicago.....	\$3.65	\$3.65	\$3.00@ \$4.35	
Smokeless mine run.....	Columbus.....	5.25	3.25	3.00	2.75@ 3.25	Franklin, Ill. mine run.....	Chicago.....	3.00	2.85	2.75@ 3.00	
Smokeless screenings.....	Columbus.....	5.10	2.90	2.80	2.25@ 2.60	Franklin, Ill. screenings.....	Chicago.....	1.65	1.65	1.45@ 1.85	
Smokeless lump.....	Chicago.....	6.35	6.10	6.10	5.50@ 6.00	Central, Ill. lump.....	Chicago.....	2.60	2.60	2.50@ 2.75	
Smokeless mine run.....	Chicago.....	6.25	3.60	3.60	2.50@ 3.00	Central, Ill. mine run.....	Chicago.....	2.10	2.10	2.00@ 2.25	
Smokeless lump.....	Cincinnati.....	5.90	6.00	5.75	5.50@ 6.00	Central, Ill. screenings.....	Chicago.....	1.45	1.35	1.35@ 1.40	
Smokeless mine run.....	Cincinnati.....	5.50	3.35	3.35	3.00@ 3.60	Ind. 4th Vein lump.....	Chicago.....	3.35	3.35	3.25@ 3.50	
Smokeless screenings.....	Cincinnati.....	5.40	3.00	3.00	2.50@ 3.25	Ind. 4th Vein mine run.....	Chicago.....	2.60	2.60	2.50@ 2.75	
*Smokeless mine run.....	Boston.....	8.90	5.60	5.45	5.25@ 5.50	Ind. 5th Vein lump.....	Chicago.....	1.60	1.60	1.50@ 1.75	
Clearfield mine run.....	Boston.....	6.90	2.35	2.35	2.00@ 2.75	Ind. 5th Vein mine run.....	Chicago.....	2.85	2.85	2.75@ 3.00	
Cambria mine run.....	Boston.....	7.40	2.85	2.85	2.75@ 3.25	Ind. 5th Vein screenings.....	Chicago.....	2.10	2.10	2.00@ 2.25	
Somerset mine run.....	Boston.....	6.90	2.60	2.60	2.25@ 3.00	Mt. Olive lump.....	St. Louis.....	1.45	1.45	1.40@ 1.50	
Pool 1 (Navy Standard).....	New York.....	3.35	3.35	3.00@ 3.60		Mt. Olive mine run.....	St. Louis.....	3.00	3.00	2.75@ 3.25	
Pool 1 (Navy Standard).....	Philadelphia.....	3.50	3.45	3.20@ 3.65		Mt. Olive screenings.....	St. Louis.....	2.00	2.00	2.00	
Pool 1 (Navy Standard).....	Baltimore.....					Standard lump.....	St. Louis.....	1.75	1.75	1.50	
Pool 9 (Super. Low Vol.).....	New York.....	8.65	2.65	2.75	2.35@ 2.75	Standard mine run.....	St. Louis.....	2.55	2.55	2.10@ 2.50	
Pool 9 (Super. Low Vol.).....	Philadelphia.....	8.25	2.65	2.60	2.40@ 2.85	Standard screenings.....	St. Louis.....	1.85	1.85	1.85	
Pool 9 (Super. Low Vol.).....	Baltimore.....	7.25	2.40	2.40	2.00@ 2.50	West Ky. lump.....	Louisville.....	\$6.35	2.15	2.25	2.15@ 2.35
Pool 10 (H.Gr. Low Vol.).....	New York.....	8.00	2.25	2.25	2.00@ 2.50	West Ky. mine run.....	Louisville.....	6.25	1.70	1.60	1.35@ 1.85
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	8.00	2.25	2.15	2.10@ 2.40	West Ky. screenings.....	Louisville.....	6.10	1.05	1.05	.85@ 1.25
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	7.25	2.20	2.25	2.25@ 2.30	West Ky. lump.....	Chicago.....	6.85	2.10	2.10	2.00@ 2.25
Pool 11 (Low Vol.).....	New York.....	7.25	1.95	2.00	1.60@ 2.00	West Ky. mine run.....	Chicago.....	6.75	.95	.95	1.25@ 1.35
Pool 11 (Low Vol.).....	Philadelphia.....	7.85	1.85	1.85	1.80@ 2.10						
Pool 11 (Low Vol.).....	Baltimore.....	7.25	1.95	2.00	2.00						
High-Volatile, Eastern											
Pool 54-64 (Gas and St.).....	New York.....		1.75	1.80	1.65@ 2.00	South and Southwest					
Pool 54-64 (Gas and St.).....	Philadelphia.....	7.85	1.70	1.80	1.70@ 1.95	Big Seam lump.....	Birmingham.....	3.50	3.25	3.25	3.40@ 3.65
Pool 54-64 (Gas and St.).....	Baltimore.....	6.25	1.70	1.70	1.70	Big Seam mine run.....	Birmingham.....	3.20	1.95	1.95	1.75@ 2.25
Pittsburgh se'd gas.....	Pittsburgh.....		2.65	2.65	2.60@ 2.75	Big Seam (washed).....	Birmingham.....	3.50	2.35	2.35	2.25@ 2.50
Pittsburgh mine run (St.).....	Pittsburgh.....		1.95	1.95	2.00@ 2.15	S. E. Ky. lump.....	Chicago.....	6.35	2.85	2.85	2.75@ 3.50
Pittsburgh slack (Gas).....	Pittsburgh.....		1.45	1.45	1.50@ 1.60	S. E. Ky. mine run.....	Chicago.....	6.25	2.10	2.10	1.75@ 2.00
Kanawha lump.....	Columbus.....	5.60	3.00	3.00	2.75@ 3.25	S. E. Ky. lump.....	Louisville.....	5.85	2.70	2.90	2.75@ 3.00
Kanawha mine run.....	Columbus.....	5.50	1.85	1.85	1.75@ 2.00	S. E. Ky. mine run.....	Louisville.....	5.75	1.75	1.75	1.50@ 2.00
Kanawha screenings.....	Columbus.....	5.10	1.05	1.10	1.00@ 1.15	S. E. Ky. screenings.....	Louisville.....	5.60	1.00	1.00	.75@ 1.25
W. Va. lump.....	Cincinnati.....	5.85	2.85	3.10	3.00@ 3.25	S. E. Ky. lump.....	Cincinnati.....	5.85	3.00	3.10	2.75@ 3.50
W. Va. Gas mine run.....	Cincinnati.....	5.85	1.50	1.55	1.50@ 1.75	S. E. Ky. mine run.....	Cincinnati.....	5.75	1.50	1.55	1.40@ 1.75
W. Va. Steam mine run.....	Cincinnati.....	5.50	1.50	1.55	1.50@ 1.75	S. E. Ky. screenings.....	Cincinnati.....	5.60	.90	.85	.80@ 1.00
W. Va. screenings.....	Cincinnati.....	5.10	1.05	.85	1.00@ 1.10	Kansas lump.....	Kansas City.....	5.25	4.00	4.00	3.50@ 4.50
Hooking lump.....	Columbus.....	5.85	2.75	2.75	2.50@ 3.00	Kansas mine run.....	Kansas City.....	5.15	3.25	3.25	3.00@ 3.50
Hooking mine run.....	Columbus.....	5.50	1.85	1.85	1.75@ 2.00	Kansas screenings.....	Kansas City.....	4.90	2.60	2.60	2.50@ 2.75
Hooking screenings.....	Columbus.....	5.35	1.25	1.15	1.00@ 1.20						
Pitts. No. 8 lump.....	Cleveland.....	7.85	2.55	2.50	2.10@ 3.00						
Pitts. No. 8 mine run.....	Cleveland.....	7.85	1.95	1.80	1.85@ 2.00						
Pitts. No. 8 screenings.....	Cleveland.....	7.85	1.25	1.25	1.20@ 1.35						

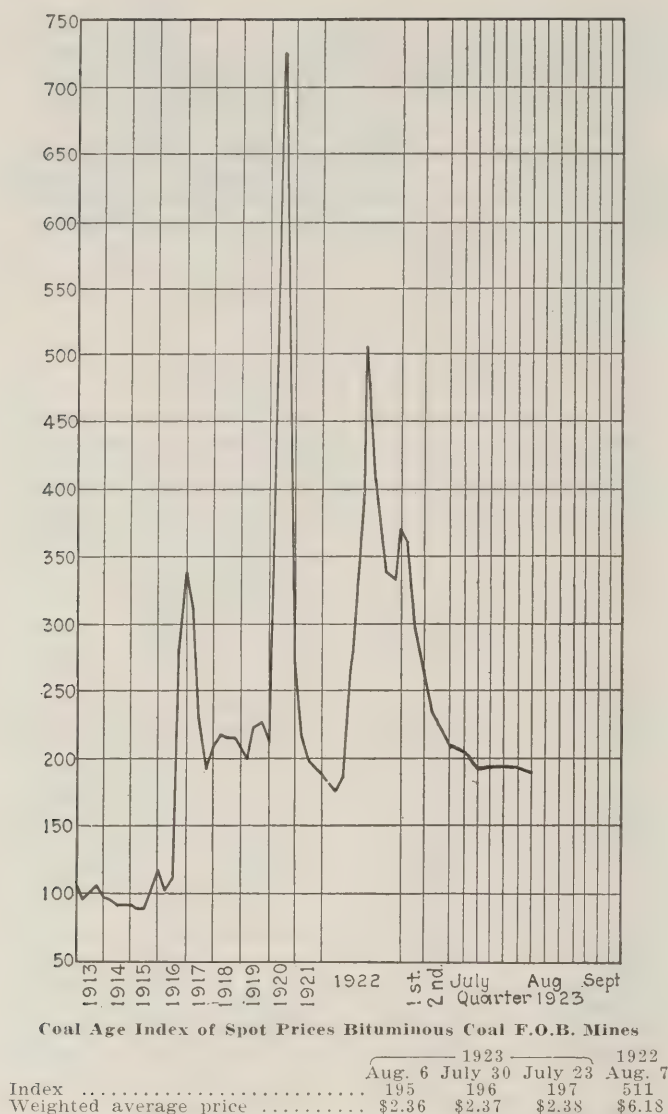
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		July 30, 1923		Aug. 6, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia.....	2.39		7.90@ 8.10		7.90@ 8.10		7.90@ 8.10
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	\$8.50@ 12.75	8.00@ 8.35	\$8.50@ 12.75	8.00@ 8.35
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago.....	5.06	12.50@ 13.00	7.20@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago.....	5.06	12.50@ 13.00	7.35@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 12.75	8.00@ 8.35	8.50@ 12.75	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago.....	5.06	12.50@ 13.00	7.35@ 8.35	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York.....	2.34		8.25		8.30		8.30
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.00	6.00@ 6.30	6.75@ 8.00	6.00@ 6.30
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago.....	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	2.75@ 3.50	3.50@ 4.15	3.00@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	2.00@ 2.50	2.50	2.25@ 2.50	2.50
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye.....	New York.....	2.22		2.10	1.40@ 1.60	1.60	1.25@ 1.60	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

is flat and Standard is unusually slow. Wagonload steam is off and carload light, with no steam from the country. Country domestic call is picking up on cheaper coals. No heavy tonnage is involved, but scattering inquiries come in.

Kentucky Suffers Little

Operations in Western Kentucky are not showing much improvement. The field is operating about one-third time. Out of about 176 of the better mines, only about 100 are operating. Car supply is full. Prices continue relatively low, but as good as could be expected considering competition, general conditions, and the season. Mine run is quoted as low as \$1.35 a ton. Production of coal by the stripping process has been increasing in Western Kentucky, and is causing the pit mine operators to do a lot of knocking.

There has been a somewhat improved demand on the Louisville market for steam coal over the past few days, and some nice orders have been placed by large consumers of screenings, including industries and utilities, while inquiry is somewhat better all along the line. This has resulted in advances on Eastern Kentucky screenings, of from 15 to 25 cents a ton, but other sizes are showing no improvement. A few of the coal men are feeling more optimistic and are endeavoring to bull the market by quoting over the market price but selling under it. However, on

prepared sizes \$3.50 appears to be just about the top for fine 6-in. block from the gas coal districts of Eastern Kentucky, and very little coal is moving at that price.

It seems that the principal advance is in screenings, and this is more largely due to reduced production, as a result of many mines being down, and lack of prepared coal orders. Movement to the Lakes has been good.

Northwest Stocks Anthracite

Receipts of coal at Duluth fell off during the week. Only fifty cargoes reached the Head-of-the-Lakes docks. Five of these were anthracite. Last week sixty cargoes arrived of which ten were hard coal. This falling off is attributed to the fact that many docks are unwilling to take a chance of being caught with a large amount of unsalable bituminous on hand. Only twenty-two cargoes are reported on the way from lower lake ports of which but two are hard coal. The delay of the I. C. C. in handing down a rate decision in the Southern Illinois coal matter is causing much apprehension.

The buying situation remains the same. Public utilities are taking a little coal and railroads are helping out some but the general market is dead. Dealers and other consumers are buying from hand to mouth.

Hard coal demand far exceeds the supply. Prices on hard coal are firm at last week's levels. Egg, \$12.50; stove, \$12.80; nut, \$12.85; pea, \$11; buckwheat, \$8.50.

Prices vary a little in bituminous. Youghiogheny and Hocking are the same as last quoted: Lump, \$6.50, run of pile, \$5 to \$5.25 and screenings \$4. The screening market is weak, however, and lower levels are being quoted by some. Splint has strengthened slightly thus: Lump, \$7.50; run of pile, \$6.50; screenings, \$5.25. Kentucky: Miller Creek lump, \$9.50; screenings, \$5.75. Elkhorn lump, \$8.50; run of pile, \$7.25; screenings, \$5.25. Pocahontas is in demand at \$10 for lump, \$7.25 for mine run and \$6.25 for screenings. Smithing is at \$8.

The coal market at Milwaukee is in a more satisfactory condition than it has been for some time, because of fear of a strike in the anthracite field. There is an increasing number of orders for anthracite and for Pocahontas and the domestic grades of bituminous coal. Steam coal is being taken a little more freely, but in small lots. There seems to be no disposition on the part of large consumers to stock up. Prices continue unchanged. The movement by lake to this port has slackened to some extent.

Western Trade Is Spotted

In the Southwest market centering in Kansas City there are signs of the clouds breaking but everybody realizes the coal trade will have to wait at least until the end of the month for trade to regain normalcy. No bills are still on tracks but they are fewer. No changes in bituminous prices have been made but Arkansas semi-anthracite advanced 50c. Aug. 1 to \$6.50 for lump.

In Utah trading is still lifeless except for a little business in the largest cities where dealers have been stocking. Other yard men feel no fear of the car shortage the trade foresees. Industrial coal demand is modest but sugar companies will begin buying for storage soon. Demand for slack at the low prices of \$1.25@1.50 is light.

Demand Slightly Better in Ohio

A slightly better demand for all grades, particularly domestic, developed in the Columbus market. Retail dealers in the larger cities are the heaviest buyers, as rural dealers are unable to move much stock owing to the farming season. Householders who heretofore have hesitated before putting in their winter supply of coal are now showing a disposition to fill their bins believing that prices have reached the bottom. Steam business is showing some briskness, with buyers picking up bargain coal. One of the best features of the market is the activity in school coal. The market for run-of-mine and slack at Cincinnati seemed to have improved slightly during the week. Rejections have fallen off to a considerable degree. This has resulted in a slackening of the amount of distress coal that has to be faced. Accumulations at the various railroad yards have

been reduced. There has been a falling off in the orders for domestic bituminous coals as compared with a month ago. On the other hand the lake business seems to have grown a bit better. River business during the week was good. West Virginia 2-in. lump was quoted at \$2.75, as compared with \$2.50@2.75, and Southeastern Kentucky 2-in. lump at \$2.50@2.75, as compared with \$2.40@2.75. Inquiries in the Cleveland market for steam coals slid off a trifle, operators and jobbers say, but that there was more activity in the retail trade. The holding off on the part of steam coal buyers is based upon general trade conditions and the fact that the supply of steam coal in the middle west will be ample for some time.

The principal development in West Virginia coals has been a slight increase in demand, attributed solely to the present status of the anthracite wage negotiations. Production of smokeless coals is large.

Steam coal has been gradually stiffening in the Pittsburgh district, as well as in the Bessemer and the Connells-ville districts. There is no material change in the volume of demand, and buyers continue to be as cautious as heretofore. The closing of some of the smaller mines, especially those that had to sell their coal in the spot market, caused the betterment, enabling the larger producers, whose output has been increasing to maintain a better front. Numerous inquiries are being received by the Central Pennsylvania operators, together with contract offers for the balance of the year. However, operators are not willing to tie up at present prices, most of them being willing to take chances on the open market. The Buffalo market remains quiet. Industrial business is dull and consumers are not adding to their stocks of coal.

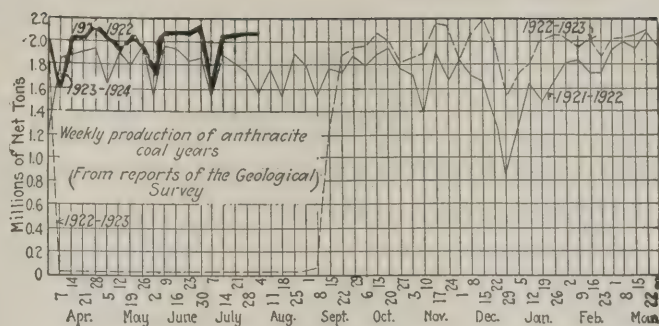
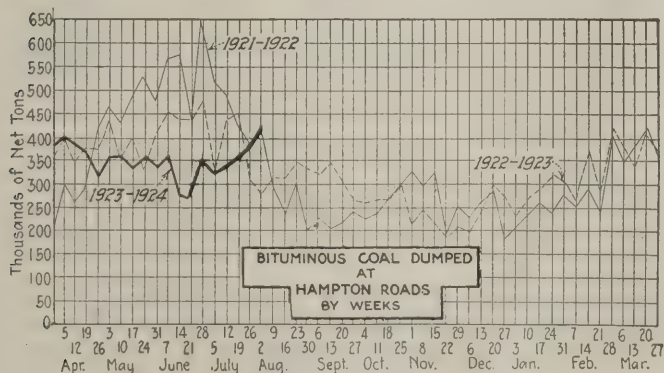
Steam Trade in New England Quiet

In New England the steam trade is practically at a standstill. Except for small purchases there is no buying and shippers are patiently waiting for the long desired turn. The industries here are mostly on short time and consumption for July and August will be far behind expectation. Receipts of the period from January 1st have been greater than for any year since 1918 and when light business and the inroads of oil are considered it is clear there will be only dull business for the next sixty days.

All-rail inquiry is extremely light. Most of the mines producing medium to light grade coals are shut down for much of the time and even those operators who considered themselves amply supplied with contract business through the summer are offering coal for August delivery. Prices are unchanged; the various interests set them at as low a figure as they could justify as early as June 1st and under present conditions there is small inducement to make sales at less than cost.

At the Hampton Roads piers there is a minimum of tonnage on cars. The smokeless agencies are adhering closely to their policy of not mining in advance of sale, and while prices are quoted with reasonable firmness at \$5.25@5.50 for Navy standard grades, it is realized that this range is nominal and that little coal is actually changing hands.

Among retail dealers and in the trade generally there is little interest in any movement to use bituminous as a substitute for anthracite. Consumers in this territory are so constituted that they will not as a rule show any willingness to take bituminous more than a day or two ahead of actual necessity. It would therefore need to be a very serious



emergency before even choice low volatiles would be used in households, as was abundantly shown during last winter.

New York Tidewater Market Dull

Consumers of soft coal in the New York market are making no apparent effort to add to their stocks. The New York harbor is well cleared of distress coal and there is very little offered now. Inquiry for coke is on the increase. The Philadelphia market is quiet, although it is believed the situation in the anthracite regions has induced some of the smaller users of soft coal to take in an extra car or two. The large consumer however, still clings to the belief that he will be able to get all the coal needed when his time to buy comes along. Baltimore complains of lack of business, and no improvement was noticed at Birmingham. Business at the latter place is practically at a standstill. Contract mines are in better shape than those not having such obligations and are working more regularly. The domestic trade is quiet.

Several new inquiries for export coal were reported in the New York market, some involving gas coal to France and others New River product to Norway. The export situation is the most important at Baltimore. One-third of the vessels leaving Baltimore during July were consigned to Canadian ports. These vessels took one-third of the coal shipped from that port during the same period. During the past three months Canada has taken from Baltimore 91,603 tons of cargo and bunker coal.

A fair tonnage of coal is going from the Ohio mines to the Head-of-the-Lakes, while there is some congestion at some of the lower ports. The lake trade at Buffalo is active but not up to that of 1921, loadings in July amounting to 516,500 net tons, as compared with 665,101 tons in the corresponding month of 1921.

Increased Demand for Anthracite

The demand for anthracite domestic coals gradually increased, while retail dealers are calling on producers for larger shipments. Although there is a feeling there will not be a suspension consumers continue to be anxious about getting their winter coal into their cellars. Quotations for independent coals are strong and while some of the smaller operators are reported as asking around \$13.50 for egg, stove and chestnut, the general range seems to be around \$13. The steam coals at New York and Philadelphia are in better shape. The Baltimore dealers are being urged for deliveries by consumers.

"Production of anthracite continues at a high rate, in excess of 2,000,000 tons per week," says the Geological Survey. "The estimated total output during the week ended July 28 was 2,080,000 net tons."

Production of coke during the week ended July 28, says the Geological Survey, is estimated at about 361,000 net tons, as against 360,000 tons the previous week. The cumulative output of beehive coke during the present year amounts to about 11,543,000 net tons.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended July 21, 1923.....	1,028,927	190,788
Previous week.....	1,019,667	193,831
Same week in 1922.....	845,548	72,420

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
July 21, 1923.....	79,710	5,167	7,891	3,676
Same date in 1922.....	203,322	141,430		
July 14, 1923.....	84,210	4,865	5,574	2,700

Foreign Market And Export News

British Coal Output Falling

Coal production in Great Britain continues to decline. The output for the week ended July 21 is reported as 4,600,000 tons, says a cable to *Coal Age*, a decline of 442,000 tons from the previous week, and of 1,197,000 tons since May 19 when it was 5,797,000 tons. Part of the decrease is attributed to the Scotch holidays.

The Welsh coal market is in an undecided state; demands have improved but are not heavy; shipments have declined and recent good weather has led to holiday making and consequent reduction of output. The French State Railways have placed contracts for 30,000 tons, and other orders are from the Norwegian whaling fleet, and the Italian and Australian Governments. It is impossible to meet the demand for anthracite.

The Newcastle market is erratic and accumulated coal is being offered at a discount. Present prices are not being accepted for forward contracts. A number of contracts have been made for August and later delivery.

French Coal Demand Strong

Demand is strong for all grades of French coal. Output is slowly increasing. While the collieries of the Nord and Pas de-Calais have very little available supply on hand, their full production being almost insufficient to take care of contracts already placed. Demand for industrial coals is heavy enough to meet the output.

Retail dealers have difficulty in securing additional supplies. Comparatively little Belgium coal is coming forward. Imports from Great Britain continue satisfactory.

Hampton Roads Situation Improves

Business at Hampton Roads last week was fair, though prices showed a tendency to weaken on the spot. Coastwise trade was comparatively dull, but bunkers and exports held firm.

General coal movement over the piers showed a decided increase, following a lull during June and July. Shippers watched the tendency of the foreign business to increase and viewed the entire situation with optimism in

spite of rumored impending difficulties in the fields.

Shippers expected coastwise movement to begin taking on its usual fall activity, with big business in prospect for the next few months.

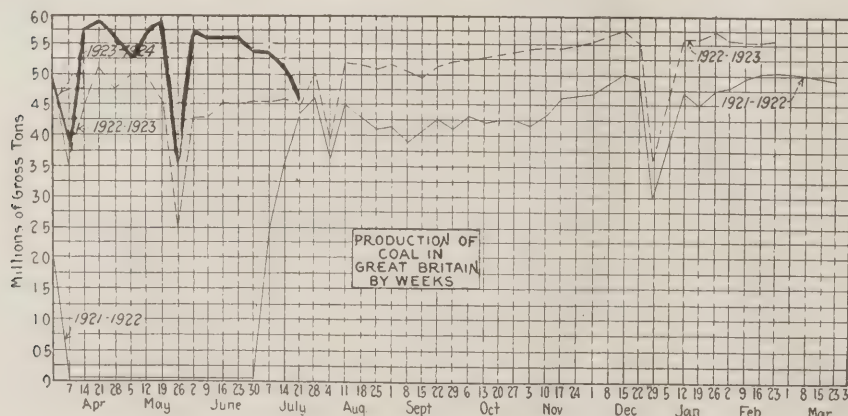
French May Imports and Exports

French imports of coke and briquets and exports of coal, coke and patent fuel in May and for the first five months of 1923, according to French Customs returns, follow, in metric tons:

	May	Jan-May
Coke:		
Sarre.....	26,192	39,968
Great Britain.....	47,441	270,578
U. S.....	76,696	87,726
Belgium.....	23,472	184,550
Netherlands.....	23,214	136,934
Germany.....	184,416	573,567
Czecho-Slovakia.....	1,051	28,311
Other countries.....	143	146
Totals.....	382,625	1,321,780
Briquets:		
Great Britain.....	19,277	62,327
Belgium.....	21,515	169,692
Netherlands.....	2,257	9,448
Germany.....	15,624	64,876
Other countries.....	46	428
Totals.....	58,719	306,721

EXPORTS

	May	Jan-May
Coal:		
Belgium and Luxemburg.....	91,130	578,307
Switzerland.....	41,060	127,506
Spain.....	231	794
Italy.....	3,769	49,223
Germany.....	131	39,781
Sarre.....	64,703	131,683
Other countries.....	4,793	26,528
Bunkers { to French str.....	23,108	68,555
{ to foreign str.....	3,188	17,175
Totals.....	232,113	1,039,552
Coke:		
Belgium and Luxemburg.....	1,084	3,173
Switzerland.....	8,985	33,616
Spain.....	232	1,142
Italy.....	21,785	94,430
Germany.....	0	1,560
Other countries.....	1,355	9,041
Totals.....	33,441	142,962
Patent fuel:		
Belgium and Luxemburg.....	640	6,168
Switzerland.....	12,808	75,410
Italy.....	157	7,239
Algeria.....	20	8,403
Germany.....	0	4,950
Other countries.....	3,274	15,922
Bunkers { to French str.....	208	2,411
{ to foreign str.....	2	238
Totals.....	17,109	120,741



Export Clearances, Week Ended Aug. 4, 1923.

FROM HAMPTON ROADS

For Africa:	
Swed. SS. Adolf, for Bathurst.....	2,885
For Belgium:	
Ital. SS. Vincengo Florio, for Antwerp.....	9,322
For Brazil:	
Br. SS. Northlea, for Pernambuco....	4,540
For Canada:	
Br. SS. Reindeer, for Sydney, N. S....	4,803
Nor. SS. Ottawa, for Halifax.....	3,634
Nor. SS. Albatross, for Montreal....	4,577
For Chile:	
Amer. SS. Argosy, for Valparaiso....	3,011
For Cuba:	
Swed. SS. Ivernia, for Havana.....	2,599
Amer. Schr. B. S. Taylor, for Ensenada de Mora.....	1,177
For Holland:	
Ital. SS. Ansaldo VII, for Rotterdam.....	2,906
Du. SS. Aldebaran, for Rotterdam.....	11,253
Nor. SS. Arna, for Rotterdam.....	8,592
Jap. SS. Egypt Maru, for Rotterdam.....	9,501
For Santo Domingo:	
Br. SS. Saint Patrick, for Puerto La Plata.....	5,750
For Sweden:	
Nor. SS. Jethou, for Stockholm.....	5,971
For West Indies:	
Swed. SS. Braecia, for Curacao.....	4,885
Nor. SS. Jacob Christensen, for Fort de France.....	5,536
For	
Amer. Schr. Sally Persis Noyes, for Salt River.....	1,013
Br. SS. New Brooklyn, for Secondee..	1,021

FROM BALTIMORE

For Canada:	
Br. SS. Cynric Queen.....	6,499
Br. SS. Ligan.....	7,467
Nor. SS. Alfred Nobel.....	4,145
Br. SS. Magdala.....	7,588
For France:	
Span. SS. Gorbea Mandi.....	6,922
For Germany:	
Ger. SS. Eisenach.....	2,590
For Holland:	
Nor. SS. Hallgyn.....	9,338
For Italy:	
Jap. SS. Vancouver Maru.....	8,847
FROM PHILADELPHIA	
For Canada:	
Br. Schr. Gov. Parr, for Halifax....	—
For Cuba:	
Br. SS. Turner, for Havana.....	—

Hampton Roads Pier Situation

	July 26	Aug. 2
N. & W. Piers, Lamberts Pt.:		
Cars on hand.....	1,246	1,629
Tons on hand.....	72,405	89,803
Tons dumped for week.....	124,907	148,161
Tonnage waiting.....	9,850	31,925
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,843	1,746
Tons on hand.....	108,870	100,330
Tons dumped for week.....	109,349	121,793
Tonnage waiting.....	30,653	2,666
C. & O. piers, Newport News:		
Cars on hand.....	1,334	1,742
Tons on hand.....	59,100	94,285
Tons dumped for week.....	115,967	121,772
Tonnage waiting.....	26,640	18,024

Pier and Bunker Prices, Gross Tons

	PIERS	
	July 28	Aug. 4†
Pool 9, New York.....	\$5.25@ \$5.75	\$5.35@ \$5.85
Pool 10, New York.....	4.90@ 5.25	4.90@ 5.25
Pool 11, New York.....	4.75@ 5.00	4.50@ 5.00
Pool 9, Philadelphia.....	5.20@ 5.70	5.30@ 5.80
Pool 10, Philadelphia.....	4.35@ 5.20	4.60@ 5.30
Pool 11, Philadelphia.....	3.70@ 4.35	4.10@ 4.70
Pool 1, Hamp. Roads.....	5.40@ 5.50	5.25
Pools 5-6-7, Pamp.Rds.....	4.25@ 4.50	4.50
Pool 2, Hamp. Roads.....	5.10@ 5.20	5.00
	BUNKERS	
Pool 9, New York.....	5.55@ 6.05	5.65@ 6.15
Pool 10, New York.....	5.20@ 5.55	5.20@ 5.55
Pool 11, New York.....	5.05@ 5.30	4.80@ 5.30
Pool 9, Philadelphia.....	5.65@ 5.95	5.70@ 6.05
Pool 10, Philadelphia.....	4.75@ 5.55	4.90@ 5.65
Pool 11, Philadelphia.....	3.90@ 4.65	4.35@ 5.00
Pool 1, Hamp. Roads.....	5.40@ 5.50	5.35
Pool 2, Hamp. Roads.....	5.10@ 5.20	5.15

Current Quotations British Coal f.o.b. Port, Gross Tons

	Quotations, by Cable to Coal Age	
	July 28	Aug. 4†
Admiralty, large.....	30s. @ 31s.	30s. @ 32s.
Steam smalls.....	20s. @ 22s.	20s. @ 21s.
Newcastle:		
Best steams.....	25s. 9d. @ 26s. 6d.	25s. @ 27s.
Best gas.....	28s.	27s.
Best bunkers.....	26s. @ 27s.	26s.

† Advances over previous week shown in heavy type, declines in italics

News Items From Field and Trade

ALABAMA

At a recent meeting of the board of directors of the **New Castle Coal Co.**, Birmingham, **Harold McDermott** was elected to a vice-presidency. He will continue to serve as secretary-treasurer, a position which he has held for a number of years.

Moss & McCormick, Birmingham coal operators, were the successful bidders in the leasing by the federal government of 1,840 acres of coal lands in Fayette County, the first lease given by the government in Alabama. Under the terms of the agreement the purchase price of the lease was \$85,000, one-fifth of which was paid in cash, the balance to be paid in thirty days. The lessees guarantee the government a royalty on a minimum yearly output of 20,000 tons at 10c per ton. These lands carry the Black Creek seam of coal, an excellent steam product as well as domestic fuel. There was only one other bidder, the Galloway Coal Co. It is understood that the owners of the lease expect to begin extensive development in the near future.

Arrangements are being made by the **Tennessee Coal, Iron & Railroad Co.** to construct an aerial railway connecting its ore mines with its works and those of its subsidiaries at Fairfield. This railway will result in great savings in freight charges and also expedite the movement of raw material. The work, it is estimated, will cost from \$3,000,000 to \$4,000,000.

COLORADO

J. R. Lemist, pioneer assistant sales manager in the wholesale department of the Colorado Fuel & Iron Co., on account of health and at his own request has been transferred to the Los Angeles office of the company, which has just been reopened. Mr. Lemist will have charge of the sales on coal, coke and steel in that territory. **Douglas Millard**, who also has been an assistant sales manager, now has charge of the wholesale department of sales at headquarters in Denver.

State Coal Mine Inspector **James Dalrymple's** June report shows the tonnage for the state's June production to be 756,557, making the total for the first six months of the year 5,027,151, an increase of 707,843 tons over the same period last year. The coal mining industry employed 11,387 men in June, something less than the average of 13,018 for the year. Fifteen counties report larger production, Las Animas leading with 249,001 tons more than last year, and five counties report smaller production.

The **Big Four Coal & Coke Co.** is making several improvements in its state mine, near Erie. The tippie is being remodeled and the shaft enlarged.

Dr. E. T. Devine, U. S. Coal Commissioner, will spend the greater part of August traveling among the Rocky Mountain and Pacific Coast fields representing the U. S. Coal Commission. The only definite dates so far settled are Aug. 3-4 in the Trinidad, (Colo.) field and Aug. 11-12 in Carbon County (Utah) field. Dr. Devine will attend the annual inter-company first-aid contest and picnic of the employees of the Colorado Fuel & Iron Co. and will address the employees there. From Utah he will proceed to Rock Springs and thence to the Washington coal fields. On his way East late in August he expects to visit the Roundup field in Montana.

ILLINOIS

The Hamilton-Lester Coal Co. of Marion, has instituted suit in Williamson County, for \$17,675 for damages to its mine during the riots of last June. Charles F. Hamilton, president of the company, filed the suit. This is not the same Lester Coal Co. mine at which the riot occurred, when 22 non-union workers were killed, but is a smaller property located nearby.

Charles M. Moderwell, president of C. M. Moderwell & Co., of Chicago, a well-known coal wholesale concern, has been appointed to the Chicago Board of Educa-

tion and was elected chairman by the board at its organization meeting May 23. The board has been in bad odor in Chicago under the régime of Mayor William Hale Thompson so that the new Mayor, William E. Dever, accepted the enforced resignations of the majority of the members and replaced them. Mr. Moderwell is confronted with a big job for the public good.

The mine of the **Paradise Coal & Coke Co.**, at Paradise, has resumed operations after several weeks shut down for repairs.

The **Tamaroa-Little Muddy mine** at Tamaroa has resumed work after a suspension caused by a cave in around the top of the shaft due to excessive rains several weeks ago.

Announcement is made by the **Pure Carbon Co.**, Wellsville, N. Y., of the appointment of a Chicago representative, **John Nangle**, 184 West Washington Street, where he will give personal engineering service on all brush problems and requirements in this territory.

James Robertson, superintendent of the Du Quoin mine-rescue station, is to be one of the judges for the national first-aid contest to be held at Salt Lake City, Utah, the latter part of August. The judges for this contest are appointed by the federal department of mines and only men with the highest ability and experience are chosen.

The mine of the **Missouri-Illinois Coal Co.** at **Rentchler Station**, near Belleville, has been closed by State Mine Inspector **James R. Richards** and County Mine Inspector **W. A. Wilson**. The mine was closed because of the absence of a means of escape for men up the air shaft of the mine. Sometime ago the steps in the air shaft of the mine were removed for repairs and for some reason were never replaced.

Many mines in the **Standard field** are shut down and those which are still working are only operating from one to three days per week. Following is list of mines in the Belleville district which are not working at present. Belleville, 5; Collinsville, 2; Freeburg, 2; O'Fallon, 2; Marissa, New Athens, Lenzburg, Lebanon and Breese, one each.

INDIANA

The **Metzner Bros. Coal Co.**, Fort Wayne, has filed a preliminary certificate of dissolution.

Elmer Pope of Linton, has been appointed receiver of the **Kathleen Coal Co.**, which operates a mine in Greene County. Suit for receiver was filed in Superior Court in Vigo County.

Alfred Kauffmann, vice president of the Link-Belt Co. and general manager of its Indianapolis plants, was elected a director of the **Fletcher Savings & Trust Co.**, recently.

The **Big Bend Coal Co.** has been incorporated to mine and deal in coal at Brazil. It has a capital of \$150,000 preferred and 750 shares common, no par. The directors are **Louis Clements**, **Rowland Rowland** and **John Magenhardt**.

John Stevely and **Sam Wilton**, deputy mine inspectors, announced recently that their investigation had shown that **J. E. Fudgett**, engineer, was not responsible for the accident at the **Vernilion Co.'s** mine, near New Goshen, July 20, in which thirteen men were injured, one fatally, when the cage fell 125 ft. to the bottom of the shaft. The inspectors found that six set-screws in the balancing plate in one of the cylinders were loose and prevented proper compression so that when the engineer threw the lever to check the descending cage it failed to hold.

The **Crawford & McCrimmon** foundry and machine shops, Brazil, operated by a receiver for several months, are in the hands of Brazil stockholders and a reorganization will be effected, putting the factory on a better financial footing. A receivership, which was the result of a petition of **Edward Shirkie**, of Terre Haute, a stockholder, was dismissed in the Vigo Superior Court with the settlement of all claims against the company. The company manufactured mine engines, mine pumps and mine fans extensively.

Asserting that he was dragged from his home in Jasonville in the spring of 1921 by a group of miners because he engaged in work forbidden by the Jasonville local, that he was threatened with death and hanging and driven from his home with the threat of death if he returned, **James Gatherum** filed suit in federal court July 24, asking damages of \$50,000 and an injunction against interference with his work and home life. The suit is brought against **Merritt Myers** and thirty-two members of Local No. 24 of the United Mine Workers.

KANSAS

The second step toward putting an end to "Progressive Miner" radical activities in the Kansas district was taken June 27 by the district board of District 14, United Mine Workers, when it gave the names of U. M. W. A. members active in the "Progressive" meeting at Franklin, May 29, to their respective locals for action. The board suspended all members who attended the Franklin meeting shortly after it was held. This action was upheld by the international board at its recent meeting at Indianapolis. The locals will be required to try the men whose names were submitted to them. If the suspensions by the district board are upheld, the only recourse of the suspended miners will be to the international executive board to obtain reinstatement.

KENTUCKY

The **Rainbow Coal Co.**, Louisville, capital \$25,000, has been incorporated by **Charles D. Salyers**, **F. S. Salyers**, and **Donnelly B. Salyers**. The liability limit is placed at \$100,000.

The **Glidden-Decker Coal Co.**, of Barbourville, has increased its capital stock from \$10,000 to \$50,000.

The **Hampton Coal & Phosphate Co.** has been incorporated in Livingston, by **George Hamburg**, **R. L. Crawford** and **E. M. Nelson**.

The **Louisville Times** in a recent editorial highly complimented the work of **Willard Rouse Jillson**, director of the Kentucky Geological Survey, and recommended that the department, which has been starved for money to carry on its work, be given funds with which to carry out its work.

Mayor **Houston Quinn**, Louisville, has named **Louisville delegates to the American Mining Congress** and national exposition of mines and mining equipment, Milwaukee, Wis. Sept. 24 to 29. The men named include **F. M. Sackett**, **R. C. Tway**, **H. H. McBratney**, **Kenneth U. Meguire**, **C. D. Glass**, **M. G. Sackett**, **C. E. Reed**, **M. S. Barker**, **H. T. Carmichael** and **W. L. Caldwell**.

A report to be submitted by the U. S. Engineers of this section shows that a material increase in river traffic was noted on the **Kentucky River** during 1922. Much of this increase has been due to efforts of the **Inland Waterways Co.**, Louisville, which operates mines on the Kentucky river, and a fleet of boats, bringing coal and oil down to the Ohio River, for transportation in larger tows to both upper and lower river points.

William Scroggins has been released from custody at Hartford in connection with the shooting of **Opal Wells**, son of a prominent coal operator. **Charles Scroggins**, uncle of **William Scroggins**, a coal miner and garage mechanic, has been held under bond of \$1,000 for the Grand Jury. Evidence showed that the shooting was in self-defense, Wells having drawn a gun and started the shooting.

The **St. Bernard Mining Co.**, of Madisonville, is starting to spend some money on its retail yards. The Nashville (Tenn.) yard has been improved, while the Paducah, Ky., yard is being enlarged, and will have a coal unloading trestle. At Louisville Manager **W. B. Gathright** has started work on a trestle at the Logan Street yard, and will also install one at the Kentucky Street yard, which will be enlarged. Under the trestles the yards will be concreted, and equipped with retaining walls, and loading to trucks will be handled by portable conveyors.

MASSACHUSETTS

Fuel Commissioner Eugene C. Hultman of Massachusetts warns consumers that in order to protect themselves against the consequences of a strike in the anthracite mines they should begin to put some bituminous coal into their bins. In spite of the brisk buying by consumers, Mr. Hultman says, the stocks on hand in the dealers' yards have increased nearly 100 per cent since April 1. At that time there were on hand 181,887 net tons. During April, May and June 1,523,790 tons was received. In

the same three months the dealers delivered 1,344,634 tons, leaving a balance on hand July 1 of 361,049 tons. "At the present rate of receipts," Mr. Hultman points out, "we should receive a total of about 1,000,000 tons of domestic anthracite in July and August. It is therefore evident that Massachusetts cannot physically receive more than one-half of its year's requirements of anthracite before Sept. 1."

Mayor Curley of Boston has sent Frank P. Rock, superintendent of the supply department, to Pennsylvania, to make arrangements to buy 25,000 to 50,000 tons of anthracite for Boston. In his order to Mr. Rock, the Mayor said: "The best interests of the people of Boston require that precautionary measures be taken in the event that the city, for the protection of the public, is again required to engage in the purchase, sales, and distribution of coal." In that the substitution of oil for coal has reduced the needs of city departments, only about 5,000 tons of anthracite will be required for municipal buildings, and about 100,000 tons of bituminous, against the former total of about 160,000 tons purchased annually. Mr. Rock's errand, however, is to provide for Boston householders.

MICHIGAN

The Cooper Coal Co., a newly organized corporation with a capital stock of \$500,000, announces it will drill in several townships near Saginaw and will work at least three mines soon. Otto L. Dittmar is president.

MINNESOTA

At the National Smoke Prevention Association convention in Minneapolis recently, B. J. Mullaney, former Commissioner of Public Works of Chicago, said that of the nation's fuel bill of three billion dollars a year, 95 per cent is wasted in unburned gases, smoke and sediment. He suggests that the substitution of gas fuel burned in its raw state will save 65 per cent, and the electrification of the railroads will save the remainder. Lignite also was given favorable mention as a smokeless fuel by W. A. Pittsford, chairman of the public service committee.

MISSOURI

The Mound Valley Coal, Gas and Oil Co. has been incorporated at Beldon, and will prospect for coal and other minerals. Its capital stock is \$100,000 and its incorporators are Arthur Hesse, W. Marseillon and A. A. Neimeyer.

Fred Wreidt, who recently opened a coal shaft on an 80-acre farm southwest of Bevier, has disposed of his holdings to a Bevier coal company which is leasing more acreage. The company will run a railroad spur to its new holding and will equip it electrically.

The Riverside Coal & Iron Co. has been incorporated with a capital of \$250,000. The company is headed by Edward F. Goltz, Democratic national committeeman, who has recently acquired control of the government fleet of barges on the Mississippi River. The purposes of the corporation are to manufacture and sell iron, steel, coke, etc.

Robert Carr and associates have leased the Reese coal mine near Rich Hill. The plant has been cleaned up and has been put back in operation. When the mine was closed down some time ago 50 miners were employed there. Reese goes to Illinois to become manager of the McComb mine property near Danville.

MONTANA

The largest coal lands lease in Montana in recent years has just been made by the government to Lyman L. Miller of Lead, S. D. The lease covers a 1,600-acre tract in Carbon County near Joliet containing the Bridger seam.

NEBRASKA

Another vein of coal has been discovered in the southwestern part of the state, near Auburn. Many veins have been found in that locality and one southeast of Pawnee City has been mined for several years with profit.

NEW YORK

A certificate of incorporation has been filed in the office of the Secretary of State at Albany by the **Hickory Grove Coal Mining Corporation, Rochester.** The directors

are William O. Boswell, 91 Berkley Street, Rochester; Jacob M. Floesch, 3 Argyle Street, Rochester; and Lawrence H. Fitch, 550 Park Ave., Rochester.

Bids will be received until 2 P.M., Aug. 13, by The United Shipping Board, New York City, for furnishing bunker coal for the vessels of the United States Lines at the Port of New York, for eight months from Aug. 25 and alternately for one year. Coal to be furnished must be Pool 1, Pennsylvania or West Virginia, or coal from the mines now in the U. S. Navy acceptable list. The bidder must be prepared to furnish not more than 15,000 tons per month and must give price f.a.s. New York harbor.

C. E. Tuttle, president of the Tuttle Coal Corporation of New York City, resigned as a director of the Pittsburgh & West Virginia Ry. at a meeting of the Board of Directors held on Aug. 2 and was elected president of the **Pittsburgh Terminal Coal Co.** A. W. Calloway, formerly president of the Pittsburgh Terminal Coal Co., was elected chairman of the board. W. C. Atwater, of New York, was elected to succeed Mr. Tuttle on the Board of Directors of the railway company.

W. A. Marshall & Co., of New York City, have taken over the output of the Fort Grand mine of the Fort Grand Coal Co., at Lowesville, W. Va., and will market that coal. The mine has an output of about twenty cars per day.

NORTH DAKOTA

Major Stanley Washburn, of Lakewood, N. J., president of the North Dakota Lignite Coal Operators' Association and vice-president of the Washburn Lignite Coal Co., in a recent address to bankers at Bismarck, declared that North Dakota this year will mine and sell 2,000,000 tons of lignite coal and in 1933 the state should be mining for its own use and for export between 10,000,000 and 15,000,000 tons of coal. He said that with the backing of the bankers the development of the lignite mines could be carried forward with amazing swiftness.

OHIO

The Black Diamond Coal Mining Co., Cincinnati, has been incorporated with a capital of \$100,000 to mine and sell coal, coke and minerals. Incorporators are W. B. Cramer, L. N. Birk, Calvin Cramer, N. C. Kelly and Arthur W. Gordon.

Suit has been filed at St. Clairsville, county seat of Belmont County, by the **Central National Bank Savings & Trust Co., of Cleveland,** against the **Belmont Collieries Co.,** for the foreclosure of a mortgage covering \$355,000 in bonds, the plaintiff being the trustee.

The International union of the United Mine Workers has revoked the charter of the local union at the Big Run mine, south of Bellaire. The revocation was made at the request of President Lee Hall, of Ohio, according to an announcement at the headquarters of sub-district 5, following refusal of the members to return to work at the Big Run mine. Several weeks ago the miners at Big Run engaged in a strike, which was declared by sub-district officials to be illegal and without the sanction of the union. After a protracted conference, however, an agreement was reached and the miners resumed work, but went out again when \$1 was checked off their pay as a penalty for the illegal strike. The membership of 381 miners in the union is affected by the revocation of the charter.

Buying of coal for public utilities, institutions and governmental departments will soon be in full swing in Columbus and Ohio. Bids have been asked for 3,500 tons of coal by the County Commissioners, of which 1,000 tons are for the court house, 2,000 tons for the county infirmary and 500 tons for the Memorial Hall. This will be either mine-run or lump. State Purchasing Agent J. P. Brennan will soon ask for bids for between 150,000 and 200,000 tons of coal for the various state institutions under the charge of the Department of Public Welfare. Only Ohio-mined coal will be purchased and specifications provide for either mine-run or nut, pea and slack. Steps will be taken to obtain a large part of the supply immediately upon the award of the contracts, as storage space for 100,000 tons is available. The Columbus City Council has authorized the purchase of approximately 22,650 tons of coal for the municipal light plant, water works department and garbage reduction plant. The supply is to last for the remainder of the current year.

OKLAHOMA

Test holes near Porter show a 20-in. bed at a depth that will permit stripping.

The Crowe Coal Co., of Henryetta, has closed its mine, known as Whitehead No. 2, one of the oldest mines in the Henryetta district and one of the best producers. No explanation is given for the shutdown, except that there is no demand for the total output, and that production must be curtailed.

The Calvert Coal Co., of Rockdale, has sold its lignite mines and 300 acres of land underlaid with lignite, situated two miles east of Rockdale, to the **Sparks Coal Co.,** of Rockdale. The consideration involved in the transaction is withheld. The property is developed to the extent that two shafts are now being worked, and the output is about 200 tons a day. The Sparks Coal Co. now owns some land at Hicks, eight miles south of Rockdale, on which it has been working one shaft. The Sparks company announces that it will at once undertake to develop the Calvert property.

PENNSYLVANIA

The Bethlehem Steel Corporation has under consideration the erection of two more batteries of coke ovens at Johnstown. These will be of the type required to fit in with those recently erected.

Harry Montz, formerly connected with the general manager's office of the Lehigh Valley Coal Co., recently was appointed mining engineer for the company with office in Wilkes-Barre.

Notices of the charge of \$1 a month dues, abolition of the button system and the bonding of local officers in District 1, United Mine Workers, have been mailed out from the district headquarters by District Auditor John Gallagher of Wilkes-Barre. The action on these matters was taken at the tri-district convention in Wilkes-Barre.

The Glen Alden Coal Co. is rapidly preparing its newly acquired shop and foundry for occupancy by its general repair and construction departments. The new shop is located in West Pittston and formerly was owned by the Exeter Machine Works.

The Philadelphia & Reading Ry. Co. is offering a prize of \$25 for the best suggestion for fuel conservation submitted by an employee. The offer is made in connection with a contest being conducted by the International Fuel Association for the best plan of railroad fuel conservation, for which \$100 is being offered. The latter contest is open to railroad employees on any railroad and will close Aug. 31.

The City Council of Harrisburg is discussing a small tax on all coal landed along the improved section of the river front. The reclaimed anthracite from the Susquehanna River is brought by boat to the city and the councilmen hold that it is wrong to allow the dredgers the unrestricted use of the river front.

Emil Johnson, Ed Gustafson and Gus Carlson, employed by the Rinn-Sutter Coal Co. at Plumville, near Punxsutawney, were drowned in a narrow manway several hundred feet under the ground on July 30. A terrific downpour of rain sent Plum Creek over its banks and poured thousands of gallons of water into the shaft. The bodies were recovered the next day.

A state charter has been issued to the **Keystone Fuel Co., Inc.,** of Scranton, with a capital stock of \$50,000. S. M. Hawks, Carbondale, is treasurer and one of the incorporators, the others being F. W. Moser, Scranton and James H. Rolles, Olyphant. A charter also was issued to the **Portage-Sonman Coal Co.,** Portage, capital, \$10,000; incorporators, M. M. Griffith, Portage, treasurer; Paul Nelson and H. D. Nelson, Portage.

The Pennsylvania Department of Mines, according to a report made by Secretary J. J. Walsh to the State executive board, is effecting a material saving in administration through changes in allowances to mine inspectors for expenses. Under the plan of concentrating state offices in the Capitol, the department's leased office space in a building at Harrisburg has been given up at a saving of approximately \$5,000 a year. The cutting down of expense allowances will save the State \$17,500 in two years.

One man was killed and three others wounded in a hold-up on a Laurel Line train near Moosic July 30, when the payroll of the West End Coal Co., of Moosic, amounting to \$70,126, was stolen. The dead man was Edward Murphy, of Scranton,

while those injured included Arch Hen-shall, Scranton, paymaster for the West End Coal Co.; P. J. Durkin, of Scranton, motorman, and Philip Scribner, Thomas Thomas, assistant paymaster of the Coal Co. and Thomas J. Welby and Joseph W. Berwick, coal company guards, escaped injury.

Charles S. Goldsborough, of New York, has been elected president of the **Pennsylvania Coal Co. and the Hillside Coal & Iron Co.** to succeed Captain W. A. May, who died recently. A. K. Morris will continue as vice president with William P. Jennings and Joseph P. Jennings continuing as superintendents. Mr. Goldsborough for the past ten years has been assistant to F. E. Underwood, president of the Erie R.R. Prior to that he was general superintendent of the New York and Susquehanna R.R. and also was superintendent of the Tioga division of the Erie R.R.

It is unofficially reported that **no new state mine inspector will be appointed for the Eighth, or Pittston, district** to succeed Robert Johnson, who resigned recently. The collieries of the district have been divided between Inspector McDodge, of Rendham, and Inspector Curtis, of Forty Fort, and it is intimated that this arrangement may be made a permanent one. When Chief Walsh took charge of the Department of Mines some months ago it was reported that retrenchments would be brought about by the consolidation of districts. If this new arrangement continues permanently it will be the first time in 30 years that Pittston has been without a resident mine inspector. At one time two inspectors were stationed there.

Insisting that men in its employ shall check their time on the way in and out of the mines led to a **strike at two collieries**—the Nottingham and Washington of the Lehigh and Wilkes-Barre Coal Co. recently. The checking system, is ordinarily known as "pulling your peg." By it the company officials are able to tell exactly how many men are underground and also can identify them. The men oppose it as an attempt to restrict their liberty. They say the last wage agreement said nothing of the check system.

T. R. Johns, general manager of the Bethlehem Mines Corporation, the coal mining subsidiary of the Bethlehem Steel Co., at Johnstown, has made the following appointments in his organization effective Aug. 1: **Samuel Steinbach**, division superintendent of the Johnstown division, becomes assistant general manager of coal mines for all divisions. **Frank Horton** from superintendent of the Johnstown mines to division superintendent of the Johnstown division, which, in addition to the Johnstown mines, includes the Wehrum and Slickville operations. **Duncan May**, mine superintendent of the Rosedale mine, appointed superintendent of all Johnstown mines. **Edwin Roberts**, superintendent of Nos. 73 and 74 mines, will succeed Mr. May as superintendent of No. 72 mine. **Robert Owen Robertson**, foreman of No. 71 mine, will succeed Edwin Roberts as superintendent of Nos. 73 and 74 mines. **George Alberter** has been promoted from foreman at No. 71 to the position of foreman of No. 71 mine. **William A. Thomas**, fireboss at No. 71 mine, has been appointed assistant foreman of No. 71 mine.

TEXAS

The **Western Securities Co.**, of which J. G. Puterbaugh, McAlester, Okla., is president, will develop a 1,330-acre deposit of lignite near Rockdale, which is reported to be from 8 to 15 ft. in thickness.

Dallas retail coal dealers have united in a campaign to urge early buying of fuel for next winter's consumption, it is announced by Harry Pennington, Sr., of Dallas. Mr. Pennington explains that the Dallas coal men have launched this campaign in co-operation with the policies of the various government bureaus "as a matter of insurance, a help to transportation facilities, and an aid in stabilizing the working time of the coal miners."

Resumption of operations on the properties of the Western Securities Co. near Rockdale, Tex. is indicated in the construction of a railroad switch track from the main line of the **International-Great Northern** to the mine properties. These lignite mines were formerly owned by Federal Fuel Co. and sold to the Standard Coal Co. and then acquired by the Western Securities Co., of which J. G. Puterbaugh, of McAlester, Okla., president of the McAlester Fuel Co. and also president of the Oklahoma Coal Operators' Association, is Southwestern representative. The properties embrace a large area of valuable lignite land and two mine shafts. The lignite under

some of the land is sufficiently near the surface for stripping operations to be carried on with profit.

UTAH

The **Western Coal & Iron Co.'s** affairs have been placed in the hands of the Tracy Loan & Trust Co. as receivers.

VIRGINIA

The case of the **Norfolk & Western Ry. against the Pan Handle Coal Co.** for collection of demurrage charges alleged to have accumulated during the last four years has been **partly settled out of court**. Certain portions of the charges were agreed on, the remainder being allowed to pass through the processes of litigation. Fourteen other cases are dependent on the outcome of this suit.

WEST VIRGINIA

The **Boone County Coal Corporation**, of Sharples, has contracted with the Roberts & Schaefer Co. for a steel tippie complete with loading booms to be installed at its mine at Monclo.

Fire late in July was responsible for the complete destruction of the repair shops of the E. E. White Coal Co. at Stotesbury, in the Winding Gulf field, the loss amounting to about \$100,000. Almost before the ashes of the old buildings were cool the company had begun the construction of a new and more modern structure to replace the one destroyed by fire.

The **Deep Run Coal Co.**, of Cumberland, Md., is opening a new mine in the Elk Garden district of West Virginia, involving the expenditure of approximately \$300,000 under the direction of Benjamin Robinson, Sr., of Frostburg, consulting engineer of the company. The company is operating in a territory embracing about 2,500 acres, including some very rich coal land. Three mines are already in operation and this concern expects to have the fourth ready for production soon, as the main heading is nearly completed and construction work is far advanced on a new tippie. An 11-ft. incline also is almost ready for use. At the beginning of operations the new mine will have an output of about 500 cars a day, which will be increased as the mine is further developed. One hundred and twenty-five men are at work, but the number will be increased after the new mine begins to operate. The company has a production of about 300 tons a day at its other mines. All the plants of the company are operated on an open-shop basis. The president of the company is C. H. Lantz, of Piedmont, W. Va.; W. R. Nethken, of Cumberland, Md., is the vice-president.

The **Dwyer Coal Co.**, which has been engaged in the production of coal near Coalburg in the Kanawha field for a number of years, is opening a new mine near Chapmansville, where the company recently acquired about 1,000 acres of coal land so located as to make it possible to mine from a rise and thus insure excellent drainage and also to make it possible to handle the coal at a minimum of expense. With a view to securing the largest production possible, the company is building a modern colliery and also attractive quarters for its employees. John G. Dwyer will have charge of the mines.

Arguments were begun in the Circuit Court of Logan County before Judge Robert W. Bland on Thursday, Aug. 2, on a plea for a change of venue for **Harold W. Houston**, chief counsel for District 17, United Mine Workers, charged with complicity in the armed march on Logan and Mingo counties in 1921. Several months ago Houston was indicted by a grand jury in Logan County as an accessory to the murder of John Gore, George Munsky and John Cafalgo, deputy sheriffs, killed in a skirmish on Blair Mountain. Counsel for the United Mine Workers also are asking for a change of venue for Edgar Coombs, alleged to have been a participant in the armed march and who, according to the testimony of the Rev. J. E. Wilburn in the Blizzard case, fired the shot which killed Gore. Although changes of venue were granted in connection with others indicted in Logan County without any resistance on the part of the state, it has been asserted by Prosecuting Attorney John Chafin of Logan County that the state will oppose any change in venue in the case of other defendants, owing to the fact that in every instance where there has been a change of venue an effort has been made through propaganda and otherwise to influence the opinion of potential jurors in the various counties to which the various "armed march" cases have been transferred.

WYOMING

The Secretary of the Interior has directed the U. S. Land Office at Douglas, Wyoming, to offer for lease a tract of public coal land in Wyoming containing 1,720 acres. The land is in the Wadman district of the Wind River coal field in Natrona County. The lease will be at a government royalty of 8 cents per ton for coal mined, a minimum investment in mining operations of \$100,000 during the first three years of the lease, and a minimum production of 15,000 tons of coal a year beginning with the fourth year of the lease.

WASHINGTON, D. C.

The **National Coal Association Policy Committee**, to serve during the present year, as appointed by President Brydon, is as follows: Walter Barnum, treasurer, Pacific Coast Company, New York; C. E. Bockus, president, Clinchfield Coal Corporation, New York; J. G. Bradley, president, Elk River Coal & Lumber Co., Dundon, W. Va.; J. C. Brydon, president, Quema-honing Creek Coal Co., Baltimore; B. M. Clark, president, Rochester & Pittsburgh Coal & Iron Co., Indiana, Pa.; Ira Clemens, president, Clemens Coal Co., Pittsburg, Kan.; T. B. Davis, president, Island Creek Coal Co., New York; E. L. Douglass, vice-president, First Creek Mining Co., Cincinnati; T. F. Farrell, second vice-president, Pocahontas Fuel Co., New York; George H. Francis, secretary, Keystone Coal & Coke Co., Greensburg, Pa.; Michael Gallagher, general manager, M. A. Hanna Co., Cleveland; R. H. Gross, president, New River Co., Boston (acting for Mr. Bradley during the latter's absence in Europe); T. W. Guthrie, president, Hillman Coal & Coke Co., Pittsburgh; George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago; Moroni Heiner, vice-president, U. S. Fuel Co., Salt Lake City, Utah; John S. Jones, president, Sunday Creek Coal Co., Columbus, Ohio; C. H. Krause, vice-president, Willis Coal & Mining Co., St. Louis; F. W. Lukins, president, Farmers Fuel Co., Kansas City, Mo.; A. M. Ogle, president, Vandalia Coal Co., Terre Haute, Ind.; J. B. Pauley, vice-president, J. K. Dering Coal Co., Chicago; P. H. Penna, secretary, Indiana Bituminous Coal Operators' Association, Terre Haute; P. J. Quealy, president, Gunn-Quealy Coal Co., Kemmerer, Wyo.; H. N. Taylor, president, U. S. Distributing Corporation, New York; D. B. Wentz, president, Stonega Coke & Coal Co., Philadelphia; F. W. Wilshire, vice-president, Consolidation Coal Co., New York, and S. L. Yerkes, vice-president, Grider Coal Sales Agency, Birmingham, Ala.

Obituary

Charles C. Beury, one of the leading operators of the New River coal field, well known throughout southern West Virginia, a pioneer in the smokeless regions, whose early training was received in the anthracite fields of Pennsylvania, died at Lewisburg, W. Va., Tuesday, July 31, after a lingering illness. He was held in such affectionate regard by both those in and out of coal circles that his death, expected though it had been, was a distinct shock. Charles C. Beury had been an operator in the New River field for more than 40 years. In association with his brother, the late Joseph Beury, he had an active part in developing the smokeless fields of southern West Virginia. He was president of the Beechwood Coal & Coke Co. and was also heavily interested in the Turkey Knob Coal Co., the Branch Coal & Coke Co., the Coal Run Coal Co., and also was a stockholder in the Flat Top Coal Co. operating in the Pocahontas field and in other companies in that field. Mr. Beury had been president of the New River Coal Operators' Association in 1918 and 1919 and at the time of his death was a member of the executive committee as well as being treasurer of the association. He is survived by his widow, Bessie A., daughter of former Governor George W. Atkinson of Charleston, and three daughters, Nancy Ellen, Christine and Catherine; one son, Charles C., Jr.

Association Activities

Elijah Coles, recently elected president of the **Texas Retail Coal Dealers' Association** at the annual convention in Galveston, on his return to Houston announced that

he will soon launch a state-wide campaign to increase the membership of the association, and hopes to have every retail coal dealer in the state become a member. Allotment of the proper kind of cars for moving coal and better routing of cars also will be sought by the association, he said. Mr. Coles expressed the view that retail coal prices are not going up appreciably during the coming winter, nevertheless he urged all householders to lay in their supply of winter coal now.

Reduction in freight rates on coal from some fields, proposed reduction from others and the competition of southern West Virginia coal led to a meeting of the directors of the Northern West Virginia Coal Operators' Association, and representatives of the Monongahela Coal Association, Upper Potomac Operators' Association and the Northern Panhandle Coal Association at Deer Park late in July for the purpose of considering ways and means to meet the competition and disadvantage brought about thereby. It is feared that as a result of the revision in rates much steam coal from West Virginia may be eliminated from the markets of Ohio, Indiana, Illinois and Michigan. The directors at the meeting had the advice and counsel of E. J. McVann, of Washington, D. C., on traffic matters. No announcement was made as to what action it was proposed to take.

Recent Patents

Arch Support for Mines. 1,451,840. Rudolf Novotny, Portage, Pa. April 17, 1923. Filed Jan. 30, 1922; serial No. 532,930.

Drive Chain. 1,451,286. George W. Wilmot, Hazleton, Pa., assignor to Wilmot Engineering Co., Hazleton, Pa. April 10, 1923. Filed Sept. 1, 1920; serial No. 407,364.

Coal Chute and Apron. H. A. Ernst, Chicago, Ill., assignor to Roberts & Schaefer Co., Chicago, Ill.; 1,444,174. Feb. 6, 1923. Filed May 17, 1922; serial No. 561,702.

Process of Screening Coal. R. G. Lawry, Chicago, Ill., assignor to Roberts & Schaefer Co., Chicago, Ill.; 1,444,195. Feb. 6, 1923. Filed March 4, 1920; serial No. 363,157.

Lubricating Mine-Car Wheels. John M. Cameron, Dorchester, Va.; 1,444,234. Feb. 6, 1923. Filed July 27, 1921; serial No. 487,944.

Miner's Cap and Lamp Attachment. W. R. Scott, R. Dubinski, Jr. and P. B. Magidson, Nokomis, Ill.; 1,444,278. Feb. 6, 1923. Filed June 28, 1922; serial No. 571,355.

Mine-Car Check Lock. M. L. Caretti, Pittsburgh, Pa.; 1,444,330. Feb. 6, 1923. Filed April 8, 1922; serial No. 550,693.

Process and Apparatus for Burning Powdered Coal. A. G. Kinyon, Chicago, Ill., assignor to Fuller Engineering Co., Allentown, Pa.; 1,444,421. Feb. 6, 1923. Filed May 13, 1918; serial No. 234,055.

Jig Plunger. R. W. Rigler, Phila., Pa., assignor to Guy H. Elmore, Phila., Pa.; 1,444,705. Feb. 6, 1923. Filed Sept. 29, 1920; serial No. 413,489.

Controlling System for Mine-Blasting Operations. S. F. Bridwell and J. F. Kennedy, Terre Haute, Ind.; 1,444,827. Feb. 13, 1923. Filed May 25, 1921; serial No. 472,590.

Flotation Apparatus. J. P. Ruth, Jr., Denver, Colo.; 1,445,042. Feb. 13, 1923. Filed Aug. 16, 1917; serial No. 186,602.

Coal-Loading Machine. J. F. Joy, Belle Vernon, Pa., assignor to Joy Machine Co., Pittsburgh, Pa.; 1,445,084. Feb. 13, 1923. Filed May 28, 1918; serial No. 237,111.

Coal Cutting and Wedging Machine. J. F. Joy, New Bethlehem, Pa., assignor to Joy Machine Co., Pittsburgh, Pa.; 1,445,085. Feb. 13, 1923. Filed Feb. 15, 1919; serial No. 277,177.

Drill. J. F. Joy, New Bethlehem, Pa., assignor to Joy Machine Co., Pittsburgh, Pa.; 1,445,086. Feb. 13, 1923. Filed Feb. 18, 1919; serial No. 277,837.

Coal-Loading Machine. J. F. Joy, Pittsburgh, Pa., assignor to Joy Machine Co., Pittsburgh, Pa.; 1,445,087. Feb. 13, 1923. Original application filed March 27, 1918; serial No. 224,983. Divided and this application filed Jan. 5, 1920; serial No. 349,388.

Gathering Mechanism. J. F. Joy, Pittsburgh, Pa.; 1,445,088. Feb. 13, 1923. Filed June 11, 1920; serial No. 388,156. Renewed Nov. 1, 1922; serial No. 598,436.

Method of Producing Coke. J. G. West, Pittsburgh, Pa.; 1,445,735. Feb. 20, 1923. Filed Feb. 16, 1922; serial No. 537,088.

Skip Hoist. G. E. Mellin, New York, N. Y.; 1,446,313. Feb. 20, 1923. Filed Nov. 12, 1921; serial No. 514,510.

Retarding Brake for Coal Cars. W. C. Richey, Denver, Colo.; 1,446,584. Feb. 27, 1923. Filed Nov. 21, 1921; serial No. 516,816.

Hoisting Apparatus. N. D. Levin, Columbus, Ohio, assignor to the Jeffrey Manufacturing Co., Columbus, Ohio; 1,447,025. Feb. 27, 1923. Original application filed Aug. 1, 1913; serial No. 782,522. Divided and this application filed April 10, 1919; serial No. 288,968.

Spring Bumper for Mine Cars. Martin T. Kitchen, Logan, West Va.; 1,450,041. March 27, 1923. Filed Feb. 8, 1921; serial No. 443,376.

Kickback Car Dump. C. B. Anfinsen, Charleroi, Pa.; 1,453,331. May 1, 1923. Filed Nov. 9, 1921; serial No. 514,010.

Arc-Welding Dynamo-Electric Machine. K. L. Hansen, Wilkinsburg, Pa.; assignor to the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.; 1,453,389. May 1, 1923. Filed Sept. 25, 1919; serial No. 326,294.

Miner's Carbide-Lamp Holder. Edward S. Barnstable, Nokomis, Ill.; assignor of one-half to D. E. Alyward and one-half to John W. Busker, both of Livingston, Ill.; 1,454,034. May 8, 1923. Filed Sept. 19, 1921; serial No. 501,801.

Self-Coupling for Mine Cars. James Whewell and H. L. Yoder, Holosopple, Pa.; 1,454,201. May 8, 1923. Filed May 24, 1921; serial No. 472,211.

Breathing Apparatus. Frederick W. Koehler, Pittsburgh, Pa.; assignor to American Atmos Corp., Pittsburgh, Pa.; 1,454,645. May 8, 1923. Filed March 29, 1921; serial No. 456,576.

Car-Handling and Dumping System. Richard Peale, St. Benedict, Pa.; assignor to Rembrandt Peale, St. Benedict, Pa.; 1,454,602. May 8, 1923. Filed Sept. 12, 1919; serial No. 323,264.

Concentration of Minerals. Walter O. Borchardt, Austinville, Va.; assignor to the New Jersey Zinc Co., New York City; 1,454,838. May 8, 1923. Filed March 19, 1919; serial No. 283,628.

Spiral Separator. Frank Pardee, Hazleton, Pa.; assignor to Anthracite Separator Co., of Pennsylvania; 1,454,904. May 15, 1923. Filed Oct. 11, 1921; serial No. 507,109.

Miner's Lamp. William W. Zickler, Mullan, Idaho; 1,455,130. May 15, 1923. Filed April 10, 1922; serial No. 551,324.

Process for Removal of Water from Colloidally-Dissolved Substances such as Crude Peat, Coal Sludge, etc. Heinz Horst, Urdingen-on-Rhine, Germany, assignor to Gesellschaft für Maschinelle Druckentwässerung mit beschränkter Haftung, Urdingen-on-Rhine, Germany; 1,455,728. May 15, 1923. Filed May 13, 1922; serial No. 560,709.

Skimming Device for Coal Jigs. Edgar T. Anderson and William Morgan, Scranton, Pa.; 1,455,854. May 22, 1923. Filed March 15, 1921; serial No. 452,487.

Dumping Mine Car. Oliver W. Crooks and Elmer H. Crooks, Big Creek, Calif.; 1,456,054. May 22, 1923. Filed Dec. 22, 1921; serial No. 524,186.

Mining Machine. Cyrus S. Oldroyd, Cincinnati, Ohio, assignor to the Oldroyd Mfg. Co., Knoxville, Tenn.; 1,456,930. May 29, 1923. Filed June 24, 1919; serial No. 306,335. Renewed Oct. 28, 1922; serial No. 597,693.

Publications Received

Geology and Mineral Resources of the Morris Quadrangle. by Harold E. Culver, Department of Registration and Education Division of the State Geological Survey, Urbana, Ill. Extract from Bulletin 43. Pp. 114; 7x10 in.; illustrated; 3 plates.

Godfrey Conveyors. The Godfrey Conveyor Co., Elkhart, Ind. Pp. 20; 8x11 in.; illus. Describes the unloading of coal from bottom dump cars into a chute underneath the railroad track, from where it is conveyed by gravity into a bucket, which in turn is elevated and carried to a storage pile, bin or conveyance.

Taylor's Spiral-Riveted Pressure Pipe. American Spiral Pipe Works, Chicago, Ill. Catalog No. 22. Pp. 75; 8x10 in.; illus. The fore part of this catalog is devoted to a description and letters from companies who have had this pipe in service for lengthy periods, and the latter part gives prices and tables showing flow of water through pipes. The forged joint permits the pipe, regardless of size or length of lay, to follow the contour of the ground.

Traffic News

The recent Virginian decision of the I. C. C. had no influence on the Montana Railroad Commission late in July when it ordered the C. M. & St. P. Ry. to build a 1,500-ft. spur from Roundup yards to the new mine of the Gilbert-Crawford Coal Co. The mine expects to begin at 50 tons a day and attain 500 tons eventually. The road objected on the ground that enough coal was being produced in Montana, that the coal company did not know the exact nature or extent of its deposit and that the spur would have no public value. The coal company asserted that there is a wide market for its output and that the spur would be public. The state commission felt the railroad was refusing rail connection to the mine because "it is a public fact that" the railroad's relations with the competing Roundup Coal Mining Co. "are very intimate."

Alabama railroads will appear before the Public Service Commission, Aug. 23, at a hearing of a proposed new schedule of rates on coal and coke moving between points in the state. The schedule prepared by the commission carries a material reduction in most instances over the tariffs now in effect.

The number of loaded coal cars handled by the Norfolk & Western in June—114,031—was the highest for any month of 1923, yet they were 12 per cent below the tonnage handled by the same road during June, 1922, owing to the fact that there was a large production of non-union coal during the early part of the 1922 strike and before the strike of shopmen put railway equipment out of commission.

Fewer freight cars were in need of repair on July 15 than at any time since December, 1920, according to the Car Service Division of the American Railway Association. The number in need of repair on July 15 was 183,621, or 8.3 per cent of the number on line. This was a decrease of 1,790 compared with the number in need of repair on July 1, this year, at which time there were 190,411, or 8.4 per cent. Class 1 railroads of the United States had in need of repair on July 15, 11,855 locomotives, or 18.6 per cent of the total number on line. This was an increase of 405 over the total number on July 1, at which time there were 11,450, or 18 per cent. The railroads on July 15 had 2,437 locomotives in good repair and stored away to meet increased traffic demands later in the year. This was an increase of 256 over the number in storage on July 1. During the first fifteen days in July 18,290 locomotives were repaired and turned out of the shops.

Coming Meetings

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the International Safety and First-Aid Meet. Secretary, Benedict Shubart, Denver.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, AUGUST 16, 1923

Number 7

Do Something! Do What?

MASSACHUSETTS legislators are going to settle the moot anthracite question by the simple method of boycotting that fuel. "You can't play in my back yard," say the members of the Joint Special Coal Investigating Committee of Massachusetts, "unless you miners and operators quit scrapping." The Committee says it will recommend that all New England abandon the use of hard coal and turn permanently to substitutes, greatly favoring the smokeless coal of West Virginia.

New England can, if it must, get along without anthracite, but it will not. The convenience and comfort of anthracite have made the householders in that chilly clime habit-bound to its use. Welcome as the news may be and heartening as well, to the smokeless producers that the committee is going to add some millions of tons annually to their markets, they are too familiar with the situation to send the coal up there before it is ordered.

Anthracite has, as the Committee states, become expensive, but so have shoes and cotton goods, "almost to the point of luxury." If it is so simple to induce the New Englander to adopt soft for hard coal, why indulge in the luxury longer? Let the committee poll its constituency to find how willing they may be to forego the luxury fuel. If it is so easy to convert the habits of the people, why should there be "further suffering for many and possibly death" if the hard-coal miners strike in September?

The committee is hitting the nail on the head when it says that "the patience of the anthracite consuming public is strained to the breaking point. It will brook no stoppage in its fuel supply." But what is the public going to do about it? Tell the President to take over the industry? and if he does, will Boston citizens volunteer a trip to Scranton and dig coal, as they volunteered and did public service at home when their police force struck?

This committee says it takes no sides in the present controversy, believing that both sides should adopt a more conciliatory attitude. The check-off is a clean-cut issue, either the operators grant it, or they don't; either the union drops its demand or strikes for it. There is no half way measure, no compromise settlement here. Wherein enters the "conciliatory spirit"?

Why don't these Massachusetts gentlemen look into the matter that is at issue between the anthracite miners and operators—the check-off—and decide which side to back? But casual investigation will show them that strikes alone cause the shortages of hard coal they decry and that the United Mine Workers are demanding that the operators force the collection of funds to line its war chest so it may strike longer and harder. Then if the Massachusetts' consumers conclude that enough is enough, that the union has attained a satisfactory growth, let them cease pointless generalities and get

down to the brass tacks of seeing it through. Let them say to the world, "We will get along this winter with what hard coal we have and the abundance of soft coal we can get, in order that another year we will not need fear a strike and shortage; that we may, those who prefer the luxury, have an uninterrupted supply."

What sort of sports have we in Massachusetts, who would pass the buck to Washington, call a special session of Congress, ask the President to do something? Do what? This is no quarrel between the capital and the labor of the anthracite fields, no dispute regarding the rights of abused workers. As is pointed out by the anthracite operators, it is a quarrel among the men. A militant union is demanding that the operators collect dues and assessments from all the workers, because it cannot, or is too lazy to collect them. No one for a moment supposes that Congress could if it would impose such a situation on the industry. If New England and other hard-coal consumers want peace in this industry, let them make their voices heard in defence of good Americanism.

Preparing the Public's Mind

IN THIS day when we depend on a few headlines in the morning paper to keep us abreast of the times, the news that gets attention is that which stirs. You may call it "inflammatory" if you will, but if it is to get across to the American people it must have some "pep." Steady pounding away on everyday truths plainly told will in the end harvest a crop of understanding, but for the action of today and this week and even this month or year, there must be headline value to the story. Deprecate it as you may, that is the condition of a sensation-satiated popular mind.

The Coal Commission has called attention to the fact that "some of the material from both the operators and the United Mine Workers presented to it is calculated even if not intended to inflame the public mind for or against one of the parties," and considers these charges and counter charges "most unfortunate at this period of [the anthracite] negotiations." The American people are not so callous that a year after the event the mention of Herrin does not make them "see red." If the recital of that and other outrages that characterized the strike of 1922 serves to remind America that a majority of the coal-mine labor is dominated by a force that permits such practices, the operators will doubtless be willing to plead guilty to the charge of thus inflaming the public mind. What is to be gained by shutting eyes to the unpleasant, unlawful features of such industrial strife? Can it be that forgetfulness will purge them from the ranks and encourage the officers of the union to prevent their recurrence?

In its anthracite report of July 9, the Coal Commission had itself some headline news. It was not the finding that the operators realized so much profit or the mine workers certain annual earnings, not that the

commission had urged coal be held henceforth as a public utility. Rather it was that in the event of an emergency in hard-coal supply, whatever the cause, the President of the United States be authorized to take over the mines, operate them, fix profits and prices for the operator and wages and working conditions for the miner. Again it may be said with a slight change that the American people are not so callous that a year after the event the mention of the 1922 hard-coal strike does not make them "see red." They rose to the occasion and applauded the headlines that followed the publication of the report, "Coal Commission Recommends President Take Over Coal Mines." There was some "pep" in that news.

If the situation is so serious that nothing short of the arbitrary hand of the government may serve to give the people necessary fuel, then indeed we are in desperate straits. It must not be assumed that the Coal Commission came lightly to a decision so unusual, so drastic. The evidence before them must have been compelling and the necessity great to have provoked such an indictment of the ability of this great industry to function continuously.

Even the most casual observer must know of the similar threat by President Roosevelt in 1902. Then the mine workers were on strike and the operators steadfastly refused the peaceful mediation of the President. He was forced to threaten the use of Federal troops and the imposition of his power before he could compel the operators to concede arbitration of their differences with the workers.

Even the most casual observer of the situation today, and in 1922, must know that the positions are now reversed. The operators learned a lesson in 1902, the union has its lesson yet to learn. It is the union now that is militant, domineering, arbitrary and recalcitrant. If the President this year finds it necessary to exert emergency power over the anthracite industry it will be because the United Mine Workers will concede nothing of their power. Perhaps this is why Mr. Gompers objects so strenuously to the Commission's proposal. It will not be because of any position so far assumed by the operators. To argue otherwise is to impugn their good faith in reiterated offers to arbitrate any and all differences.

With sublime patience and forbearance the Coal Commission last month counseled "that each side forget past differences and grievances" and hoped "that a constructive view will be taken, not controversial in its character, so as to assure a continuous output from the anthracite mines." This sound advice from a commission not set up to determine the merits of this immediate controversy has not prevented a deadlock in the hard-coal negotiations. The matter is fast drifting into a position where President Coolidge is being expected to "inquire into the reasons for failure to agree," as recommended in the supplemental report on labor relations in the anthracite industry, just released by the Coal Commission. The Commission's recommendation has prepared the public to expect him to act.

PAUL WOOTON, Washington correspondent of *Coal Age*, whose stories on the coal situation as it is viewed in the Nation's Capital are conceded to be the most timely and interesting coming out of that center, is now in Europe. On his return *Coal Age* will have a series of timely stories of his impressions of the coal situation abroad.

Preparing for the Fall Rush

THOUGH there is yet uncertainty about the supply of anthracite after Sept. 1, and every possible pound is being mined and shipped, there is no doubt but that the country is preparing itself with ample reserves of soft coal in anticipation of a heavy fall demand with transportation facilities curtailed. There will be no suspension of mining in the soft coal regions after Sept. 1, induced by labor trouble. Since April 1, the country has been running a race in the storage of coal. If the consumer wins, the suspensions of bituminous coal mining will result from lack of market, otherwise the cause will be car shortage.

Whatever be the outcome, there can be no regret over not having tried. Since the beginning of the coal year consumers have added to their stocks some 10,000,000 tons of soft coal and are even yet putting it away at bargain prices. With the total now somewhere near 50,000,000 tons, the safety line may be said to have been passed. Apparently nothing but a prolonged shutdown in the anthracite region can produce a demand for soft coal but what the railroads can take care of without serious car shortage in the coal fields.

Business interests discounted the slump in July. The spring rate of industrial activity was too much for the hot period. There is already evidence of an August pickup and having continued so far with a demand for soft coal approaching 11,000,000 tons per week, there is reason to anticipate that it will hold to this level until other freight crowds it off the rails in the fall rush. As to the course of the market after that the trade is uncertain.

The Vagaries of Compensation

WORKMEN'S COMPENSATION is provided in every coal mining state except only Arkansas and Missouri. If payments for compensation do not actually add to the cost of coal, the amounts so paid, which range from 3c. to 10c. per ton, are at least clearly recognized and definitely known to the operators. The operators and workers have accepted as just the principle that the one group should be charged with major responsibility for injuries suffered by the other group. The only question that now arises, other than the determination of the proper rate, concerns the matter of preventing its serious abuse. It is not an uncommon experience for an operator to find in his employ a worker who is receiving payment for complete disability for an accident at some other property.

A study of workmen's compensation laws has recently been made by the National Industrial Conference Board, an abstract of which is published elsewhere in this issue of *Coal Age*. The striking facts brought out by this report concern the extremely variable results of the operation of these laws in the different states. As pointed out in the Board's summary, the compensation is first of all a medical question, because a doctor's examination is the first step in establishing compensation.

It might be added to what the Board says that local decisions come down so fast as to confound the observer. Every case seems to present peculiar aspects and the compensation boards in each state are busy establishing precedents and interpreting former decisions. The employer hardly knows where he stands and is quite naturally on his guard to hold the awards to a rightful minimum.



Navajo No. 5, Gallup American Coal Co.

Auxiliary Shaft Both Hoists and Lowers Coal at Two-Seam Navajo No. 5 Mine in New Mexico*

Cars from Upper Seam Lowered in Auxiliary Shaft to Lower Bed, from Which Coal Is Hoisted up Main Shaft by Skips—Chain Car Feeder Handles Loads at the Main Bottom

By H. B. COOLEY†

General Superintendent, Allen & Garcia Co., Chicago, Ill.

IN MOST respects the screening and preparation equipment at Navajo No. 5 mine of the Gallup American Coal Co., near Gallup, N. M., is similar to that of other bituminous coal tipples. Among the unique, or at least unusual, features to be mentioned are what might be called the dual screening arrangement. Navajo No. 5 is operated primarily to insure a supply of coal for metal mines, mills and smelters in Arizona and New Mexico. Coal for their needs requires only a bar screen for its sizing.

However, there is a market for good domestic coal, and this trade, being naturally more exacting, makes shaker-screen preparations necessary. For this reason the tippie is provided with what is practically a dual

screening arrangement—that is, bar-screen sizing, making 1-in. lump and slack, and shaker-screen sizing making lump, egg, nut and slack.

A second somewhat unusual feature is the use of rubber-covered belt conveyors for picking tables and loading booms. It is not claimed that this is the first adaptation of belt conveyors to this service, but the more common type of picking table and loading boom is the apron conveyor. The conveyors used throughout the job are belts, the expression “carry it on rubber” being strictly true in this installation. Six-ply rubber belting with $\frac{3}{8}$ -in. rubber cover is carried on pressed-steel idlers, their spirally grooved roller bearings being lubricated with grease in a manner insuring a positive feed at all times. The first cost of such an installation is less than that of an apron conveyor, and the number of wearing parts is reduced to a minimum. No figures

*This is the second part of Mr. Cooley's article on the Navajo No. 5 mine. The third part, covering power plant, water supply, safety work and company buildings will appear soon. The first part appeared in *Coal Age*, Aug. 2, 1923.

FIG. 1

Rubber Belts for Loading Booms

These loading booms serve also as picking tables and are 5 ft. wide. They travel at a speed of 80 ft. per minute. The front boom is loading egg and the rear one lump coal. A saving in first cost is effected by the use of the rubber belt. The belt idlers run on roller bearings. All the conveyors on the Navajo tippie embody rubber belts in their construction.



are yet obtainable on the length of time the belts will last, but it is safe to say they will serve for many years. Fig. 1 shows the belts carrying coal.

The third unusual feature is the arrangement for loading four grades of coal on three tracks. Though 2x1-in. stove coal is being made, the slack is carried to either one of two 150-ton storage bins located on the switch below the tippie and loaded out on the same track as is used for the loading of "stove," or nut, coal. These bins also serve as auxiliary storage pockets for boiler coal during "shutdown" periods. This stock is supplemented by the coal in a 200-ton coal bunker located in the boiler room.

The provision for utilizing burnable refuse for the picking tables is noteworthy. Bone coal occasionally is found in the Gallup seams. The heat value of this bone is around 10,500 B.t.u. and when crushed it can be readily burned on properly designed chain-grate stokers. This material is removed from the picking tables by hand and carried to a storage bin by an 18-in. belt conveyor.

To avoid installing an independent elevator for the hoisting of this bone coal to the crusher the main hoisting skips are utilized for this purpose. At convenient intervals this material is fed into the skips and dumped through a bypass gate to the crusher, whence it passes on to the boiler house over the same belt conveyors that carry the other fuel supply. This inferior coal, of course, is handled only after hoisting hours or at times during the day when the hoist otherwise would be idle.

RETARDING CONVEYOR FEEDS BOX-CAR LOADER

In this territory most of the lump coal is loaded in box cars. For this operation a drag-conveyor box-car loader with an extension end is provided. This machine is fed by a short retarding conveyor running at right angles to the track, this belt in turn being fed from the discharge end of the lump loading boom.

This short retarding conveyor is what might be called by some operators a "needless refinement." But the Gallup American Coal Co. considers any machine a valuable asset which helps to put the company's lump coal on the market clean and free from undersize. It is not unusual at other plants to see perfectly sized lump coal from a shaker screen badly shattered in passing from the screen to its resting place in a box car.

The usual facilities are provided for the furnishing of local, or wagon, coal, provision also having been made for crushing for industrial use any part of the mine output which, being destined to that use, needs to be reduced in size. The accompanying flow sheet (Fig. 2) and the general design plans (Figs. 3, 4 and 5) illustrate the preparation plant and general arrangement. Fig. 8 shows the headframe.

The entire structure is substantially built and fireproof throughout. Steel sash are freely used and a large skylight affords overhead illumination for the picking shed. The interior

walks and floors are of reinforced concrete and all outside walks and stairways are of "subway grating." This material is light and substantial and does not become coated with snow and ice during the winter months. It is rather expensive for large areas, but its use entirely eliminates fire hazard and all maintenance cost except for an occasional painting.

AUXILIARY TIPPIE HAS SOLID-CAR SELF DUMPER

The auxiliary tippie is arranged for cage hoisting. These cages are somewhat unusual in that they are designed to handle cars without end gates, this type of car generally being used with a rotary-dump installation, such as that at the bottom of the main-hoist shaft. The action of this cage can be understood by referring to Figs. 7 and 9. The tipping guides and mechanism are arranged to revolve the car through 135 deg., in which position the car is completely emptied.

A flygate, placed directly at the dumping point and operated either manually or by compressed air, enables the man who directs the dumping to divert the coal to

a set of bar screens and the rock to a 50-ton storage bin. This rock bin is adjacent to the shaft and directly over a larry track leading to the rock dump. By referring to Fig. 6 it will be noticed that there are three coal-loading tracks under the tippie.

It never was intended that this auxiliary tippie would be a continuous operating plant for coal preparation; therefore the bar-

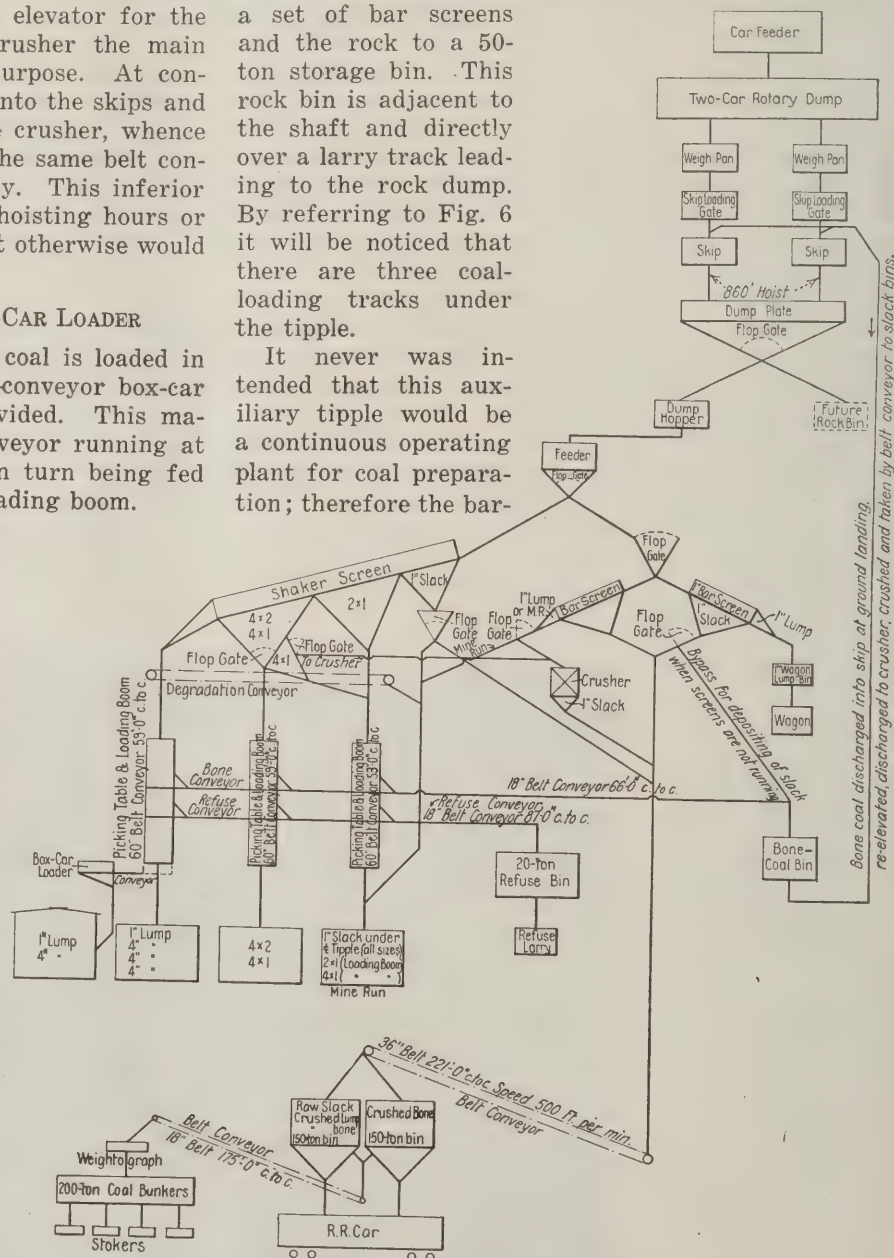
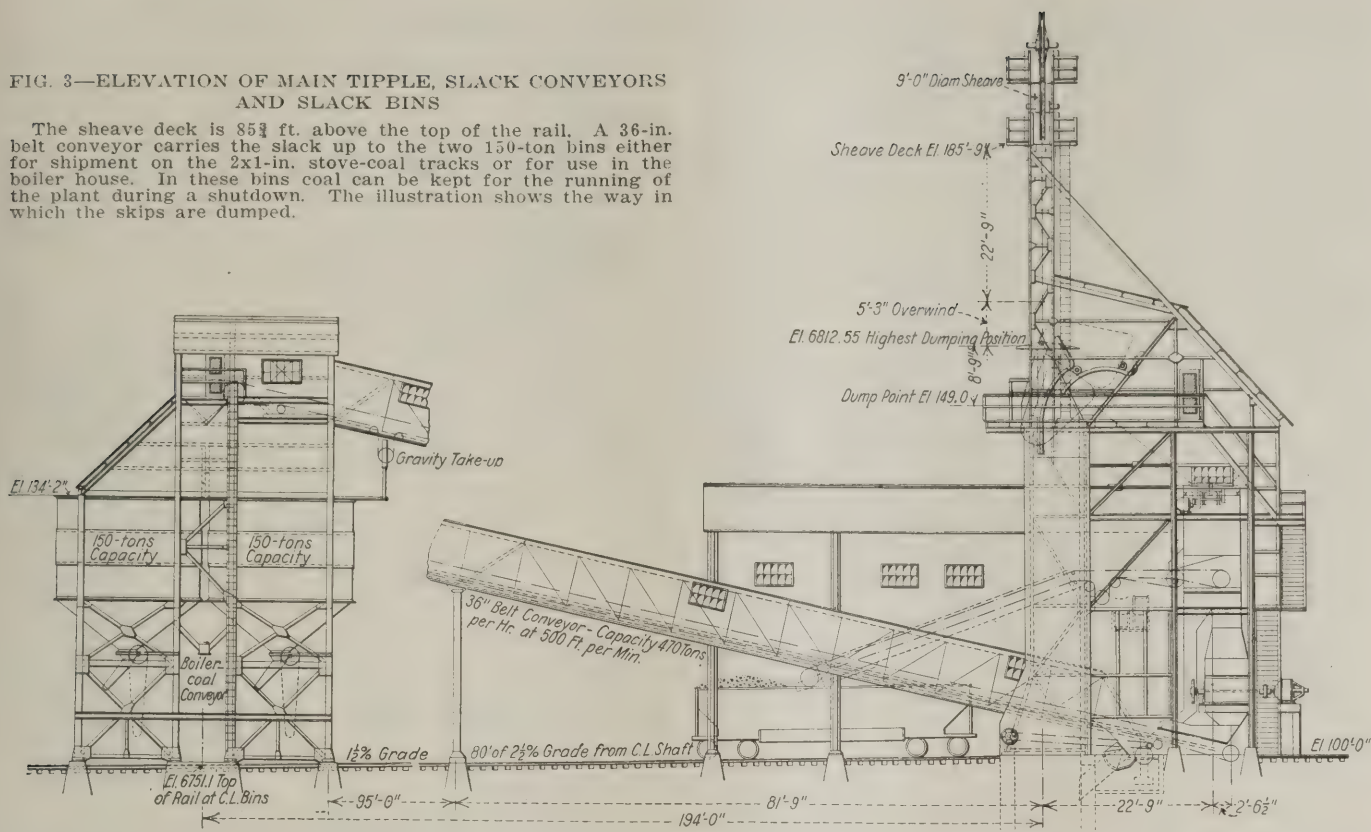


FIG. 2—FLOW SHEET FROM MINE TO RAILROAD CAR

Coal can go either (1) to the double-deck, double-leaf, pendulum-hung shaker screen with perforations and gate arrangements to supply 4x2-in. or 4x1-in., 2x1-in. coal and 1-in. slack or (2) to a 1-in. bar screen which when veiled gives mine run.

FIG. 3—ELEVATION OF MAIN TIPPLE, SLACK CONVEYORS
AND SLACK BINS

The sheave deck is 85½ ft. above the top of the rail. A 36-in. belt conveyor carries the slack up to the two 150-ton bins either for shipment on the 2x1-in. stove-coal tracks or for use in the boiler house. In these bins coal can be kept for the running of the plant during a shutdown. The illustration shows the way in which the skips are dumped.



screen sizing was considered ample. The main requirements of this headframe were that it carry the cage, sheaves and rock bin. Screening was not proposed. In laying out a design for these requirements, however, it developed that by slight modifications in the design of the engine brace this part of the structure could be used to carry a barscreen installation with practically no increase in cost except for the bar screen itself.

This headframe is arranged with the sheave wheels placed side by side, an arrangement ordinarily not as economical from the standpoint of design as where the sheaves are placed one over the other and the hoist located at the end instead of at the side of the shaft. That plan was impossible in this case for a reason that is not common in most coal fields.

The workable seams of coal are reached by these

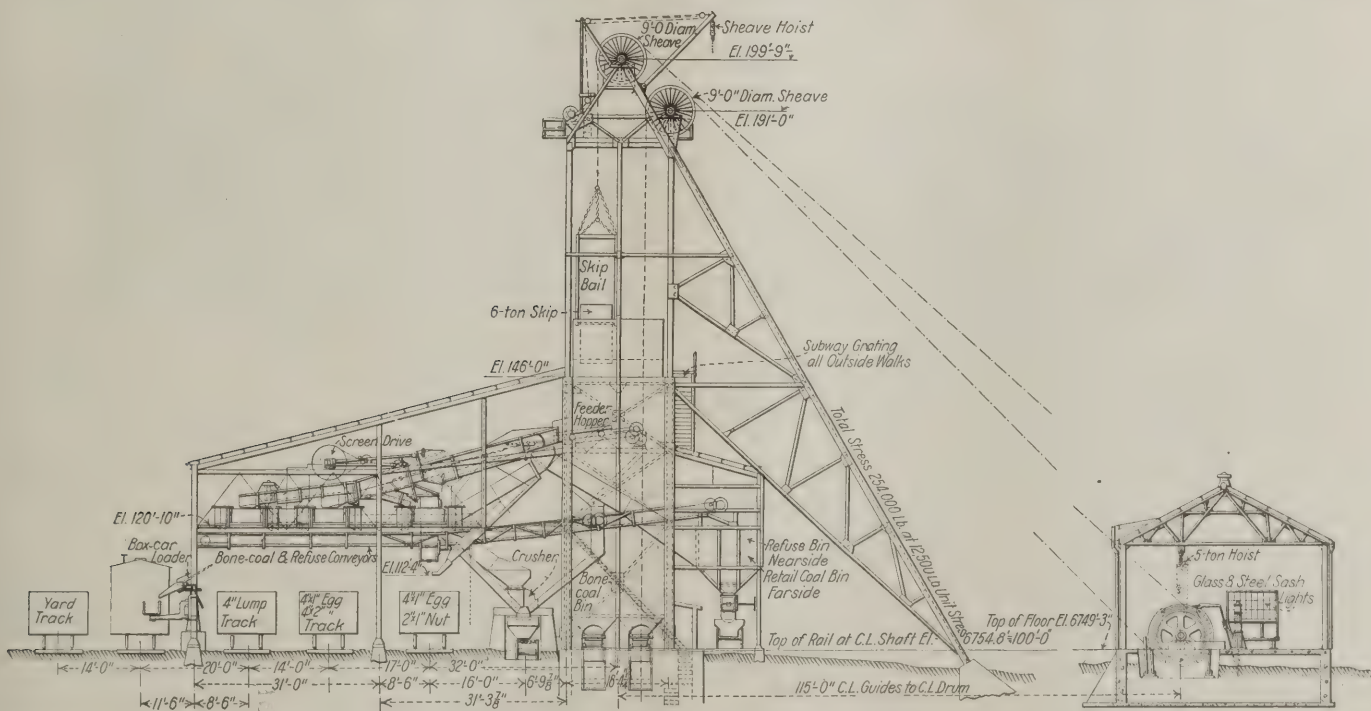


FIG. 4—ELEVATION OF MAIN TIPPLE AND HOIST HOUSE SHOWING SKIP AND TRACKS

The hoist rope is 1½ in. 6x19 plowsteel rope. The maximum load is 35,180 lb., and the breaking strength is 188,000 lb. The frictional strain is 1,330 lb. and the acceleration strain 2,830 lb. The bone coal is fed from the bone-coal bin into the skip and

raised to such a level that it can be dumped. A flap gate admits this coal to the crusher, where it falls on a conveyor and is taken to the boilers for feed. The boiler furnace is designed to burn efficiently coal containing 45 per cent ash.

shafts but the development of the upper seam would not be warranted if a separate plant were required for its operation. It is planned at Navajo No. 5 to mine the upper seam in conjunction with the lower, caging the cars at the auxiliary shaft and dropping them to the lower seam. From this point the coal is handled with that from the lower seam through the main shaft and the main preparation plant.

This plan of operation requires the installation at the auxiliary shaft of a hoist capable of being adjusted for hoisting from different levels. For this a double-drum hoist with one drum loose is installed. This explains why the hoist is not placed at the end of the shaft.

The hoist has two 7-ft. diameter straight cylindrical drums, each drum being equipped with parallel-motion post brakes. The loose drum is engaged to the shaft by means of a friction clutch operated by a hydraulic thrust cylinder with control levers placed on the platform of the operative. The hoist is of the second-motion type and driven by a 500-hp. 2,300-volt induction motor through a single set of herringbone gears.

CAGES CAN BE HOISTED UP SHAFT UNBALANCED

Though the normal operation of the hoist is in balance, the motor has sufficient torque capacity for hoisting the load unbalanced. The motor is controlled by air brake reversing and secondary switches which provide current-limit acceleration and overload protection.

The hoist equipment is provided with safety devices to prevent overspeed at any point, over-travel and abuse of the hoisting equipment when hoisting either coal, rock or men. Fig. 10 shows the duty cycle on which the rating of the motor is based for both balanced and

unbalanced hoisting. Fig. 9 shows the general arrangement, and Fig. 11 shows the hoist and its control platform. Most of the loading equipment for skip-hoisting mines has been designed for handling ore, where breakage,

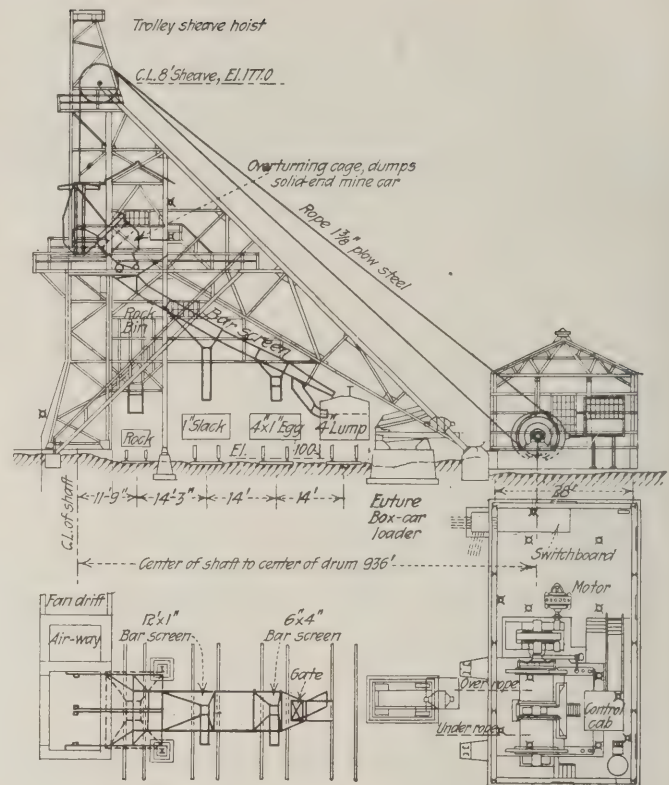
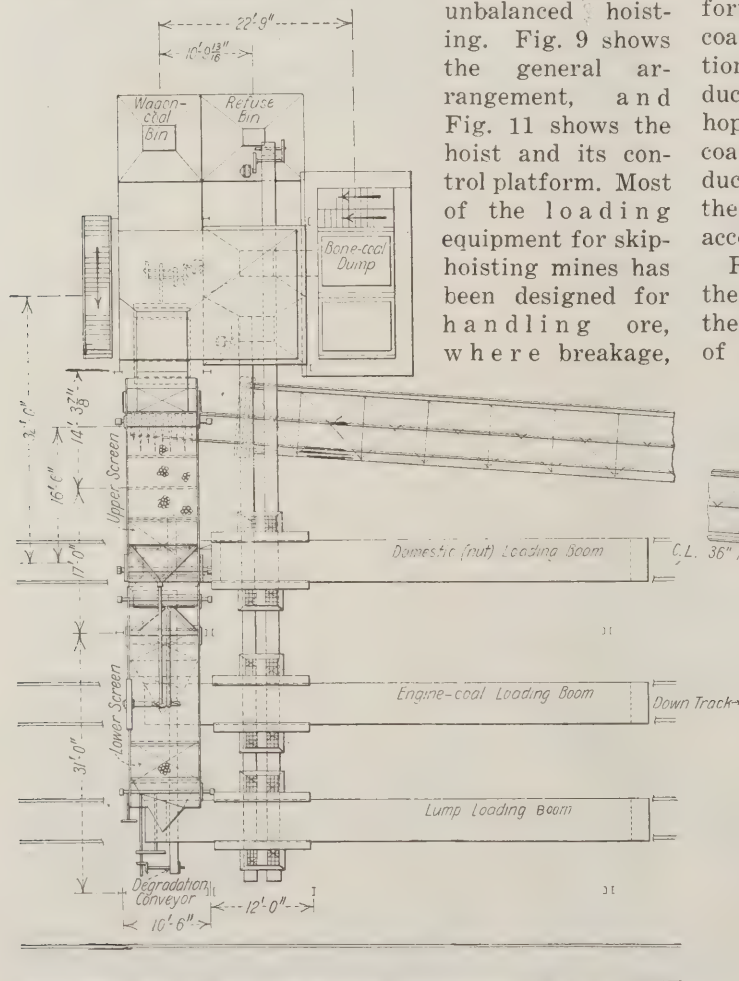


FIG. 6—SIDE ELEVATION OF MATERIAL HOIST

The tippLe of the material hoist has only a bar screen and makes lump, egg and slack. The rope is 1 1/2-in. plow steel, its maximum hoisting load is 25,800 lb., its breaking strength is 144,000 lb., its frictional strain 750 lb. and acceleration strain 1,050 lb.

fortunately, need not be considered. Degradation of coal being something to be avoided, a coal-loading station should be so arranged that breakage will be reduced to a minimum. With this in view, no storage hopper is provided, and the path along which the coal flows between the loaded car and the skips is reduced to a minimum. The arrangement as shown on the accompanying illustration, Fig. 13, is intended to accomplish this purpose.

Referring to that picture and the flow-sheet, Fig. 2, the mechanical arrangement and method of handling the coal can be understood. It is as follows: Trips of varying length are brought to the shaft bottom by

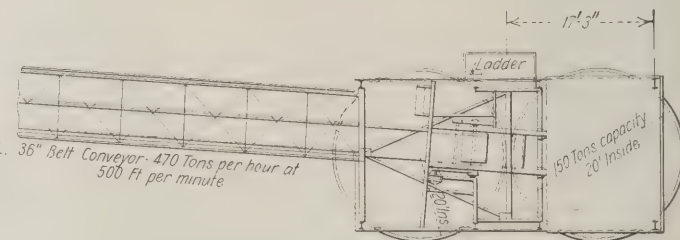


FIG. 5—PLAN OF MAIN TIPPLe, SLACK BINS AND HOIST HOUSE

A yard track, not shown, passes parallel to the box-car track at 14-ft. centers. It will be noted that the domestic coal or nut-loading track passes under the slack storage tanks, provision for loading being made at that point. A coal conveyor goes from the center line of the bin structure to the boiler room. The distance from the center bin of the guides in the shaft to the center line between the drums is 115 ft. It may be noted that the engine-coal and lump-coal tracks are covered by a single span of the tippLe structure giving the loaders plenty of room for passing between cars, the tracks being set at 14-ft. centers. The domestic-coal and engine-coal tracks are at 17-ft. centers, the posts of the tippLe intervening.

haulage locomotives and are there coupled to such loads as are standing on the load storage track. The movement of the trip from this point is controlled by a motor-driven chain "car-feeder" which engages a lug on the bottom of the car. The entire trip is moved ahead two car lengths at a time, the power being furnished by a 35-hp. motor. Deceleration and stopping are controlled by a powerful foot-operated brake acting on the head shaft of the feeder drive.

The chain and lugs on this feeder are unusually rugged and are designed to handle a trip of 40 cars, moving them through a distance of 21 ft. with a cycle as follows: Acceleration, 4 seconds; running-time, 14 seconds at a speed of 75 ft. per minute; deceleration, 2 seconds; rest period for dumping of cars, $8\frac{1}{2}$ seconds. The skip is arranged for carrying the coal from three cars, hence the hoist cycle is $3\frac{1}{2}$ times as long as the dump cycle, or 43 seconds.

The use of this power-driven feeder has many advantages over a gravity operation, the most important being that the car motion is under positive control at all times and that the cars can be positively "spotted" in correct position for dumping.

A two-car, pneumatically operated, rotary dump is used for emptying the solid-end cars. It is essentially a rotating cage with the center of rotation coinciding



FIG. 8—MAIN HOIST WITH CONVEYOR TO SLACK BINS

It will be noted that three sides of the concrete shaft curbing are carried to the dumping point, thus insuring protection to the steelwork from the shaft gases and eliminating the vibration of the hoist.

power house through a 2½-in. line which was carried down the shaft during the sinking operation and incased in the concrete shaft lining.

The coal from each car in the rotary dump is emptied

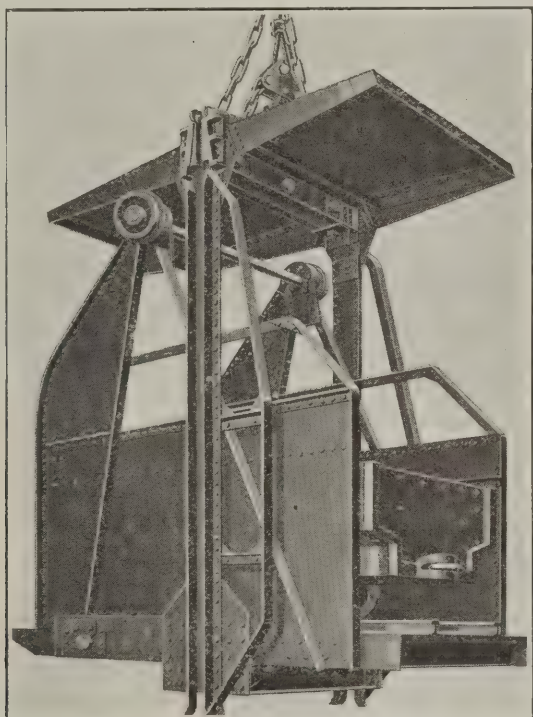


FIG. 7—SOLID-END CAR IN OVERTURNING CAGE

As the main tippie has a rotary dump the cars are made for that method of discharge. No rotary dump is provided at the material shaft and cages are used instead of skips. It has been found necessary in such cases to provide a cage that will dump the car through 135 deg., assuming, of course, that decaging with its loss of time and expense of labor is to be avoided.

with the center of the car hitching. The cars are dumped without uncoupling, there being sufficient play in the three-link hitching to permit of 135-deg. rotation. The crew at the bottom now consists of but two men, one of them the weighman. At present the trip rider goes around to the back of the shaft and cuts off the number of cars wanted for each empty trip. The actual time required for dumping two cars is less than seven seconds, and approximately 6 ft. of air at 90 lb. pressure is required for each dump. Compressed air for this purpose is furnished by the compressors in the

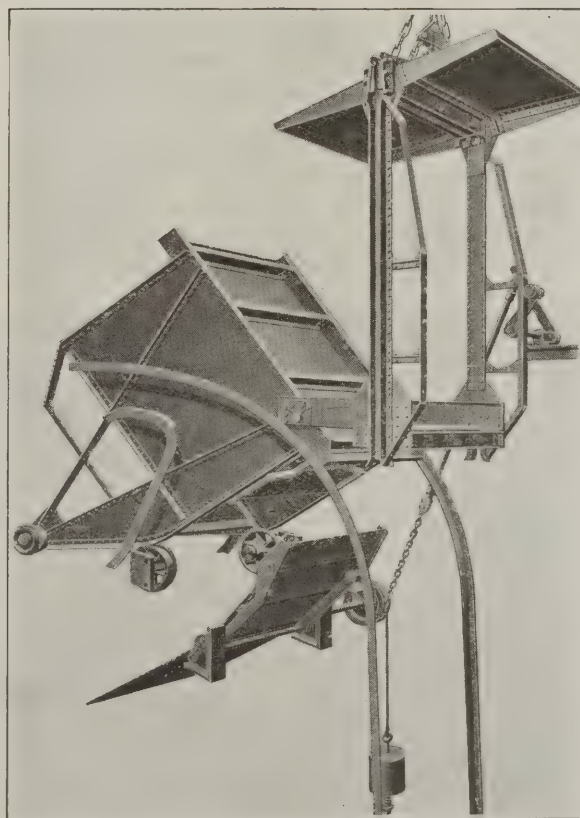


FIG. 9—OVERTURNING CAGE IN DUMPING POSITION

It was found necessary to provide a spill gate which follows the cage and projects under it so that all spill is caught and delivered onto the chute. It also was found that coal frequently spilled from the cage platform and the latest design of this spill gate embodies a pantograph extension which catches all spill from the cage platform as well. The spill gate is operated by a lever on the tipple which is engaged by angle guides on the bale of the cage.

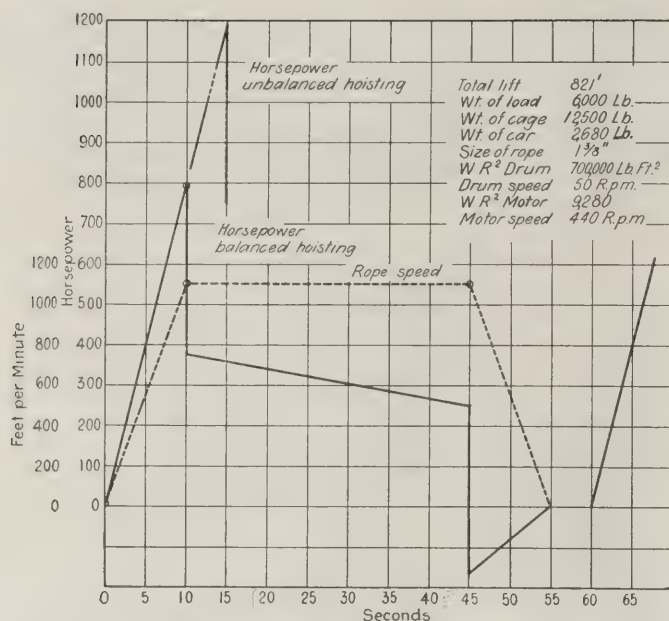


FIG. 10—DUTY CYCLE OF AUXILIARY-SHAFT HOIST

Arranged for both balanced and unbalanced hoisting. The total lift is 821 ft., the load in the car 6,000 lb.; the weight of the car, 2,680 lb.; the weight of the cage, 12,500 lb.; the size of rope, 1 3/8 in.; the WR² of the motor, 9,280 lb. ft.²; the motor speed, 440 r.p.m., and the rope speed, 1,100 ft. per minute.

into two independent weigh hoppers placed side by side. After the first two cars are weighed two more cars are dumped and the difference in weight is taken as the weight of the second cars. This operation is again repeated and the contents of the weigh pan then passes to the skip. The weigh beams on the scale are of the triple-beam type, and the poise on each beam is used to "balance the scale" after each weighing. A weightograph is connected to the end of the scale beam, and the weighman is thus given the individual car weights without any process of subtraction or possible chance of error.

Between the weigh pan and the skips are two short chutes arranged with undercut "safety gates" to prevent the coal from being spilled into the sump. These gates are opened by the descending skip and closed by gravity as the skip is hoisted. The relative position

of the bottom-loading apparatus is shown in the perspective view, Fig. 13.

The skips used are of the overturning type and have a normal capacity of six tons. They weigh 13,300 lb. each, making a ratio of weight of coal to dead weight lifted of 1 to 1.1.

An interesting comparison of weight ratios might be mentioned: In a cage-hoisting mine recently investigated the coal hoisted per trip was 4,500 lb., the car weighed 1,800 lb. and the cage (all steel) weighed 10,500 lb., making a ratio of weight of coal lifted to dead weight lifted of 1 to 2.7. Consequently the skip has a marked advantage in this respect.

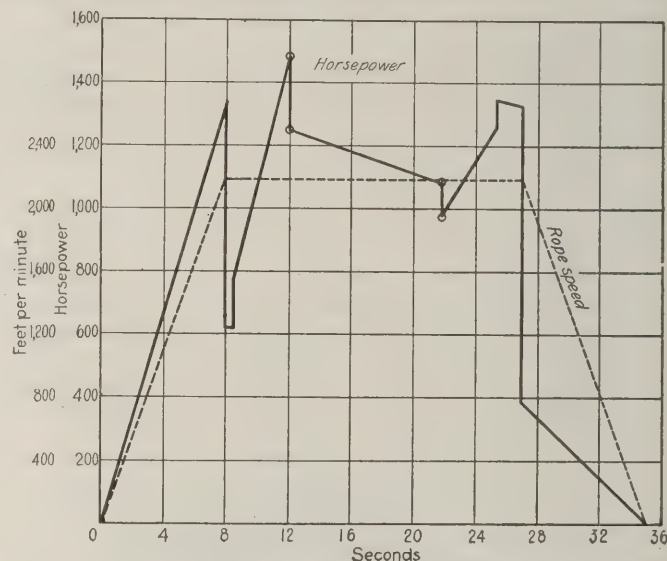


FIG. 12—DUTY CYCLE OF HOIST AT MAIN SHAFT

The same maximum rope speed of 1,100 ft. per minute, or 12 1/2 miles per hour, is provided as in the auxiliary hoisting shaft. The total lift is 860 ft.; the load in the skip is 15,000 lb.; the weight of the skip is 13,300 lb.; the diameter of the rope is 1 3/8 in., the WR² of the drum is 700,000 lb. ft.² and that of the motor, which has a speed of 66 r.p.m., is 300,000 lb. ft.²

It must be admitted, of course, that the total load lifted is larger, as three times as much coal is raised per hoist, and the hoist must be of heavier construction, although the power consumption of course, is notably less for the skip-hoisting operation.

The hoist for handling these skips is of first-motion

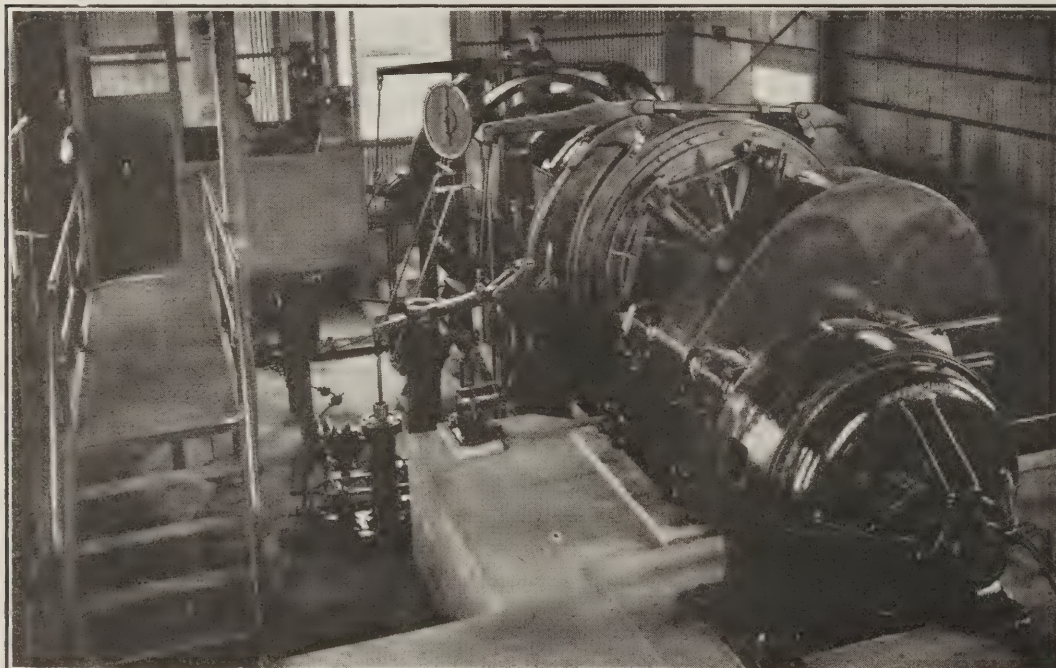


FIG. 11

Auxiliary Shaft Hoist

This hoist has two 7-ft. straight cylindrical drums, one of which is a loose drum. In consequence of this latter provision coal, men and material can be hoisted from more than one level. The loose drum is engaged to the shaft by means of a friction clutch operated by a hydraulic thrust cylinder with control levers placed on the operative's platform. The floor around the hoist is all on the drum-pit level, a convenient arrangement for access to the brake engines and control mechanism.

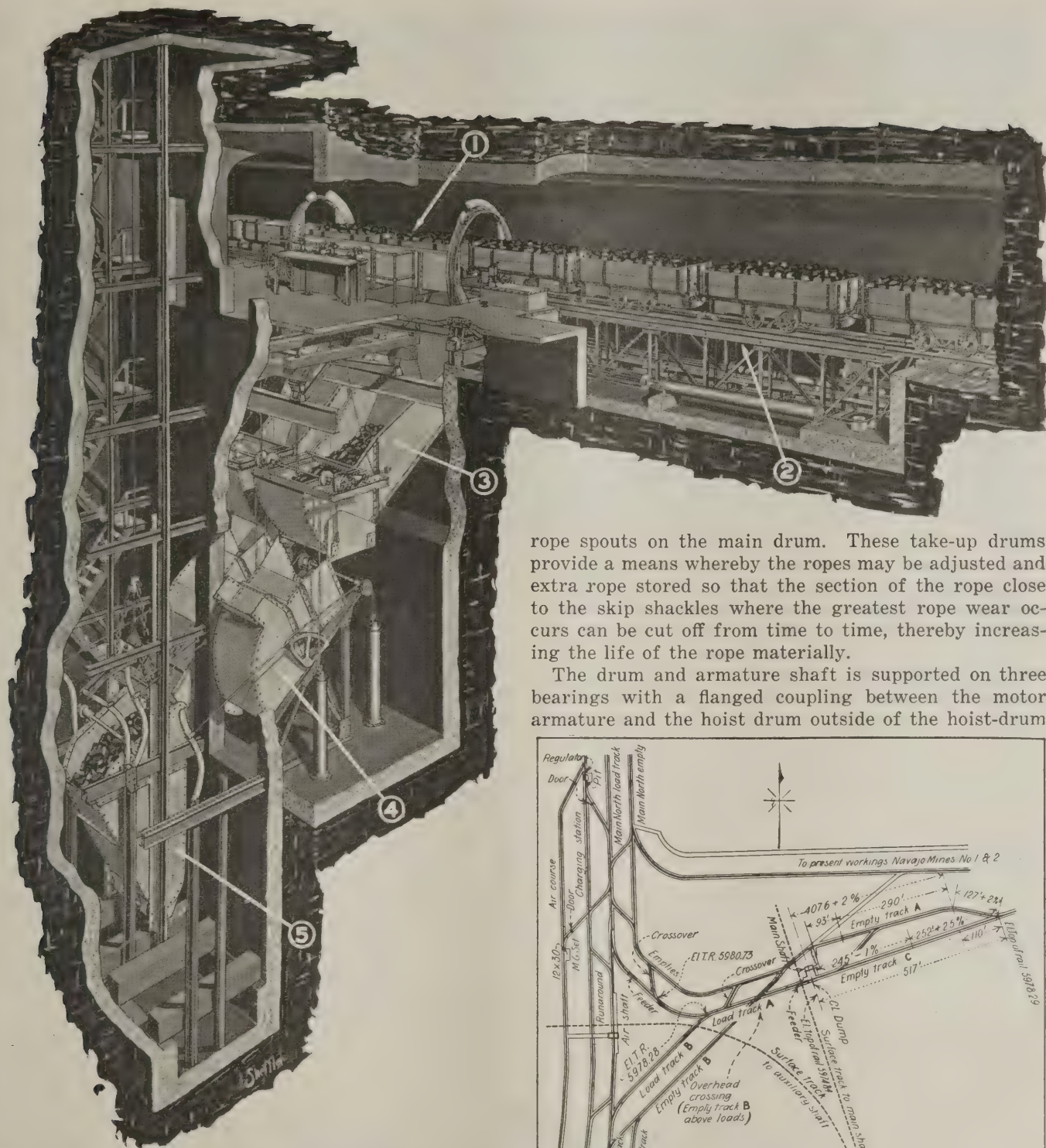


FIG. 13—DETAILS OF EQUIPMENT IN BOTTOM OF SHAFT

(1) Two-car rotary car dump which discharges cars without uncoupling. (2) Trip feeder which moves the trip two car lengths for each operation. (3) Two weigh hoppers, each of which holds and weighs a skip load or three cars. (4) Two skip-loading hoppers which prevent spillage into the sump and (5) Two skips of the overturning type.

type, the motor being coupled directly to the drum shaft. The drum is of cylindro-conical shape with a small diameter of 7 ft. and a large diameter of 10 ft. 6 in. with groove arrangement for affording maximum hoisting efficiency.

The drum is equipped with a parallel-motion post brake 9-ft. in diameter with 11-in. face set by gravity and released by a hydraulic thrust cylinder actuated by oil under pressure. The drum also is equipped with two rope-adjusting drums placed outside the spiders, but in such a position that the ropes lead on from the

rope spouts on the main drum. These take-up drums provide a means whereby the ropes may be adjusted and extra rope stored so that the section of the rope close to the skip shackles where the greatest rope wear occurs can be cut off from time to time, thereby increasing the life of the rope materially.

The drum and armature shaft is supported on three bearings with a flanged coupling between the motor armature and the hoist drum outside of the hoist-drum

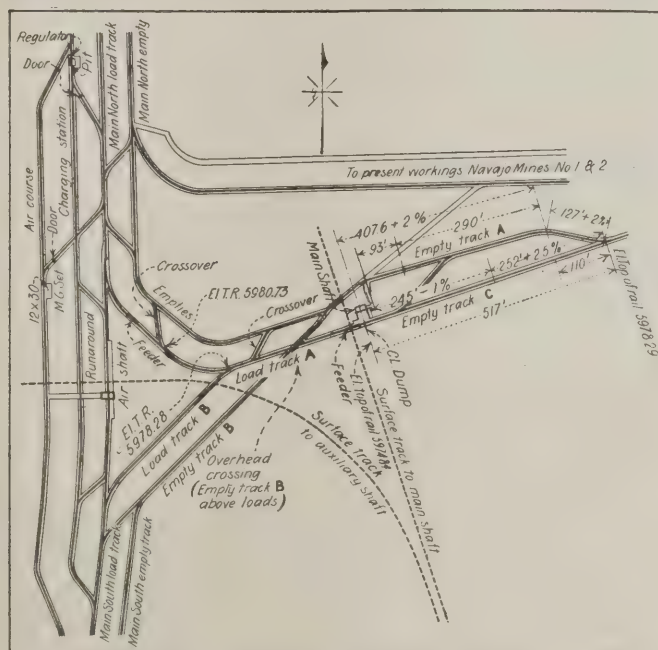


FIG. 14—LAYOUT OF MINE BOTTOM

The main-line locomotives enter by the main entries north and south delivering cars on load track A. After dumping they pass by gravity in continuous trip to empty track C. It is purposed to have a locomotive specially stationed at the bottom to deliver empty cars from track C to the main-line locomotives at the point where they have released their loaded trips.

bearing. Proper thrust bearings are provided to prevent lateral movement of the drum.

The hoist drum is driven by a 1,100-hp. direct-current motor, operated in conjunction with a flywheel motor-generator set and slip regulator and controlled by a modification of the Ward-Leonard system. This arrangement is provided so that the power input to the

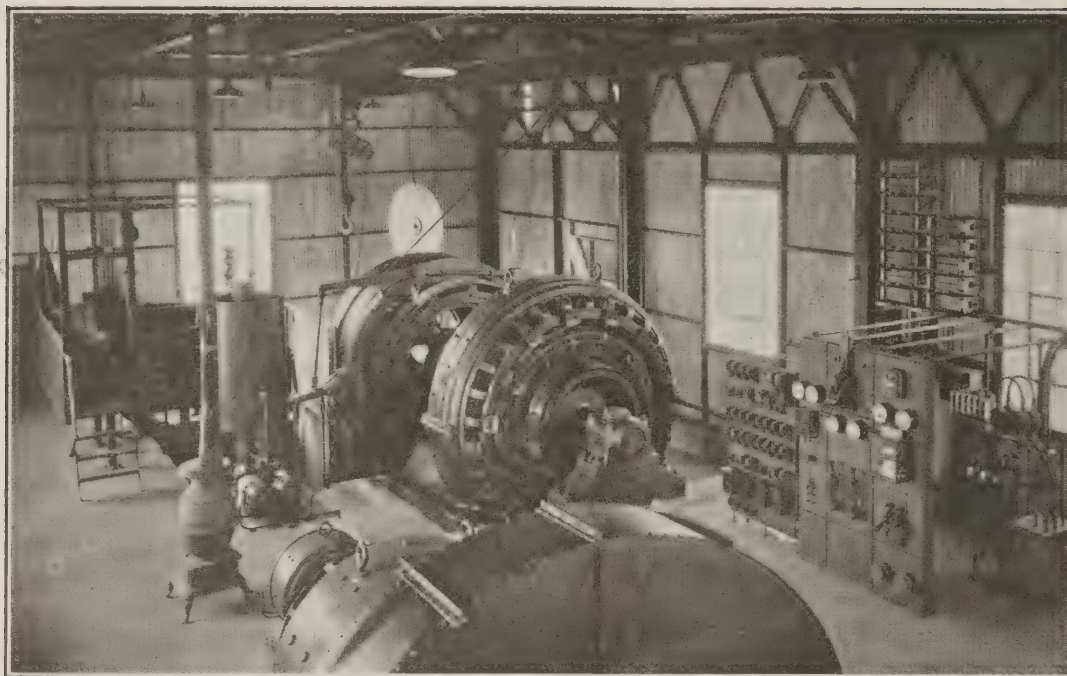


FIG. 15

Main Hoist

A cylindro-conical drum is provided. The motor is direct-connected to the drum shaft. Devices are installed to prevent overspeeding, over-travel, and starting in the wrong direction. Automatic acceleration and automatic retardation are provided. Should the operator fail to slow down his hoist at the proper time the hoist attends to that duty automatically. The drum has two rope-adjusting drums placed outside the spiders. These take-up drums provide for the adjustment of the ropes and for extra rope whenever the ends receive their periodical cutting off.

hoist can be regulated to prevent excessive peaks being imposed upon the power source. With proper regulation this input can, when hoisting in accordance with the calculated cycle, be maintained within 5 per cent on either side of the mean. Fig. 12 shows the duty curves as calculated for this hoist and on which the size of electrical equipment has been based.

The hoist operation is fully protected by devices to prevent overspeed, over-travel, starting up in the wrong direction, and to provide automatic acceleration and also automatic retardation in case the operator fails to slow down the hoist by manually operating his controller at the proper time. Fig. 15 shows the hoist arrangement, and Fig. 16 shows the flywheel set and control apparatus.

Referring to the plan of the workings adjacent to the shafts, Fig. 14, it will be noted that the main haulageways are north and south, and the main shaft is located some 500 ft. to the right of these main entries. Coal is thus brought from either side of the mine without interference with haulage from the other side. The grades were such that much rock work was necessary in making room for empty cars and this work was reduced to a minimum by making a single run-

around for motors going in for empty cars.

Slopes have been driven from the main haulageway to the roadways in the old mines, and the coal from the old workings is gradually being diverted to the shaft operation. Grades up to 8 per cent are met in getting coal from these old workings but all are in favor of the loads. Rope hoists with electric drives have been in use for many years, whereas the advent of haulage motors is recent. Three 6-ton combination storage-battery and trolley motors are now being tested for gathering, and two 10-ton haulage motors are in service for the longer hauls. The new workings have grades up to 3 per cent but most of them are in favor of the loads.

The use of mining machines for undercutting this coal was abandoned several years ago after a thorough trial. The coal cut readily, but the difficulty was that the cutter frequently stuck, due to the squeezing of the coal. The entire seam appears to be in a strain, and when the cutter bar enters there is sufficient expansion to wedge the chain. The coal is defined locally as "explosive" because of this action, for when the face is attacked with a pick the coal immediately breaks down, making it comparatively easy to mine it by hand.

FIG. 16

Motor - Generator Flywheel Set

The flywheel, which is protected and disguised by the steel cover, is 10 ft. in diameter and 22½ tons in weight. It runs at 700 r.p.m. and by reason of its great weight and high speed has sufficient energy to equalize the power input to the hoisting equipment.

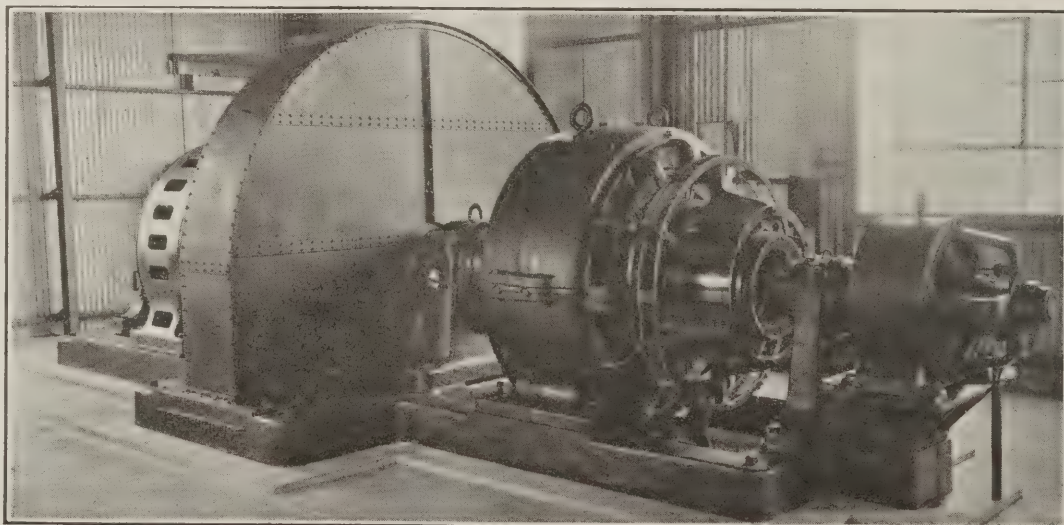




FIG. 17—SOLID-END MINE CAR

Side boards and ends are of 1½-in. and bottom of 3-in. oak. The main carrying member is a 8x8-in. Z-bar. The car has solid ends and all parts are thoroughly connected to the body irons.

The miners drill and load their own holes, but all shotfiring is done after the men leave the mine. Solid-end mine cars are used, the general design being shown in Fig. 17. Attention is called to the thorough manner in which the wood parts are held together. The entire car is really a steel skeleton with wood lining—in fact all the body irons could be assembled without using any of the wood parts for connecting them. Lincoln trucks are used with self-aligning roller bearings. The capacity of the car level full is 72 cu.ft.; the car bodies weigh 1,790 lb. and the trucks 890 lb.

Important Position of Coal In Super-Power Plan

Demand for Power Increasing — Significance and Effects of Recent Advancement—Elimination of Waste—Coal Fields Main Source of Power

BY EDGAR J. GEALY

Electrical Engineer; Associate Editor, *Coal Age*

VIEWING the steady march of progress one need not be a far-reaching expert or dreamy visionary to believe that recently proposed super-power systems are already under way. Increasing demand for greater electrical energy has necessitated the installation of greater power plants, larger distributing systems and made necessary increased economy in the generation and transmission of power.

One of the most far-reaching conceptions of modern times is shown in the map prepared by Frank G. Baum, hydro-electric engineer, which depicts a super-power system projected to cover practically all of the United States and Canada. The plan would make available to the entire nation and Canada the combined resources of water power and coal, and at the same time provide the maximum amount of power at the lowest cost, distribute it to the largest number of people, and most effectively conserve our resources.

Such a system of development is both practical and highly desirable. A nation's standing in the scale of modern civilization may be fairly measured by the extent to which it is utilizing its natural sources of power. Increased use of mechanical and electrical power releases human energy for higher application.

Electrical development has now become a direct criterion of the progress of our nation. Fully one-half the world's natural power supply is converted into electrical form before it is finally utilized. This is because electricity frequently is the cheapest and most convenient form in which to transmit and utilize power.

Recent developments have made it possible to deliver

power over distances of 400 or even 600 miles with high efficiency. Transmission lines are successfully operating on 220,000 volts. Transmission voltage like this has many advantages that are highly desirable for long-distance transmission of power. Doubling the voltage of a transmission line makes possible the transmission of four times as much power with about the same efficiency and voltage drop. It also involves the expenditure of far less capital than that required for two parallel power lines that could carry only half the amount of energy at 110,000 volts.

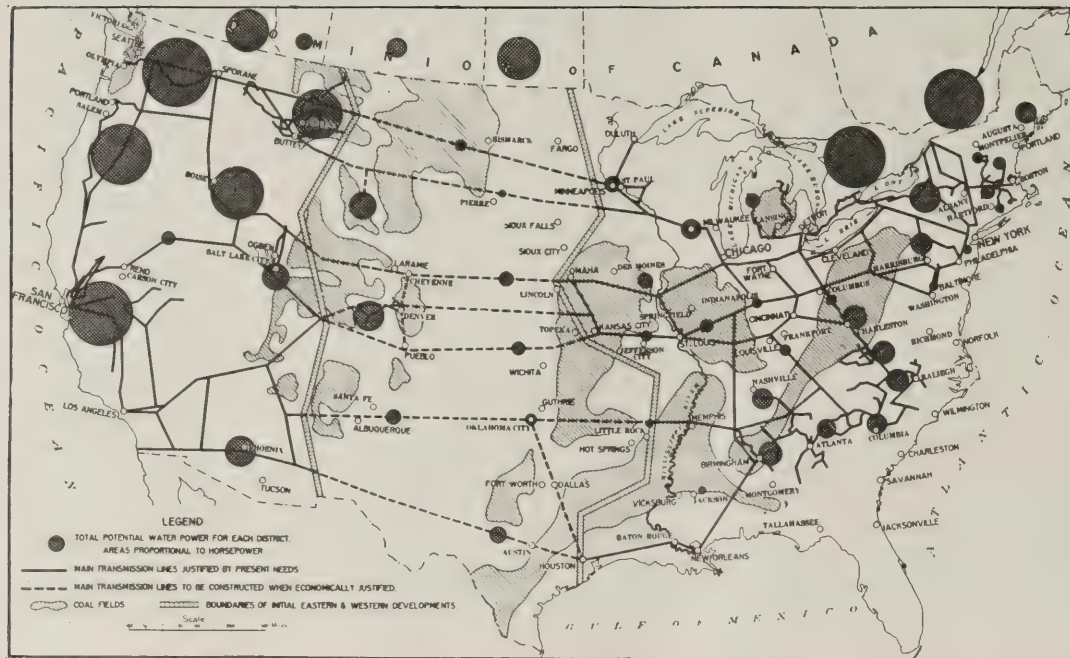
A saving of 158,000,000 tons of coal annually is possible by utilization of the power now going to waste in the Niagara and St. Lawrence rivers, it is asserted by William S. Murray, chairman of the Super-Power Survey Commission of the U. S. Geological Survey.

What does the super-power system mean to the coal industry? For years it has been the dream of engineers that coal would be converted into energy at the point of production and transmitted to users in the form of electric power, and possibly some in the form of gas. Until recently it appeared that the saving in transmitting current instead of transporting coal over a hundred to two hundred miles was not sufficient to warrant the heavy initial investment required to set up power plants and transmission lines, nor was the extent of the territory served large enough to make the project practical. But with the extension of the power-carrying facilities to a 600-mile limit new possibilities are immediately opened up.

Under the present plan large amounts of coal are transported long distances, being handled and rehandled, lost and broken, entailing great expense and waste. On arriving at its place of consumption much of it is used in the generation of electrical energy; frequently it is burned in uneconomic boiler plants by old and inefficient methods, thus resulting in additional losses and waste. This uneconomic conversion of latent coal energy into electrical energy goes on and until some plan of unification is devised and effected will continue to go on wastefully. At most of these plants the loss is on such a relatively small unit quantity that no one seems to realize the gigantic aggregate waste.

Conservation of our national resources is imperative; waste in industry must be reduced to as low a value as possible. No doubt when today's resources of energy are depleted posterity will have solved its problems; progress will be made no matter how great the task. But, nevertheless, it behooves us—and no doubt it is the problem of our generation—to utilize our power resources to the greatest advantage and with the highest economies, because by so doing we not alone conserve our resources but release our present wasted energies for higher development and use.

The super-power plan system cannot fully develop without the assistance of our coal fields. It is asserted that the full development of all our water-power sites for the manufacture of energy would replace only about half that produced through the consumption of coal today. Few realize the compact latent energy in coal, as revealed in comparing the quantities of water and coal necessary to generate a given amount of electrical energy. At the hydro-electric plant it requires the fall of about 26,000 lb. of water per hour from a height of 100 ft. to produce a horse-power-hour of electrical energy; with coal it requires the burning of 1.5 lb. per hour to produce an equal quantity of electrical energy.



Suggested Super-Power System

The plan involves the development of unit districts which would later be interconnected and expanded to stretch across the continent. Water-power sites would generate large volumes of energy which would be combined with generating plants located at the mines.

In other words a 3-in. cube of coal—which could readily be held in the palm of one's hand—can be burned to accomplish as much work as a horse can do in an hour.

A difficulty which has long stood in the way of conversion of coal into electricity at the mines is the question of railroad freight. Power at the mine is of no value; it must be carried to the factory where it is to be used. At present this work of transporting power is done by the railroads by freight cars. This is an important source of revenue to the railroads. Yet, with our railroad equipment greatly overtaxed, enormous waste and loss of coal in transportation, high labor charges in handling coal, increased facilities for the economic conversion of coal into electrical energy and improved methods of electrical transmission it appears that the urgency of the problem demands serious con-

sideration. It has been pointed out that transmission lines could be built on the railroad right-of-way, where leases for transmission lines probably would make up in large part for the loss in revenue from coal. Electrification of the railroads would be rendered more simple, thus making increased economies possible. And the normal increase of other items of freight would make up for the decrease in coal shipments.

The extensive program of tying into one great system all the electric power systems of the country is timely, as it is becoming increasingly more necessary. As the river, railroad and highway systems are the transportation arteries of the country so should the power plants be linked together to be the muscles of power for the further development and progress of the farms, factories, and mines.

Pennsylvania State College Provides Extension Classes in Coal Mining

IN ORDER to provide men in and around the coal mines of Pennsylvania with facilities for studying mining the State Department of Public Instruction, the State Department of Mines and the School of Mines of the Pennsylvania State College undertake to assist groups of persons in the various communities of the coal-mining regions in obtaining that kind of instruction. Classes may be promoted by the persons who desire the instruction. How they should proceed to obtain it is outlined as follows:

When twenty or more men in a mining town wish to form a class for instruction in mining subjects they should request the school board of the school district in which they reside to conduct an evening class in mining for them, and notify the State Department of Public Instruction, Harrisburg, Pa., of their request.

If the school board, after due consideration, finds that an evening class in mining is desirable for the community, it will open such a class in one of the local schoolhouses or other convenient place. This class will be operated by the school district, and no tuition will be charged residents of the district.

If an evening class in mining is desirable, the school board may receive assistance in organizing such a class from the State Department of Public Instruction. Ar-

rangements are also possible whereby the school board and the State Department of Public Instruction will jointly bear the expense of the instruction. The state law provides that the State Department of Public Instruction may reimburse the school district to the extent of two-thirds of the salary of a teacher of an approved mining class.

The teacher training department of the Pennsylvania State College is prepared to train and to recommend to the State Department of Public Instruction for certification competent teachers for evening classes in mining subjects. After the teacher has been appointed, lesson material in printed form will be furnished at the cost of printing by the School of Mines of the Pennsylvania State College.

The teacher-training officers connected with the School of Mines of the Pennsylvania State College will visit, for the purpose of teacher training, classes which are organized in accordance with the above plan. Officers of the Pennsylvania Department of Public Instruction will inspect and supervise the said classes for the purpose of approval and reimbursement on the part of the state.

Classes usually will begin in October or November and continue throughout the winter. They will be held in the evenings once or twice a week or at such times as may be locally agreed upon. Instruction should extend for a period of not less than sixty hours per year.

Group Insurance: What It Is and Its Advantages To Employer and Employee

Save in Two States No Medical or Physical Examination
Is Necessary—Many Unable to Obtain Individual Insurance
Get It Through Group Plan—Tends to Increase Production

BY R. W. SPARKS

OVER 2,500 years ago Aesop told a tale of how four oxen in a field repeatedly protected themselves from the attack of a lion who frequented their pasture by standing with their four tails together so that no matter from what direction the lion attacked he was met by a pair of horns. One day the oxen fell to quarreling among themselves and their defense was immediately destroyed, whereupon the lion killed and ate them one at a time.

Today we are still learning that in the long run the best course is unity and co-operation. Efforts are being made every day to bring about a closer tie between employer and employee, for therein lies the basis of successful co-operation in industry.

The sun has rapidly been sinking on the day of shirt-sleeve intimacy. While there are still a small number of concerns in the country where the owner can walk through the plant without his coat and say "Morning, Joe," or "Howdy, Frank," to his men, they are gradually being displaced by big business. Big business has wiped out most of this spirit of fellowship and good feeling and replaced it with the idea on the part of the men that the "big chief" is some kind of an individual who wears strange clothes and has a black string hanging from his eyeglasses and that to "put anything over" on him and get away with it is legitimate.

INTEREST SHOWN WORKER IS RECIPROCATED

About ten years ago group insurance began to make itself heard as a means of stabilizing labor and improving the employee's general attitude toward his work. By promoting unity and co-operation it tends to increase production; in fact it has been one of the most effective of the efforts made in many plants to bring back the "good old-fashioned" spirit. While providing protection to the worker's home and family it at the same time gives tangible evidence that the employer is interested in the things closest to his workers.

Whether an employer purchase group insurance for business reasons, such as reducing labor turnover, or because he wishes to be a benefactor of society, the benefit will be felt in both directions. But the advantages of group insurance are not restricted to the shop, for when the family of the worker become acquainted with the plan they realize how closely they are concerned in its benefits and their interest soon results in active support. Internal dissension in the plant often is stirred up by radical minds, and to have the home on the employer's side is to have a powerful ally.

What Group Insurance Is.—Group insurance is a quantity-purchase proposition. By purchasing insurance protection for all or any division of his employees numbering fifty or more an employer is quoted group

rates that are considerably lower than the rates for individual policies of equal size.

One blanket policy is issued to the employer, and individual certificates are presented to the employees protected. The employee has the privilege of naming his own beneficiary and he also may change the beneficiary he has named if occasion requires it.

One of the attractive features of group life insurance is that except in the States of Georgia and Oklahoma no medical or physical examination is required. The only stipulation from the physical standpoint is that the employee be actively at work upon the day the insurance goes into effect. If for any reason an employee is not able to be at work upon the date the insurance becomes effective, he is entitled to his certificate upon his return to active service. Age limits are entirely ignored by this clause. The man who is too old to get insurance is taken in along with the younger members of a concern and receives his protection without question.

Insurance records show that approximately 20 per cent of all people applying for life insurance are rejected because of inability to pass the required physical examination. These figures are based on all applicants and as the so-called white-collar workers are more numerous in this list than men of industry, it is reasonable to assume that this percentage would be considerably higher among industrial workers. Thus people who could not get life insurance protection individually are enabled to get it through group insurance.

Over 40 per cent of the working people carry no insurance protection, and their widows, children and mothers are often left destitute, an object of the employer's, or of public charity. Experience shows that over 50 per cent of the group insurance claims paid go to relieve direct distress.

INDIVIDUAL SELECTION OF EMPLOYEES UNLAWFUL

Group Plans.—Individual selection of employees for different amounts of insurance under the group plan is prohibited by law. There must be a definite schedule. These schedules have gradually worked themselves into three different classes known as the flat amount, salary, and length of service schedule.

As its name indicates, the flat-amount basis places an equal amount of insurance upon all employees.

The salary schedule divides the employees into different classes according to their yearly earnings, and places a different amount upon each class. For example, all employees earning \$1,000 per year or less may receive a \$1,000 certificate, those whose yearly salaries are over \$1,000 but less than \$2,000 to receive a \$2,000 certificate, and those making over \$2,000 could receive a \$3,000 certificate.

The length-of-service form has proved very popular

because of its increasing rewards to employees remaining with the company for a long period of time. The length-of-service idea is carried out in the following manner: A certificate may be issued to an employee for the starting amount, say \$500, three months after he joins the working force. To this original certificate is added the sum of \$250 upon his first anniversary with the company; after he has been with the organization two years his insurance will be increased to \$1,000, and so on, giving him a \$250 increase every year until he is receiving the maximum amount set by the company.

Minimum and Maximum.—The above examples are not arbitrary. Interesting combinations have been worked out to fit unusual conditions. The minimum amount of insurance that can be placed upon any individual under the group plan is \$500. The maximum may rise to \$5,000. Any amounts within these limits can be established for the flat amounts. On the salary and length of service basis the amounts for the different classes or the size of the increase can be fixed according to the wishes of the purchaser.

Probationary Period.—It is customary to enforce a probationary or waiting period before new employees participate in the plan. This period usually runs from three to six months although in many cases local conditions indicate that a shorter or longer period might be desirable. The waiting period is particularly effective where the industry has been in the habit of supporting a large floating element. An employer is reasonably sure that the new worker is not of the migratory type if he has remained with him six months or a year, and the period can be established so that the insurance can go into effect after that time.

Permanent Disability.—In the back of the minds of nearly every workman there lurks a constant dread of the possibility of being entirely deprived of his earning capacity, but the worker protected by group insurance need waste no worry thinking "What will become of me and my family should something happen to me and I be no longer able to earn my living." For the group insurance certificates guarantee to pay the entire amount of the insurance in cash instalments to any worker who becomes totally and permanently disabled before reaching the age of sixty.

ON LEAVING COMPANY CAN RENEW INSURANCE

Continuance Privilege.—When an employee leaves a concern carrying group insurance, that employee's insurance is immediately and automatically cancelled, but he has the privilege of converting into any standard life insurance policy at regular market rates for his attained age without physical examination by applying to the insurance company within a certain prescribed time after he leaves his employer.

Cost.—Individual certificates are issued to employees protected by group insurance at a cost to the employer of approximately 40 per cent less than what an equal amount of insurance would cost the worker in the open market. Furthermore the worker could only receive insurance he purchased himself provided he could pass the physical examination required by insurance companies.

Group insurance can be carried by the insurance companies at a more moderate rate than individual policies because the blanket policy form cuts down administrative expense. As there is little administration by the insurance company there is even less clerical detail incurred by the purchaser of a group policy.

Employees leaving an organization usually are offset by new ones taken on and in this way the new applications and the cancellations offset each other.

Further simplification has resulted from the fact that practically all transactions are based on an average cost worked out when the contract is installed. This eliminates different amounts for various ages. Furthermore, the usual technicalities connected with the paying of insurance claims have been eliminated. No affidavits or proof beyond the employer's and the physician's statement are required.

The insurance company carrying the group insurance usually furnishes the policyholder with a card file index, and complete card record of the group. Many companies are using this outfit for their own personal records. Some have had no such records before.

LITTLE CLERICAL WORK REQUIRED OF COMPANY

Average cases have been worked out and it has been found that one clerk can handle all the clerical detail for a group of 100 in one to two hours, 250 in three to four hours, 500 in less than one day a month, 1,000 in a day, 5,000 in three or four days a month.

Group life insurance has no connection with workmen's compensation insurance. It affects it in no way, and its benefits are entirely in addition to it.

To show that there is nothing experimental about group life insurance a few facts may be given. The Metropolitan Life Insurance Co., only one of several big writers of this kind of insurance, has more than fifteen hundred companies insured under this plan. Nearly half a million workers enjoy group life insurance protection from this company alone.

The records of this company indicate that group insurance is popular with coal operators. Over five years ago it had not placed its group insurance with a single coal company. Since then about seventy coal concerns have been insured and the protection now covers more than 20,000 employees of coal mines. Not a single coal company has ever cancelled its contract with the Metropolitan Life Insurance Company because of dissatisfaction.

Factor in Public Opinion.—The attitude of the employees toward the company that employs them is a factor in guiding public opinion. Huge sums of money are spent every year by large employers of labor to create favorable public opinion. This effort often is counteracted, especially in the locality of the concern and its branches, by the impulsive propaganda of dissatisfied employees. The comment, conversation and spirit of the employee who is quick to rise to the defense of his company whenever he discovers an attack, direct or indirect, is something whose value is multiplied as many times as there are satisfied employees on the payroll.

Other Benefits.—The cost of production is made up of many elements. Material, wages and overhead costs are generally well known. In many efficient institutions the money expended in training an employee for his work has been carefully worked out and there is no doubt that it is a considerable figure. Every time an old employee leaves, the cost of training a new one to fulfill his place increases the production cost. When Herbert Hoover's committee which investigated waste in industry published its report in a book called "Waste in Industry" some time ago startling evidence was produced revealing the enormous amount of money lost as a result of poor workmanship and the production of damaged goods by poorly trained employees.

Further than this, there is a waste that is practically impossible to compute, due to employees not working as efficiently or conscientiously as they are capable. While this last can hardly be figured, we all appreciate the gigantic size that it reaches. Often it is due to a lack of understanding between workers and employers.

By bringing about a sympathetic understanding between the company and its employees, group insurance tends to increase production. By furnishing an attractive incentive for employees to remain where they are fairly treated, group insurance exerts a strong tendency toward stabilizing labor conditions, and thereby assist in reducing the cost of production.

The relative extent of labor turnover is determined more, perhaps, by the length of service of the employee than by any other single factor. Men who have been working harmoniously together over an extended length of time learn to understand each other and the principles of team-work and *esprit de corps* are thereby fostered.

With Track Shifter One Man Can Raise and Throw Over Railroad Track

MUCH has been written as to the efficiency with which distant-removal stripping is done in the iron regions, using the largest dump cars and heavy standard-gage track. The work furnishes an excellent illustration of what might be done in the stripping of anthracite. How to dump is as much a part of the "trick" of such stripping as how to load and to transport the overburden. In the Mesabi region not only the overburden must be dumped but the siliceous streaks of ore, known as "paint rock." This is placed in a separate pile, as it may become valuable. Prominent objects in the featureless scenery are the many low mounds of overburden and paint rock.

In the City of Duluth the Lake Superior Loader Co. is making a track lifter and shifter which enables one man to raise the track, ties and all, and move it over if desired, all in one operation. Its availability for distant-removal stripping in the anthracite region and elsewhere is evident. Of course the track when raised needs to be underpinned and consequently the track-shifter is equipped so that it will transport eight men and their tools. As will be noted from the illustration, the machine moves and operates under its own power. It will travel at a speed of 30 miles per hour on a level track and 20 miles an hour up an adverse grade of 4 per cent.

The machine, when shifting, is made to plant a heavily shod leg or "spud" on the track, the leg being inclined at an angle so that when the shifter is caused to climb

it, bringing the rail with it, it tends to fall toward the edge of the dump, dragging the track in the same direction. The climbing mechanism is a toothed wheel which engages a rack in the side of the shifter leg. The action is somewhat like that of a vaulter who uses a pole to aid him in his flight.

The track is seized by four rail clamps suspended from the shifting truck. These are stationed on either side of the shifter leg and between the wheels of the machine. The track is not broken at any of the joints but is lifted and shifted without any such provision. When one shift has been made, the shifter moves under its own power backward or forward two rail lengths and there repeats the operation. The claim is made that the number of men needed to make the shift is cut down one-half and the time consumed 75 per cent. Thus the work of the shovels is not impeded. It is said that the rail is not kinked nor the tie plates bent.

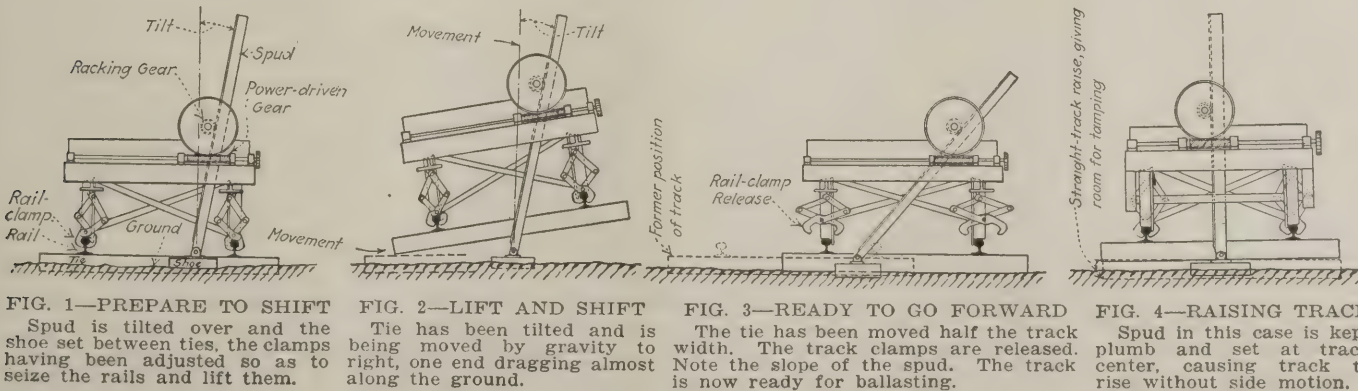
By planting the spud in the center line of the track and in a vertical position the track is not swung from line but is lifted vertically. Where the track is buried or frozen it is best to use the shifter to lift the track from its position for a few rail lengths. Then the shifter can be readjusted and run back over the same track length, shifting it into place as already described. The power is provided by a gasoline engine mounted in front of the truck. The lifting force is 25 tons and the machine is 10 ft. in length, 7 ft. wide and 8 ft. high. The length of the spud is 7 ft. The shifter weighs 4,900 lb.

Upkeep of Steam Shovels Engaged in Stripping and Loading

THE following records are from a book on "Upkeep Costs" compiled by the Erie Steam Shovel Co.:

Operating Company	Mine	Yardage	Material	Upkeep in hundredths of a cent per cubic yard.	Upkeep Cents per day
Commonwealth Fuel Co.	Douglas	156,000	Clay & Gravel	14	
Ocala Lime Co.	Ocala, Fla.	900,571	Coal		
		190,000	Rock		
		90,000	Earth	18	65
Kennedy Refractories Co.	Tiffin, Ohio	179,856	Rock		
		57,332	Earth	43	
		10,000	Coal		
		3,000	Iron Ore		
Gay & Hays	Greensburg, Pa.	18,486	Earth	5	27
		59,156	Shale		
		55,458	Coal		
Vielhauer Coal Co.	Dover, Ohio	300,000	Earth & Shale	5	29
Keystone Limestone Co.	Millville, W. Va.	200,403	Shallow Earth with rough rock bottom.	20	57
		139,000	Earth		
		138,000	Frosted Earth, Rock and Hardpan	60	25
Penn. Products Co.	Dillsburg, Pa.				

It should be noted that all these shovels are of small to medium size.



New Equipment

Automatic Sectionalizing Contactor for Trolley and Feeder Circuits in Mines

RELATIVELY new type of sectionalizing contactor giving automatic circuit-breaker protection, time delay and lockout features generally required in mining service has just been brought out.

It is designed for application between feeder or trolley sections and prevents an interchange of excessive amounts of current between the sections which it connects. It is fully automatic, opening on overloads and reclosing only when the potential difference between the sections is sufficiently small to limit the flow of current on reclosure to less than the overload setting of the relay.

The equipment, which is assembled on the slate panel in the box shown in Fig. 1 consists of the following apparatus: main contactor, overload relay, holding relay, snap switch, fuses, resistor and terminals. The contactor is of proved design and construction having arc chutes and magnetic blow-out coils, features highly desirable for this service. The overload and holding

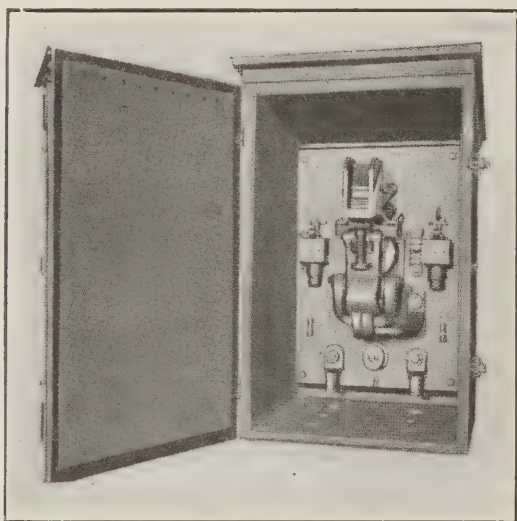


FIG. 1—AUTOMATIC CONTACTOR ENCLOSED

This device gives automatic-circuit breaker protection, reset and time-delay features. Enclosed in a box it may be locked and will perform without any further control equipment or devices.

relays are similar except for the coils—and are simple and reliable in operation. The overload relay has a series overload coil, while the holding relay has a shunt operating coil. Both are automatically reset.

Referring to the wiring diagram, Fig. 3, which is a simplified arrangement of the factory diagram shown in Fig. 2, the arrow points show the direction in which the plungers move when sufficient current is applied to the coils.

On the occurrence of an overload exceeding the setting of the overload relay, this relay will operate, opening its lower and closing its upper contacts. The opening of the lower contacts de-energizes the operating coil of the main contactor, causing the contactor to open. At the same time the closing of the upper contacts energizes the coil of the holding relay, causing this, in turn, to open its contacts.

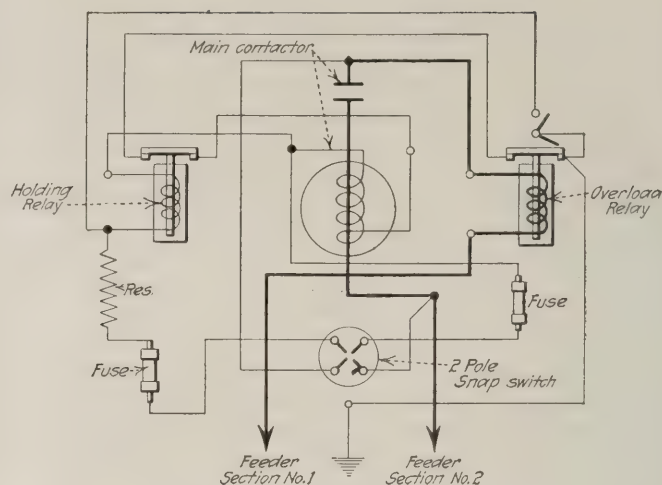


FIG. 2—FACTORY WIRING DIAGRAM

The wiring diagram shows the relative location of the equipment illustrated in Fig. 1, showing the interconnections between the control devices.

When the main contactor opens, the overload relay is de-energized and immediately resets. If the voltage difference between the two feeder sections—the voltage across the contactor—exceeds a given minimum, the holding relay will remain energized, as its coil—with resistance in series—is connected directly across the contactor, thus preventing the contactor from reclosing.

When the voltage difference drops below the minimum value, however, the holding relay is de-energized and causes the contactor to reclose. This feature prevents the reclosure of the contactor unless it is safe to do so: that is, if it does reclose, the current flow from section 1 to section 2 will not exceed the overload setting of the relay and cause the contactor to reopen immediately. In this way sections of feeders on which faults occur, may be cut off from other sections automatically, and later be automatically reconnected as soon as the fault is cleared and voltage properly re-established on the line.

These sectionalizing contactors which are manufactured by the Westinghouse Electric & Manufacturing Co., are made in various sizes up to 1,250 amp. for either 275 or 600-volt service. The relays have wide ranges of settings so as to trip the contactor at any desired load and re-establish service with any desired percentage of dead load floating on the line when the contactor is open. For special conditions the company has worked out many applications for this contactor with a few changes in the circuits or the adaptation of additional relays.

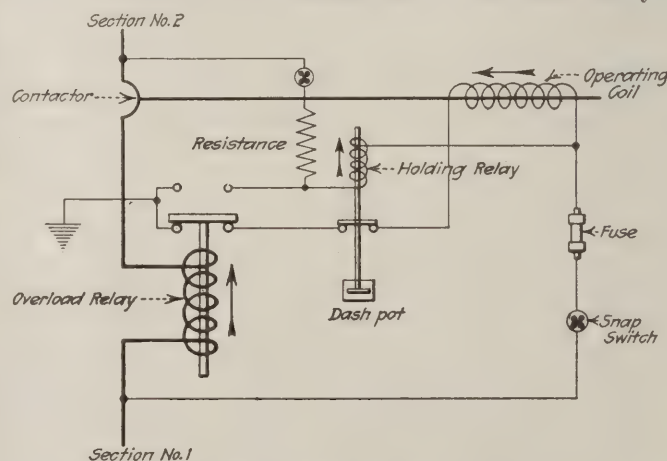
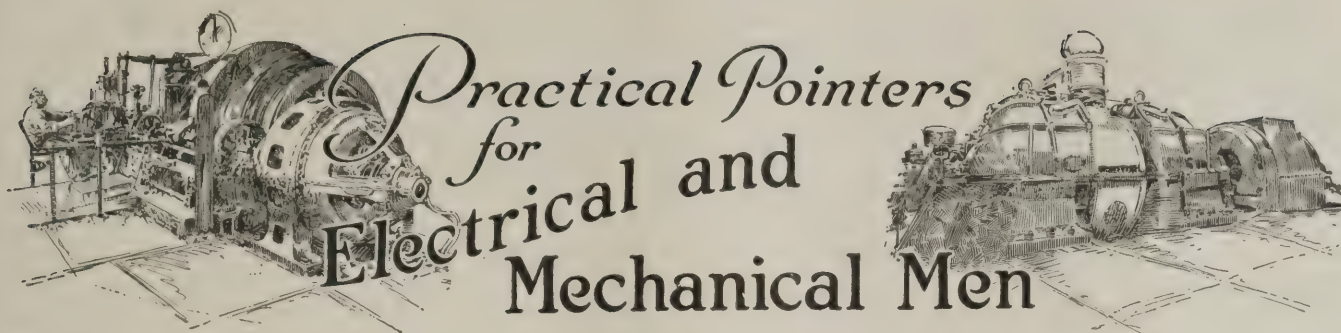


FIG. 3—SIMPLIFIED WIRING DIAGRAM

The operation of the contactor may be readily understood by making reference to the text. The raising of the plunger in the overload coil opens the circuit through the operating coil and opens the contactor. Then the holding relay functions to lock out the contactor until it is safe to re-establish service.



Putting Pinions on Mine Type Locomotive Armatures

MANY of the pinion failures on electric mine motors are caused by putting the pinions on incorrectly.

Driving a Pinion.—It is generally believed that if a pinion is shoved on the shaft and the nut tightened, it will run satisfactorily without loosening. Experience has shown that in order to obtain satisfactory operation, pinions should drive their gears through the "press fit" or "shrink fit" on the shaft and not through the key. The key acts merely as a safety device if the pinion should accidentally loosen. The desired fit for the pinion can be had by heating or by pressing.

Precautions.—The following points should be observed when putting pinions on railway motor shafts with taper fit:

(1) The shaft should be clean and free from burrs or swellings.

(2) The pinion bore should be clean and free from burrs.

(3) The fit of the pinion bore should be in contact with at least three-quarters of the surface of the taper fit on the shaft. This can be checked by rubbing Prussian blue, thin red lead and oil, or thin lamp black and oil on the pinion bore and fitting it on the shaft.

(4) After the above points have been taken care of, the pinions should be put on the shaft cold to make sure (a) That the keyway in the pinion is the proper size for the key mounted on the shaft; (b) That the pinion does not ride or bind on the top and sides of the key and will not ride the key when pressed further on.

The keyway on the pinion can be 0.002 in. larger, but not less than the key. There should be at least $\frac{1}{16}$ in. clearance between the top of the key and the bottom of the keyway in the pinion. The corners of the key should not cut into the fillet of the keyway. To prevent this the corners of the key should be rounded.

PRESSURES FOR PUTTING ON PINIONS

Pressing on Pinions.—Pinions can be pressed cold onto the shaft with a wheel press. The pressure required will be 12 to 25 tons for pinions up to 125 hp. and 40 to 80 tons for pinions transmitting 125 hp. or over. A 25-to 50-ton press can be used for pinions up to 125 hp. and a 100-ton press for pinions above 125 hp. Pinions with bores up to 3 in. that are pressed on cold should advance on the shaft approximately $\frac{1}{2}$ in.; those with 3- to 4-in. bore, $\frac{3}{4}$ in., and those with 4- to 5½-in. bore, $\frac{1}{2}$ in. This distance is measured from the point where the pinion is seated firmly on the shaft before pressing.

Heating Pinions for Motors Up to 125 hp.—Pinions up to three inch bore should be heated in boiling water for 30 minutes, and those with 3-in. or larger bore for

60 minutes. When the pinion has attained the temperature of the boiling water, namely 100 deg. C. (212 deg. F.), it should be taken out of the water and the bore quickly wiped clean. Without allowing the pinion time to cool, it should be tapped on the shaft with a 6- or 8-lb. sledgehammer, using a heavy piece of wood or copper between the pinion and the hammer. This sledging is not to get a driving fit but to make sure that the pinion is home and well seated. Three or four taps evenly distributed around the pinion end should be enough. The pinion nut with lock washer can then be screwed home tight with a wrench having a purchase or lever arm of 3 or 4 ft.

A suitable pinion heating arrangement is shown in Fig. 1, the water being heated by an electric heater. A gas flame or a steam coil, however, could be used instead. To prevent rusting and to insure a clean surface at the fit, washing soda should be added to the water in the proportion of $\frac{1}{4}$ lb. of soda to 5 gallons of water.

Heating Pinions for Motors Over 125 Hp.—The pinions should be heated with a gas flame applied in the bore of the pinion in such a manner as not to touch the teeth of the pinion, as this might affect the temper. The flame should be so regulated as to take 45 to 75 minutes to bring the pinion to a temperature of 125 to 150 deg. C. (257 to 302 deg. F.). The temperature can be measured by placing the bulb of a thermometer against the pinion between the teeth. The surface of the pinion where the bulb touches it must be made perfectly clean by rubbing with emery cloth. It also is important to protect the exposed part of the thermometer by covering it with asbestos cloth so that the flame cannot touch the thermometer.

When the pinion has reached the correct temperature

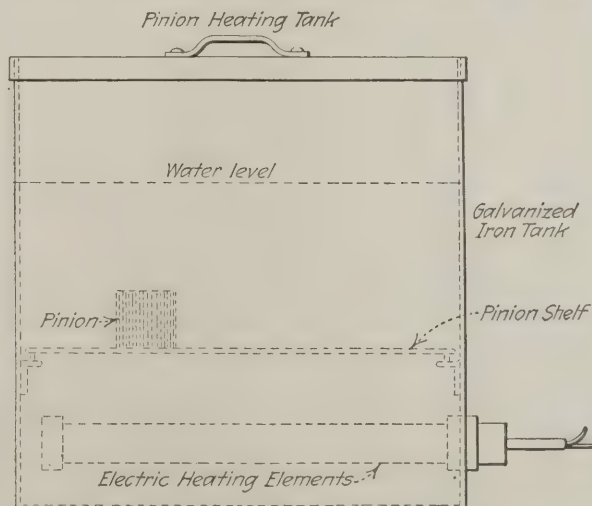


FIG. 1—ELECTRICALLY HEATED PINION HEATING TANK

An electrically heated tank can be used with the greatest success owing to the ease with which the heat may be controlled.

the bore should be wiped clean and the pinion put on the shaft in the same manner as suggested for pinions for motors up to 125 hp.

Heating Apparatus.—Any furnace in which the pinion is so located that the flame cannot touch the teeth can be used for heating pinions. The flame can be regulated and the pinions kept at a temperature of 100 deg. C. (212 deg. F.) for pinions up to 125 hp., or 125 deg. C. (257 deg. F.) for 125-hp. motors or larger, until the mechanic is ready to apply them.

Results.—Pinions put on after boiling in water will hold when cool with a pressure of from 12 to 25 tons, and those heated above 125 deg. C. and not more than 150 deg. C. with a pressure of from 40 to 80 tons, depending on the length of fit of pinion and the diameter of the bore. By following these directions it is possible to put pinions on armature shafts that will stay put and drive through their fit under the very hardest pulling from the motor.

How to Babbitt Motor Bearings

TO CLEAN cast iron, malleable iron or cast steel shells (untinned) remove all the old lining from the shell. This may be done by heating the shell sufficiently to melt out the old lining. Remove all oil, dirt or other foreign matter by dipping the shell in a solution of caustic potash or by burning. If the burning method is used, continue the burning until all smoke ceases, showing that all oil and dirt have been burned off; then scrape the surface with a file and rub down with coarse sandpaper to remove all scale and oxide.

Bronze, Pipe or Steel Shells (Untinned).—Remove the old lining by heating, preferably in a pot of scrap babbitt, and be sure not to heat above 375 deg. C. As soon as the old lining is melted out, swab the tinned surface with zinc chloride (a saturated solution of zinc in hydrochloric acid), then dip into a pot of "half and half" solder, which should be kept at a temperature not less than 340 deg. C. and not more than 375 deg. C. If shells are to be babbitted immediately, do not touch tinned surface after removing from the solder pot. If the shells are to be allowed to cool, brush off the tinned surface with a piece of clean waste.

Tinning Bronze or Steel Shells.—Paint with a thin mixture of graphite and water the parts not to be tinned. When dry swab with zinc chloride the parts to be tinned, then dip the shell into a pot of "half and half" solder, which should be kept at a temperature not less than 340 and not more than 375 deg. C. Leave the shell in the solder until it is just hot enough for the solder to run off, leaving a thin coating. Remove the shell from the pot and rub the surface to be coated thoroughly with a swab saturated with zinc chloride, then dip in solder again to wash off all traces of zinc chloride. If any untinned spots can be detected on the surface to be babbitted repeat the operation. If shells are to be babbitted immediately do not touch tinned surface after removing from the solder pot. If the shells are to be allowed to cool, brush off the tinned surface with a piece of waste.

Steel shells must be pickled to remove the scale before being tinned.

Iron or Steel Shells (Untinned).—Preheat the mandrel to a temperature of approximately 150 deg. and the shell to 100 deg. C. If the shell is heated too much, the length of time for cooling may be so prolonged that the heavier metals in the babbitt will have time to settle

to the bottom end of the bearing, in which case the metal in one end of the bearing will be soft and in the other end brittle, while if the shell is too cold it will cool the babbitt too suddenly and cause it to shrink away from the shell. After each bearing is poured, swab off the mandrel with a piece of waste which has been dampened with clay wash. This leaves on the surface of the mandrel a thin layer of fine clay dust, which has been found to be of great assistance in producing smooth, clean bearings.

Bronze or Steel Shells (Untinned).—Preheat the mandrel to about 100 deg. C. The same reasons for having the temperature correct apply here as given under preheating of mandrels for iron or steel shells. After each bearing is poured it may be found necessary to cool the mandrel. This is done by dipping it in a clay wash, which leaves a layer of fine clay dust, the same as the swabbing for iron and steel shells. When the mandrel is at the proper temperature, the water of the clay wash will evaporate quickly on the surface of the mandrel, but will not spatter vigorously. The brass shell is preheated in the tinning operation and should be babbitted immediately after it has been tinned, before losing the heat given to it by tinning.

Melting.—Melt the babbitt in an iron pot or kettle, and maintain at a temperature between 460 and 470 deg. C. It is necessary that this temperature be maintained when pouring bearings and that the maximum temperature of 470 deg. C. be not exceeded at any time, as in certain grades of babbitt the metal is irreparably damaged if this temperature be exceeded. The use of an automatic regulator is necessary to hold the temperature within these limits. Stir the metal thoroughly at frequent intervals; otherwise the heavy metals will settle to the bottom of the pot. Keep the babbitt covered with charcoal or graphite to prevent oxidation.

Pouring.—Pour from a ladle in a steady stream directly down along the mandrel to avoid splashing or pocketing of air. The lip of the ladle should be kept free from burrs or other surface irregularities in order to pour a smooth, round stream. If the metal is splashed against the mandrel it will cause blowholes and give a mushy bearing.

Summary.—Pouring temperature for babbitt—460 to 470 deg. C. Temperature of "half and half" solder for tinning—340 to 375 deg. C.

Preheat iron and steel shells—100 to 150 deg. C.

Preheat bronze shells in tinning operation.

Preheat mandrel for iron and steel shells—100 to 150 deg. C.

Preheat mandrel for bronze shells—100 deg. C.

Railroads Consume Less Coal in May

Class I railroads of the United States consumed 9,034,000 net tons of coal during May, 1923, as charged to account 394, compared with 9,373,000 tons during the preceding month and 6,964,000 tons in May, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During the first five months of 1923 these roads consumed 48,578,000 tons as compared with 38,328,000 tons during the corresponding period of 1922. The delivered cost per ton in May last was \$3.47 compared with \$3.55 for the corresponding month of last year.

Consumption of fuel oil during May totaled 155,062,000 gallons compared with 147,694,000 gallons in April and 118,429,000 gallons in May, 1922. The totals for the first five months of 1923 and 1922 were 744,894,000 and 593,499,000 gallons respectively.



Problems of Operating Men

Edited by
James T. Beard



Abnormal Roof Conditions Require Special Study

Observed Peculiarities in Roof Conditions Working the Miller Seam—Roof Breaks to Great Height with Little Warning—Need for Careful Study

FROM time to time, I have referred incidentally and in a suggestive way to a condition that has come under my observation in working the Miller or "B" seam. This was done in the hope of eliciting an expression of opinion in regard to the probable cause of the roof conditions that many must have observed and contended with in the working of that seam.

As yet, the subject has not received the consideration it demands and, for that reason, I beg to again draw attention, in a more direct manner, to the sudden breaking of the roof strata when driving openings in that seam. These breaks will frequently extend to an indeterminate height, even in narrow workings. The condition is peculiar to the Miller seam, which suggests that there must be some definite underlying cause, as yet unknown or but partially understood.

ROOF FALLS DUE TO PRESSURE OF GAS OR WATER

When discussing the cause of these occurrences, with practical mining men, the opinion has generally been expressed that they are due either to gas or water. That each of these factors is capable of producing powerful effects in creating pressure cannot be denied. However, before we can ascribe the observed conditions to the action of either of these agencies, there must be evidence to support our conclusions.

In the instances that I have observed, all evidence has been lacking of the existence of either water or gas, previous to or immediately following the breaking of the roof. While it is true that one instance occurred in a mine generating small quantities of explosive gas, the other took place in workings where no gas was generated.

In respect to water, in the former instance, there appeared no indication that would suggest an excessive pressure from this cause, the quantity of water present being far less than what might be expected from the height of the cave and the local conditions. In the latter case, however, there was no evidence of water in the strata and we must look elsewhere for the cause.

PRESENCE OF GAS OR WATER PLAINLY MANIFEST

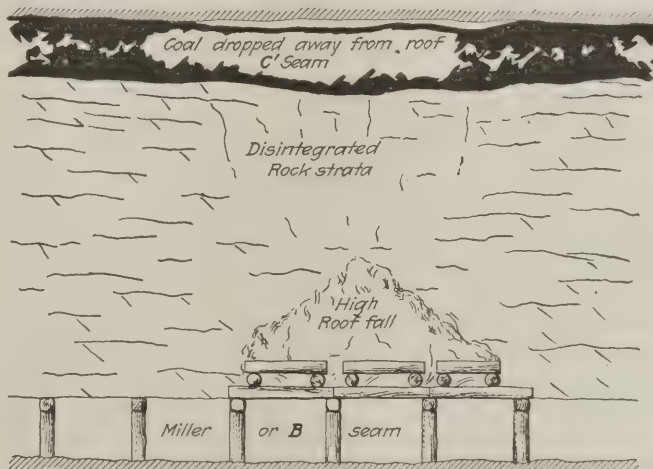
In my own experience and, I believe, in that of others also, where a roof fall has resulted from the pressure of gas or water, the presence of these elements has been manifest and the cause of the trouble was clearly evident, because the agencies that brought it about were plainly seen and their effects realized in a manner that left no doubt in the practical mind.

Now, in reference to the roof conditions observed in the working of the Miller seam, there can be no doubt of the existence of a producing cause other than those I have mentioned. It is possible that the sudden rupture of the roof strata, in certain cases, may result from a local condition such as the near approach of the excavation to a weakened barrier that is incapable of supporting the pressure thrown upon it in the progress of the work.

Again, the trouble may result from an undue concentration of pressure from a cause that is persistent over the entire area. My inclination is to attribute the observed conditions more generally to this latter cause. Where the Miller seam is overlaid by the upper seams of the lower geological period, or even by the next higher seam, which is the "C" seam, it is subjected to a pressure caused by the expansion of the limestone stratum lying between the two seams.

HIDDEN CAUSE FOUND IN OVERLYING SEAM

From long observation in several widely separated localities, it is known that this limerock has been subjected to the action of water with the result that the coal of the C' seam has been badly ruptured. In places, the disintegration has left nothing but a soft deposit through which an iron bar can be easily forced. In other instances, as appears in the accompanying



SHOWING RESULT OF DISINTEGRATED STRATA

figure, the stratum has been partially removed allowing the coal to drop from its natural position so as to leave a space of from 6 to 12 in. between roof and coal.

My thought is that, in view of these facts, it is not unreasonable to assume that this disrupted condition in the strata overlying the Miller seam may be responsible for a concentration of pressure that is, perhaps, the chief cause of the abnormal conditions existing in the roof of that seam. It is possible that I am in error in assuming the exact location of the cause as being in the limestone underlying the C' seam.

While there may be other strata of a nature similar to the limerock mentioned and whose disintegration has caused the disruption of the roof of the Miller seam, I believe the assumption to be correct with respect to the general producing cause. I have referred to the rock underlying the C' seam only as illustrative of this condition, which I am inclined to think is responsible for the difficulty.

Let me say, in closing, that mining is an industry that must be conducted subject to the effects produced by physical causes. The more accurate knowledge we have of those causes, the better we will be able to contend with and overcome their effects.

Washington, D. C.

I. C. PARFITT.

Action of Gas in Roof to Cause Sudden Breaks

Timbering weak roof must closely follow extraction of coal—Air current disintegrates roof rock—Pressure of gas causes high falls.

ATTENTION was drawn, some time since, to the sudden breaking of the roof at times when it is least expected to occur. If I recall correctly, the writer of the article had reference particularly to mining conditions existing in the Miller seam, which I think was being mined not far from Pittsburgh.

Since reading the article, I have been turning the matter over in my mind, at different times, and now desire to offer a few remarks regarding the possible causes of sudden breaks in mine roof. What I have to say is drawn from my own experience and observation regarding similar occurrences in the mining of coal in other districts.

It has been my practice when driving places under weak roof to have the timbering closely follow the extraction of the coal. Even then, it has often been necessary to provide other supports between the timber sets, in order to prevent the continual dropping of small fragments of the roof slate on the road.

FACTORS OPERATING TO BREAK MINE ROOF

Owing to the disintegrating action of the air current on the roof the trouble is greater at times than at others. It is always greater in summer than in winter, because the current then carries more moisture, which is rapidly condensed in contact with the cooler rocks in the mine. I have observed the action taking place more commonly in shallow mines where the workings are extended a considerable distance underground.

Beside the disintegrating action of the air on the roof, however, there is another factor that must be regarded as greatly affecting the strength of the roof and causing it to break suddenly. I refer now to the pressure of the gas that may exist in the roof strata. This pressure is often very considerable and far exceeds that of the atmosphere acting to support the roof.

So great is the difference between the possible pressure of the gas in the strata above and that of the atmosphere below, that any slight changes that may take place in the atmospheric pressure will have little influence in determining the tendency of the roof to fall. However, it is conceivable that a sudden diminution of atmospheric pressure may accelerate and assist the action of the gas in breaking the roof.

At times, it may happen that the gas emanates from an overlying seam of coal and extraction of the coal

in the seam below causes expansion of the gas and its pressure is exerted to break the intervening rock separating the two seams. Or a somewhat more impervious stratum may cause an accumulation of gas under a greatly increased pressure and give rise to an outburst in the seam below when the opportunity is offered.

REMEDY WHERE GAS ACCUMULATES IN ROOF

Where the roof is a slaty shale and gas exists in the overlying strata, its pressure will often fracture the roof when driving openings in virgin or solid coal. The breaking of the roof in such instances is caused not so much by the weight of the roof, as by the pressure exerted by the gas. The force thus acting along the line of an opening may have a powerful leverage that will enable it to break a fairly strong roof.

In the working of some fiery seams, I have known holes to be drilled up in the roof to a depth of four or five feet with a view of draining off the gas and relieving its pressure on the roof and rendering the latter less liable to be broken down. The effect of relieving the pressure of gas in roof strata is plainly manifest both in longwall and pillar workings where a heavy roof fall greatly relieves the pressure on the remaining pillars. It is well known that after the first break occurs, in longwall working, it is far easier to control the pressure on the face of the coal and this, in many instances, is largely due to the relief of the gas pressure in the strata above.

Bay City, Mich.

WILLIAM DICKINSON.

Deep Mining in Belgium

Necessity for deep mining of coal in Belgium not due to exhaustion of mines. Desire is to supply coking coal for blast-furnace use and make its steel industry independent of other countries.

Sometime recently, reference was made in *Coal Age* to deep coal mining in Belgium (Vol. 23, p. 722) and in responding to the request for information on that subject, I showed that there were a number of coal shafts in that country whose depths ranged from 1,000 to 1,200 meters, and one reached a depth of 1,240 meters (4,068 ft.)

At that time it was not explained why the mining of coal was carried to such great depths in Belgium. It was naturally assumed by many that coal seams lying nearer the surface had been worked out and exhausted. That such is the case, however, is far from the truth.

Enough coal remains available, at depths between 250 and 750 meters to keep that country's production through several centuries longer at an annual rate of 35 million tons. The present capacity of the mines, however, does not exceed 25 million tons a year, but there is good reason to expect that the higher figure mentioned will be reached before five more years have passed.

The reason why Belgium has sunk many of its shafts to such great depths is solely to reach a good quality of coking coal needed for the blast furnaces and make the country's steel industry independent of foreign supply.

At the present time Belgium produces enough gas, steam and domestic coals to export an appreciable tonnage of these after supplying its own requirements; but it must import 70 per cent of the coal necessary to make the coke needed for its blast furnaces.

Belgium's present supply of domestic coking coal is

limited to the tonnage obtainable from that part of the lower coal measures thrown upward by geologic disturbances sufficiently to permit of their being mined by tunnels driven across the strata from more shallow shafts. But these shafts will soon have to be sunk deeper before reaching the coal lying in regular formation.

A number of the shafts just mentioned have been already deepened or are now being sunk to where the best quality of coking coal is expected to be found—the territory known as the "Great Flats." Some of these shafts will be 5,000 ft. deep before they can develop into good sized operations in the coking beds.

It is of interest to state, here, that the seams found in the lower measures, the coking seams, are those in which have occurred all the outbursts or blowouts recorded in Belgium, since these have occurred there, the earliest on record being in 1847. What is known of these occurrences, their causes and the phenomena that accompany them, encourages the belief that where the seams lie in regular formation, there will be less danger of their occurrence than in the disturbed territory to which operations have been thus far confined.

The "Great Flats" are also expected to present other natural advantages that promise cheap mining; namely, absence of faults, regularity of grades and greater uniformity in mining. In this system of development of their mines, the Belgian engineers have shown foresight and judgment that is commendable. Not only will they be able to produce cheaper coal, but the country will be independent of foreign supplies for maintaining its steel industry.

If present expectations are fulfilled, Belgium will produce a much larger tonnage of coking coal than they will need for home consumption and will be able to export much of the output to France where coking coal is scarce. This will not interfere with their present exportation of gas, steam and domestic coal.

Hoisting and ventilating are the two main problems always connected with deep mining. The first of these problems the Belgians have long since proved they know how to handle. At all the deep shafts in that country hoisting is done by the use of 4-deck cages guided by steel rails and run at a speed of 61 ft. a sec. In the region of Limbourg, a number of new shafts, having diameters of 20 ft. in the clear, are now being sunk. Each shaft is intended to hoist 2,000 tons per 8-hr. shift, from workings operated more than 4,000 ft. deep in the "Great Flats."

Ventilation presents quite a problem owing to the high temperature of the strata at the great depths mentioned as reached or to be reached. Nothing but a large abundance of rapidly moving fresh air will make this temperature bearable for man. Belgian coal seams average less than 30 in. in thickness, which makes it necessary to give the workings a great extension, in order to obtain the large outputs necessary to make such deep and difficult operations pay.

In order to drive large volumes of air through extensive, narrow and complicated openings it requires a high water gage. Fans of the Rateau system, developing water gages as high as 12 in., are coming more and more into use. These fans are capable of circulating 350,000 cu.ft. of air per minute through some of the deepest and narrowest mines of the country. All of the mines in Belgium are ventilated by exhaust fans as this is made compulsory by law.

F. C. CORNET.

Quaregnon, Belgium.

Inquiries Of General Interest

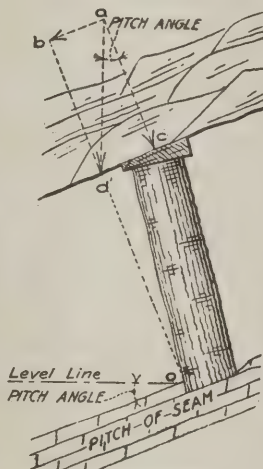
Finding Length of Prop Timber on Steep Pitches

Length of Prop Depends on Amount Timber Is
Underset and Is Independent of Pitch of Seam—
Conditions in Seam Determine Underset of Post

KINDLY explain for our information, through the interesting columns of *Coal Age*, how to estimate the length of a prop that is underset so as to make an angle of 9 deg. with the perpendicular in the seam, assuming that the coal is 6 ft. thick and the seam has an inclination of 54 deg. Also, state if there is any way to determine the underset of a prop in seams of different inclinations, without resorting to the use of a table of sines, cosines, tangents, etc. INQUIRER.

Hiteman, Ia.

Referring to the accompanying figure, the line *od* is normal or perpendicular in the seam, its length being equal to the thickness of the seam.



UNDERSSETTING A
POST INCLINED
BEAM

Extending this line and drawing the parallelogram *dbac*, the diagonal *ad* is a vertical line and the angle *dac* is the pitch angle corresponding to the inclination of the seam. This must not be confused, however, with the angle that the prop makes with the perpendicular, which in this case is 9 deg., while the pitch angle is 54 deg., the inclination of the seam being somewhat greater than that shown in the figure, but the principle is the same in any case.

The amount of the underset of a post must be determined by one's practical experience in the seam in question. While it increases with the steeper inclination of the seam, the underset of a post bears no positive relation to the pitch of the seam, but is dependent on conditions that can be determined only by practical experience in the working and timbering of the seam.

MUST ALLOW FOR THICKNESS OF WEDGE

Having decided on the amount of the underset of a post, or the angle it is to make with the normal in the seam, in any particular case, divide the thickness of the seam, expressed in inches, by the cosine of this angle, which will give the length of the post corresponding to the thickness of the seam. To this must then be added the difference between the depth of the foothold cut in the floor and the thickness of the wedge that is driven between the top of the post and the roof.

For example, taking the thickness of the seam as 6 ft. (72 in.), the corresponding length of a post when set at an angle of 9 deg. with the perpendicular in the seam, is $72 \div \cos 9 \text{ deg.} = 72 \div 0.988 = 72.87$,

or 72½ in. Then, allowing for a foothold of, say 4 in. in depth and a cap-piece or wedge 3 in. thick, the required length of the post should be, say 74 in.

When the amount of the underset of a post is given in inches, as measured from the top of the post to

the perpendicular through its foot, the length of the post corresponding to the thickness of the seam may be found by taking the square root of the sum of the squares of the thickness of the seam and the given underset, expressed in inches.

Examination Questions Answered

Annual Bituminous Examinations, Pa. Foremen and Firebosses

(Selected Questions)

QUESTION—*What are a mine foreman's duties relating to the following: (a) When the mine becomes dangerous through lack of ventilation? (b) Reporting of accidents? (c) Violations of the mining laws? (d) When any workman neglects to carry out or disobeys instructions? (e) In the removal of dangers reported to him? (f) Building of stoppings?*

ANSWER—(a) The Bituminous Mine Law of Pennsylvania requires the mine foreman to notify the superintendent, in writing, whenever he considers the mine dangerous through lack of ventilation and the presence of gas or dust in portions of the mine (Art. 4, Sec. 5).

(b) The foreman must report all serious and fatal accidents, each week, to the mine inspector, specifying the nationality, age and occupation of the victims (Art. 4, Sec. 19). If the accident is fatal, he must likewise notify the coroner of the county (Art. 28, Sec. 1).

(c) The foreman must report to the district mine inspector all violations of the mining law coming to his notice (Art. 4, Sec. 23; Art. 5, Sec. 5).

(d) The foreman must suspend or discharge any workman guilty of neglect to obey or willful disobedience to his instructions and, in case, of serious accident or loss of life resulting therefrom, the foreman must give the name of the guilty party to the mine inspector of the district for prosecution according to law (Art. 4, Sec. 9).

(e) The foreman is required by law to give prompt attention to the removal of all dangers reported to him and if this is impracticable at the time, he must notify all persons in danger therefrom and see that they remain away from the place (Art. 4, Sec. 10). The foreman must see that all entrances to dangerous places are properly fenced off and danger signals posted on such fencing to warn persons to keep out (Sec. 11).

(f) The law requires the mine foreman to see that all stoppings along airways are properly built (Art. 4, Sec. 2). He must see that, in a mine generating gas and where the fireboss' station is located a mile or more from the mine entrance, all abandoned workings in the intermediate distance are completely sealed by stoppings of masonry, concrete or other incombustible material (Sec. 5). In all new mines, the stoppings between the main intake and return airways must be substantially built of masonry, concrete or other incombustible material; and the same requirement applies to the building of new stoppings or the renewal of old

stoppings in cross-entries, in mines generating gas (Art. 9, Sec. 5).

QUESTION—*Write a mine foreman's daily report that will satisfy the requirements of the mining law, assuming that at least three violations of the law existed in the mine that day, selecting your own violations.*

ANSWER—I have this day, July 23, examined the section of the mine in my charge and found the same in a safe and healthy condition, except in the following three instances: 1. In room No. 9, 2E-N entry, I found an extra charge of powder laid aside in the gob. 2. There was no timber on hand in room No. 13, 4E-N and I find no order received for timber for this room. Timber is clearly needed in the room, as the last row of props at the face is not completed. 3. Matches were found in a crosscut near a tool box a short distance from the head of main north entry. The first instance is in violation of Art. 16, Sec. 1, of the law; the second instance violates Art. 25, Rule 1; and the third instance violates Rule 32 of the same article. In each of these cases, I have taken possession of the checks of the men working in the places and shall investigate further.

QUESTION—*In non-gaseous mines, what precautions should be taken to reduce to a minimum the dangers incident to coal dust?*

ANSWER—No accumulations of dust must be allowed in any working place. Where the coal is cut by machines, the fine cuttings or "bug dust" must be loaded out in dustproof cars. If the coal is highly inflammable and is brought down by blasting, only permissible powder must be used and strict rules enforced in regard to charging and firing the shots. All places should be well watered before any shots are fired therein. Holes should be examined by competent persons before they are charged and permission is given to fire. Greater safety is assured, in the mining of a soft inflammable coal, when competent shotfirers are employed to examine, charge and fire all shots after the men have left the mine. In any case, all roads, travelingways and air-courses must be thoroughly cleaned at regular intervals. Strict rules must be made and enforced relating to blasting and all violations of the rules and requirements of the mining law suitably punished.

QUESTION—*In a mine that is generating or is likely to generate carbon dioxide (CO₂), what kind of lamps would you recommend to be used by the workmen?*

ANSWER—If the mine is not generating or liable to generate explosive gas and rightly classed as an open-light mine, open-flame lamps or torches should be used throughout the mine. Owing to the generation or liability to the generation of carbon dioxide in dangerous quantities, no carbide lamps should be permitted in sections generating that gas or in places running to the dip where the gas is liable to accumulate. It is well known that the carbide lamp may continue to burn in air that is deficient in oxygen to an extent as to be unhealthy if breathed for any length of time. The open flame lamp will show by its dim burning that the air is unfit to breathe because of the presence of blackdamp, and will thus give timely warning.

Coal Commission Investigators Report on Labor Relations in Anthracite Industry

A report dealing with labor conditions in the anthracite industry issued by the U. S. Coal Commission Aug. 8, in the main reiterates the recommendations presented by the Commission in its preliminary report of July 9, and adds others. The recommendation that the President should have the power to intervene if the opposing forces cannot come to an agreement before the expiration of the working agreement is repeated, as well as that recommending that the expiration date of the anthracite agreement shall be set sufficiently far from the renewal date of the bituminous agreement that suspension in both coal fields at one time shall not be invited. It condemns strikes and warns the union leaders against the outlaw labor disturbances, and opposes the propaganda issued by both operators and miners, characterizing it as "loose and often swashbuckling literature."

While not mentioning the check-off the Commission in its recommendations does say that "if the union is wise it will not permit the employer to take over the duty of securing members."

Dealing with "Anthracite Coal—A Vital Public Necessity" the Commission says the frequency with which labor has stopped production of anthracite, the disregard of public interest shown on occasion in the attitude of one or the other side of the parties to these controversies and the apparent impotence of the public to protect itself, has created a situation that the public considers intolerable. The demand for some sort of remedial public action is practically universal. Periodic strikes and the ever recurring menace of strikes emphasized by loose militant utterances on both sides is a condition that should be corrected.

The report reviews the organization and procedure of industrial relations from the first appearance of labor unions in the field in 1848, going more fully into conditions since 1903, and dealing particularly with the award of the Roosevelt Anthracite Coal Commission.

The operators have no organization for dealing directly or continuously with the union during the agreement period, says the report.

The more important causes of strikes and the friction which leads to strikes the report says, appear to be the following:

Attitude toward the agreement; wages; hours; irregularity of operation and attendance; attitude toward restriction of output; discharge and discipline; union membership; and administration, and then it discusses each at length.

Out of over fifty responsible operator executives interviewed, only two expressed themselves as opposed to the idea of an agreement with the union. Union officials held identical views toward the agreement and among no essential group in the union was there any advocacy of abolishing it and taking whatever the union could get without it.

From the standpoint of performance under the agreement, there are five groups of operators: A group with a liberal constructive labor policy that stands firmly for the maintenance of operator rights under the agreement but seeks to understand and win labor by constructive measures; a "peace at any price" group, who make concessions which give away essential rights of the operators under the agreement; a group of companies with little central control whose labor policy is the policy of their respective foremen; a literal constructionist group which energetically and literally supports the letter of the agreement and frequently maintains its opposition by its defensive power rather than through organized efforts to win co-operation, and lastly a group that tries to "get away with things" by whatever method possible, agreement or no agreement. These five groups, the report says, are not to be considered as mutually exclusive, one operator may at different times be found in several groups. In the union side the practice toward the agreement is in many places, in similar contrast

to their theoretical views. All the district leaders show real knowledge of the contract and of their responsibilities under it. They realize that strikes are outlawed and that it is their duty to prevent them and even to discipline locals who go out in violation of the contract. But all believe in the threat to strike and in practice they make exceptions to their condemnation of some strikes, especially of button strikes. In general, says the report, where they consider orderly method is inadequate for the relief of a real grievance, they tacitly sanction the resort to strike.

Stating that it is difficult to get comprehensive information about petty strikes and stoppages direct from the operators and the union, owing to the inadequacy of records, the Commission says the Anthracite Bureau of Information submitted a statement showing there have been sixty-eight strikes or stoppages in the period from September 1922 to March 1923 involving a total of 56,646 men with a loss of 188,514 man days.

The report shows that the anthracite industry has changed from one in which one of the foremost characteristics was its irregularity to one which compares favorably with most industries in this respect. The change is particularly marked in contrast with the lack of change in the bituminous industry, for the anthracite industry is now much more regular than the bituminous industry.

Discussing the attitude toward restriction of output, the report says that "without doubt, limitation of output does exist," that the amount varies by districts but does not seem to be an important problem in two of the three anthracite districts. The problem will not be solved, says the report, by denunciations, but through careful study by operators and union leaders of the factors which enter into a fair day's work and of the causes of undue restrictions.

Discussing union membership, the Commission says, the agreement between the anthracite operators, and the union is mutually accepted as a permanent institution and that the acceptance carries with it certain implications, the most important of which is that neither party during the life of the agreement will try to destroy the power of the other party or to assume the other's responsibilities or rights under the agreement. There is in the agreement no provision which can be interpreted to justify the union in forcing the operators to insist upon membership in the union as a condition of employment. Union miners, however, do insist upon membership and they enforce their insistence by stopping work.

"What practice should obtain in respect to union membership under a collective bargaining agreement is a debatable question," says the report, "the answer which should be arrived at by agreement or mutual accommodation between the parties. But any answer which relieves the union of responsibility for maintaining itself, and thus divorces the question of membership from the services rendered, is bound to be harmful to the union, not to mention the other interested parties. Unions like other institutions slip easily into arrogance and incapacity when existence is made too easy. Such a condition is sure sooner or later to make them a prey to attack both within and without."

The practice of the illegal strike or threat to strike to enforce union membership, the condoning of such strikes by those union officers who are obligated to prevent them, and the acquiescence in them by those against whom they are directed should be promptly and vigorously dealt with through the conciliation machinery, declares the report.

"Administration of Labor Relations" is next discussed and it is pointed out that each of the three parties to the agreement, the operator, the union, and the public, has a definite share of responsibility, and that the way in which these administrative relations are discharged makes for friction or the absence of friction.

"Such a collective bargaining agreement as exists in the anthracite industry," says the report, "cannot be maintained by police or statutory power, but can be maintained

only by the sense of responsibility and approval in each party to the agreement, backed on either side by an organization powerful enough and effective enough to command the respect of the other side and of its own members. On the union side, such an organization exists, for the union is the organization. When an operator violates the agreement, the whole weight of the union is thrown back of the effort to adjust."

There is no such organization among operators, they having no collective organization that functions from day to day to administer the operators' share of the agreement. So long as this disproportion in bargaining effectiveness exists, the process of attrition of the agreement will be likely to continue, says the report.

"Moreover," says the report, "another period of great strikes is likely to ensue corresponding to those between 1900 and 1912. This time, however, it will probably be the operators instead of the union who will be appealing to the public for fair play."

"It is our opinion the operators will not be in a position to take full advantage of their opportunity in the administration of the agreement," says the report, "unless there is, within each district an organization of the operators analogous to the union and constantly represented in labor adjustments by a competent man, or else an organization for the operators as a whole which is represented in each district by a competent labor adjuster. Such a man from the operators' side would correspond in his function to the union's district president and would be analogous, in adjustment proceedings, to the labor commissioner in some bituminous districts.

Referring to delays in the handling of dispute cases the report says there can be no question but that the long run interest of all parties is in the maintenance of the orderly method. To the public it means stability and cheaper coal. To the operators it means the limitation of direct action

and the threat of direct action. To the union it means the habits of law and order which alone permit the responsible management of a union necessary for its survival. Unnecessary delay in adjustment amounts, therefore, to playing with fire.

Discussing "Administration by the Union" the report says that a union fighting to establish itself in the face of powerful opposition is ordinarily a fighting organization pure and simple, but when it reaches the point of signing a formal agreement with employers it has ceased to be exclusively a fighting organization. It then takes over, together with definite advantages, definite responsibilities for maintaining relations on the agreed basis. The responsibility for seeing that the agreement is observed by the union must rest on the district and national officers.

That part of the machinery set up by the Roosevelt Commission may be regarded as the public's part in the administration of the agreement, says the report. A common complaint made by both operators and the union is over the delays centering around the functioning of the conciliation machinery, but the Commission declares that inadequate functioning should never afford an excuse for violation of the agreement. It then makes several recommendations concerning the work of the Conciliation Board. The best approach to a remedy for the evils of the general strike, will not, in the Commission's judgment, be found in an immediate resort to drastic prohibitory measures. The weight of opinion found among operators and union officials is that compulsory arbitration of the fundamental terms upon which a great industry shall operate, is not practicable, and offers no hope of solution of the problem of the general strike. Until measures for holding both sides to their public responsibilities have been completely exhausted it will be extremely unwise for the public to embark on more far reaching measures of regulation of labor relations.

Warriner Answers Massachusetts on Boycott

S. D. Warriner, Chairman of the General Policies Committee of the Anthracite Operators, on Aug. 11 replied to the open letter on Aug. 4 of the Joint Special Coal Investigating Committee of Massachusetts. He gives the position of the Anthracite Operators in the present situation and offers "a plain explanation of the vital issues involved and the causes leading to the present situation," which he hopes will clarify their judgment and assist them in fixing responsibility. The Committee emphasized two points, the danger of another suspension on Sept. 1 with the resultant shortage of anthracite, and the high cost of anthracite to the people of Massachusetts and the proposed boycott against the industry. Mr. Warriner in his letter takes up these matters in order, stating that one is naturally the corollary of the other. His statement follows:

"I am in accord with your view that a suspension of mining for the benefit of a special interest and to the detriment of the public is never justifiable. Let us review the facts. The strike of 1922 was ordered as a predetermined act before the old agreement had expired and before the joint committee appointed to negotiate a new agreement had even met. The operators offered arbitration. The President of the United States urged arbitration.

"The union refused both and said, 'We refused arbitration from the President of the United States notwithstanding all the pressure of the Government was back of the proposal.'"

"As soon as the major policy of the union was satisfied by the settlement of the bituminous strike, a settlement of the anthracite was made possible and promptly reached.

"The issues in the present emergency are as follows:

"1. The operators at the outset asked for a joint pledge to the public that no suspension take place on Sept. 1, upon the understanding that the new agreement should be retroactive. The United Mine Workers refused.

"2. The operators endeavored to reach an adjustment of wages and working conditions, but the United Mine Workers refused to continue negotiations, unless the operators first granted the closed shop with the check-off.

"3. The operators refused to grant the closed shop with the check-off.

"4. The operators offered to extend to April 1, 1925, the present contract with its war-peak wages and to grant certain of the union demands. This offer was not accepted though the United States Coal Commission found that present earnings admit of a reasonable standard of living.

"5. Finally, the operators offered to arbitrate all issues, not even excepting the closed shop with the check-off.

"The mine workers refused four of these propositions and the operators one, viz: the closed shop with the check-off. Our objections to this proposition are that it is fundamentally unsound in principle, and expensive to the users of anthracite in practice. Our faith in our position is shown by our willingness to arbitrate. Without a surrender of vital principles, we have taken every step that has been suggested to avoid a suspension on September 1. To have done otherwise would justly open us to your criticism.

"In our judgment arbitration represents a sound social policy in a basic industry where collective bargaining fails.

"Relative to the cost of anthracite and the use of the boycott: The United States Coal Commission pays tribute to the anthracite operators for their restraint and co-operation with public officials during the anxious situation of last winter resulting from the strike, and the care used in the distribution of coal. It is our hope that, if continuity of operation can be secured, the economic ills of which you complain will disappear. It is true that the cost of anthracite has risen, but although it has not receded from the peak, yet it is a fact that the peak of anthracite prices was never as comparatively high as many other commodities. The reports of the United States Coal Commission including its later report on retail distribution thoroughly covers the subject and invites your study. You are quite correct in saying that anthracite is not a necessity. We frankly admit that in order to retain the asset of your markets we must compete in quality and service with other fuels.

"In conclusion, let us now repeat that we have always been ready in the present emergency to extend the old agreement, to resume negotiations or to arbitrate to the end that there be no suspension of mining this year."

The Union Ultimatum: The Check-off or No Anthracite

The check-off or no anthracite, that is the ultimatum of the United Mine Workers of America to the anthracite operators and the American people, according to a statement issued this week by the anthracite operators. Extracts from the statement follow.

"They refuse the operators' offer to arbitrate any and all issues. They refuse to consider wages or working conditions until this demand is granted. They insist on what no other union demands. Negotiations are necessarily brought to an end. If government attempts to take over the mines, the same ultimatum will be outstanding, for the union grievance is against its delinquent members, and not the operators. In either case a strike for the check-off, the operators are advised, would be a violation of the Anti-Trust Laws.

"The crisis embraces more than a menace of a coal shortage, for it raises questions which go to the very heart of our concept of political and social rights. It has also a very practical bearing on the question of mine management and the cost of production. The public is entitled to be heard. To it the operators submit their reasons for refusing this demand. They believe they have no alternative.

"The check-off is a scheme for compulsory union membership whereby the employer collects union dues and assessments by deducting them from the wages of his employees. No man can be employed who is not a union member and whose wages are not so docked. The president of the union says that under this regime if a miner does not join the union he can "dig oysters in Florida." The wishes of the individual employee are not considered. All wages must be taxed to meet union requisitions in whatever amount union authorities direct.

This demand, for the enforcement of which the United Mine Workers are prepared to deprive the public of anthracite, involves a monopolistic agreement between the union and all anthracite operators, making membership in the United Mine Workers compulsory for all persons throughout the entire industry, except clerical and managerial forces.

"The demand militates against our principles of liberty, runs counter to the statements of the Presidents of the United States and Federal Administrations for over twenty years, and is in conflict with the rulings and practices of our Federal government as well as the decisions of many State courts forbidding the State and its political subdivisions to discriminate against union or non-union men.

"The United Mine Workers have been guilty of violating the anti-trust laws, and its avowed policies are aimed in that direction. It has the express authority, under its constitution, to call general strikes, which stop all commerce in coal, and, in 1922, did declare such a general strike, clearly in violation of the Federal Anti-Trust Law.

"By its recent refusal to pledge itself to the public as against another anthracite suspension, by its threat of a suspension unless it be given a monopoly, by its avowed policy of resorting to a national tie-up rather than accept the principle of arbitration in cases where collective bargaining fails to reach an agreement, by seeking arrangements with unions in other countries to prevent America from importing coal in time of emergency, this union is committed to a policy in violation of the Anti-Trust Laws and against the public interests.

"If the operators weld this union into an ironclad monopoly, charges that they encourage general strikes by that monopoly in order to create a market shortage will not lack ready utterance and belief.

"As long as the United Mine Workers avow its policy of resistance to arbitration and a resort to national strikes in case of disagreement, the operators cannot escape responsibility for such conduct, if by agreement they actively lay the foundations for more protracted coal famines.

"The anthracite operators have demonstrated their approval of collective bargaining where men voluntarily get together but cannot approve collectivism based on coercion which forces men to join an association and combine against their wills.

"This right of industrial liberty is no vague abstraction advanced for convenient purposes, but a fundamental reality, the practical importance of which is shown in many unionized industries where individual workmen have been persecuted and arbitrarily driven from their trades.

"Under the closed shop regime, what becomes of the numerous miners who are expelled for various periods up to 99 years and are fined various sums up to \$2,000? What becomes of those who wish to enter the industry and cannot pay the exorbitant initiation fees which are sometimes charged? What becomes of the various nationalities against which local unions discriminate? What becomes of the miners fined or expelled for exceeding the union limit of production?

"The records of the United Mine Workers, giving only an incomplete report of disciplinary action taken by the union in a period of sixteen weeks, shows over 600 men expelled for 99 years and over 40 men fined \$1,000. In the same period the penalties showed 1,236 members were fined a total of \$171,852 and exiled from their trade for a total of 66,784 years.

"Individual self-reliance and responsibility and individual incentive are gone and lock-step becomes the rule when all of the doors of opportunity are slammed in the faces of those who, rightly or wrongly, disagree with an organization which monopolizes the entire industry.

"Nothing that the operators do or have done is advanced as an argument in support of the demand to change this traditional policy. The union merely seeks the help of the paymaster to coerce delinquent and recalcitrant miners. It proposes to deprive the public of anthracite, because perchance some miners are slow to pay their dues. Like a jurisdictional strike, it is a quarrel within the union, with the operators and the public innocent bystanders, conscripted to play a part. The non-combatants are to suffer in this issue.

"Should monopolistic power be strengthened in an organization which has adopted the fixed policy of rejecting arbitration and preferring public suffering? Will the American people sanction more monopolistic privileges to an organization which gloats over its defiance of the Chief Executive and which, according to that executive, so largely has the country at its mercy? Have the people forgotten how, but a few years before President Wilson declared the activities of this organization to be 'not only unlawful but unjustifiable,' and exoriated it for breaking its contracts? Is there any important union in the United States so inconsiderate of the public?

"All of these matters were presented by the operators to the United States Coal Commission in a series of papers which so far as we know met no contradiction from the Union. These papers showed that the organization had no adequate sense of responsibility to the public, the operators, its members, or its contracts and that this lack of responsibility was due to a lack of legal and moral restraint and continued immunity from the consequences of its wrong-doing.

"We believe that the way out of this trouble is through it. That the American people should resolutely resist this demand coupled though it be with the threat of a nationwide tie-up. It is unwarranted by conditions in this industry. The judgment and experience of all industry are against it. In places where it has been tried the results have been disastrous and industrial warfare exists in extreme form.

"To grant it would mean an illegal combination and an abandonment of individual rights contrary to the declarations of the Presidents of the United States for over twenty years as well as a repudiation of the principles of the Roosevelt Award of 1903. It would extend the monopoly of the United Mine Workers of America, notwithstanding its practices have been under the condemnation of ex-President Wilson and President Harding, at a time when irresponsibility and a ruthless defiance of public interests dominate its policies."

What Is the Human Body Worth?

Posted in many thousand mines and workshops throughout the United States are notices, telling employees that they are protected by the provisions of their various state compensation laws. Lest any should not see and understand them, these notices often are printed in several languages. Yet in different states, there are various legal and medical interpretations of the 42 workmen's compensation laws now in force, the laws themselves having taken on widely different meanings in questions of personal injury and other accidents.

In an effort to call attention to these disagreements, which are constantly being brought before the State Legislatures and courts, the National Industrial Conference Board, New York, has just completed an exclusive report on the medical phase of workmen's compensation acts in the United States.

Every workmen's compensation case is a medical case, either actively or potentially. The Board points out that time must be lost from work because of injury to entitle a worker to compensation and this presupposes medical attention in practically all cases. The medical problem is one of the first to be encountered and one of the most important to settle in a manner satisfactory to all. At present there is so much conflict among the different states' administrative laws, and such a lack of facilities for collecting the information on this question, that the report was undertaken by the National Industrial Conference Board as a new contribution to this vital American problem.

Identical injuries are compensable in widely varying amounts in various states, and there is a similar inequality in the courts' interpretation of identical sections of the various laws. What is needed most in the administration of the workmen's compensation laws, in the opinion of the Board's experts, is greater consideration of the opinion of medical men in the administration of the laws and more uniform opinions among those concerned with their administration.

There is an increasing tendency to give due consideration to the value of adequate medical treatment in the administration of the laws. Early in their administration, the doctor's part received scant attention. In some states, even for the most serious injuries, only two weeks' medical treatment could be legally provided. "A period of experience has now elapsed," says the report, "sufficient to enable those who make the laws and those who administer them to obtain a better view of the problem. Such experience has shown the advisability of greatly increasing both the time and amount of medical service rendered, until at this time in 20 states such service may be unlimited."

The term "medical service" receives widely different interpretations in various states. Ohio and Connecticut have freed employers from liability when injured workmen took their troubles to quacks, masseuses and "doctors of medical electricity." Similarly the California State Commission refused to reimburse a worker who consulted a Chinese herb doctor. Iowa and Connecticut do not regard osteopaths as qualified to act in compensation cases, while California permits them.

States differ in the law's rulings on various surgical operations. For instance, the hand extends to the elbow in the legal opinion of Alabama, Connecticut, Delaware, Kansas, Nebraska, New York and other states, while it extends only to the wrist in Colorado, Idaho and Montana. The human foot in Colorado extends only to the ankle, but in Alabama it extends to the knee. New York takes a middle ground, merely qualifying it as some place "between the knee and the ankle."

Various state courts and commissions have answered in various ways the question: "What is the human body worth?" For example a thumb is worth \$225 in Wyoming, \$600 in Oregon, and in New York and Alabama the legal compensation for 60 weeks. Wyoming holds a human hand worth \$1,000, while its value rises to \$1,600 in Washington, \$1,900 in Oregon and 244 weeks' compensation in New York, and it is worth 104 weeks' compensation in Colorado.

Union Issue No Swashbuckling Publicity, Says Ellis Searles

Considerable resentment is displayed by Ellis Searles, editor of The United Mine Workers Journal, at the following statement in the report of Dennison, Hotchkiss and Willits on Labor Relations in the Anthracite Industry made public last week by the Coal Commission which says that "The loose and often swashbuckling literature that emerges on occasion, from the legal and publicity departments on both sides is a constant incitement to trouble," and to the mention of "irresponsible propaganda" and "misleading information."

In a communication to the Coal Commission dated Aug. 11, Ellis Searles, John Moore and Thomas Kennedy asked the commission whether this document is "merely the report of the investigators to the Commission or whether it is a statement of the Commission to the public." They asked "Has the Commission adopted the document 100 per cent as a declaration of the views of the Commission? Did the Commission authorize these investigators merely to conduct an inquiry or did the Commission delegate to these investigators authority to prepare binding conclusions on this important subject for the Commission and its members?"

The representatives of the mine workers emphatically informed the Commission that their organization does not indulge in swashbuckling literature with reference to the industry nor has it issued any irresponsible propaganda or misleading information on that subject. Since it has employed no legal talent in the preparation of its statements to the commission, the authors of this statement "anticipate that the answer will be that the operators had a legal department and that the reference was intended to apply to propaganda issued from that source." These representatives of the miners served notice on the Commission that they do not think much of this report on labor relations if it is "as accurate on other subjects as it is on this one."

The members of the Commission are reminded that they "specifically requested the United Mine Workers of America to refrain from hiring lawyers to present their case to the Commission." They state that

"The United Mine Workers have had no propaganda or publicity, neither 'swashbuckling,' 'irresponsible' nor any other kind about anthracite."

Concluding they say they have no excuses or apologies for anything that the United Mine Workers of America have said to the public in regard to either the bituminous or anthracite industry. It has kept well within the bounds of truth and propriety in this matter according to Mr. Searles.

Civil Liberty Committee Condemns Private Guards in Mine Villages

Winthrop D. Lane, whose writings on the West Virginia coal industry are well known, has just published a report, submitted to the U. S. Coal Commission on Aug. 12, which he prepared for a self-styled "Committee of Inquiry on Coal and Civil Liberties." The sponsors of the report are said to be Zachariah Chafee, Jr., Professor of Law at Harvard University; Prof. Herbert A. Miller of Oberlin College; the Rev. John A. Ryan, Director of the National Catholic Welfare Council of Washington, D. C.; the Rev. Arthur E. Holt, Social Service Secretary of the Congregational Church of Boston, and Kate Holladay Claghorn, head of the Department of Social Research of the New York School of Social Work. Jerome Davis, Assistant Professor of Sociology of Dartmouth College, assisted Mr. Lane.

The report covers conditions in parts of Pennsylvania, West Virginia and Alabama. It particularly is directed again the private guards employed by coal companies in non-union fields.

COAL AGE INDEX

THE INDEXES to COAL AGE are furnished free to all who ask for them. The index for the first half of 1923 is now ready for distribution. A copy can be had by addressing a postcard to the subscription department of COAL AGE.

Washington Moves to Prevent Anthracite Strike

On Monday the Coal Commission invited the anthracite operators and the representatives of the United Mine Workers to meet with the Commission in New York. This is the first step toward prevention of a strike in the anthracite field that has been impending since the hard coal mine workers issued their ultimatum on July 27 that negotiations could not proceed unless the operators granted forthwith the check-off. It is understood that this action follows the wishes of President Coolidge, with whom the commissioners have outlined the problem. What proposition the Commission will put before the two sides is not announced, but it is understood that the administration has made up its mind that there shall be no strike and that this will be the burden of the communication borne to the contending parties.

Events at Washington moved fast last week toward intervention by the President in the anthracite deadlock. Among the callers President Coolidge has had since he moved to Washington nearly two weeks ago, those with counsel on the hard coal situation have been the most numerous. John Hays Hammond, chairman of the U. S. Coal Commission saw the President for a short time early last week. Commissioner Smith called on Saturday, Aug. 11. Samuel Gompers has been at the executive offices twice in a week. Former Senator Calder and Representative Treadway have called, it is understood, to lay before the chief executive their views on the situation. Secretary Hoover and Commissioner Eastman of the I. C. C. talked with the President on the same subject, it is reported.

Commissioner Smith left for Gloucester, Mass., Saturday night to confer with Mr. Hammond, returning the next night. Mr. Hammond at once gave out a statement saying that the president will back the Coal Commission. His statement follows:

"I discussed the situation with the President recently and so did Dr. Smith. We found the President in accord with us and were convinced that the commission will receive his unqualified support. We have complete confidence that the situation can be handled.

"The commission believes, that neither the operators nor the miners will assume the responsibility of a lockout or strike. We realize that both are men of serious minds and realize the position they would be in before the public if a

suspension of anthracite mining occurred. Both sides realize that a suspension of operations in the anthracite mining field would afford an opportunity to the bituminous miners to dispossess them of a large part of their market for anthracite.

"Irrespective of whether there is a suspension of mining after Sept. 1, the anthracite operators realize that they must in the future meet serious competition with substitutes in their market. Recognition of this fact certainly will be a deterrent to both operators and miners in assuming responsibility for any suspension.

"Further, the commission has been busily engaged in preparing for a possible contingency by studying the sources of supply of coke and low-volatile bituminous coal. The commission feels assured that if the emergency exists, the bituminous mines will be able to supply other kinds of fuel. Not only will the use of other kinds of fuel prevent the people of Massachusetts from freezing to death this winter, but it would have considerable effect in preventing any increase in price, if not, indeed, resulting in lowering the price of anthracite in the near future.

"There is no justification whatever for anthracite dealers asking a higher price than has been obtained during the last few months, nor will the payment of higher prices assure a supply of anthracite if a suspension of mining occurs. If a strike occurs there will be no anthracite available at any price. Even if a strike should occur it would not be a protracted one, because a strike can be broken by the use of substitutes without any great hardship."

The news from the hard coal fields is to the effect that the issue of the check-off is not popular with the men. It is generally known that John Lewis chose this as an issue and issued his famous ultimatum to the conferees at Atlantic City without consultation with his confederates. The mine workers are more interested in higher wages than feeding money to the union and the trade has already discounted the final settlement as an abandonment of the check-off issue by the union and a settlement with a small increase in wages. Just how this is to come to pass is not being prophesied, but it is expected that there will be a short suspension, for effect.

Coal Commission Curtails Retail Study

The United States Coal Commission made public the following statement on Aug. 6:

"There seems to be a lack of information as to how far the United States Coal Commission has gone in the anthracite and intends to go in the bituminous industry with reference to the retailing of coal.

"To set the matter right, the Commission announces that it soon discovered that with more than 40,000 retail coal dealers in America, many of whom had their coal business complicated with other articles of merchandise, the appropriation would not permit a presentation relative to the investment, cost, margin, and profits of each of these dealers.

"The Commission has done all that it could in the way of sampling in many of the municipalities of the country the retail coal trade, and will present the result of its investigation to the country, but it has not gone and cannot go into an investigation of all the retail coal dealers of America. An investigation of such a character could not be made short of \$2,000,000, and would not be conclusive whether the citizens of a municipality were satisfied to pay the prices charged by the retailer for coal.

"Therefore, the Commission has concluded that except as to the general investigation of the subject of the retail trade, it will have done all it can when it furnishes the information as to cost at the mine. The railroad rate is easily ascertainable.

"Citizens and municipalities must do something for themselves. If they believe that they are paying to the retailer an exorbitant profit, they should supplement the work of the Commission by local investigations of the subject.

"It heartily approves all investigations that are being made to ascertain the profits of retailers in individual municipalities, the determination of profits, and any suggestions that can be made for the bettering, if needful, of conditions disclosed in the investigation of the subject."

Lehigh & Wilkes-Barre Coal Sale Approved

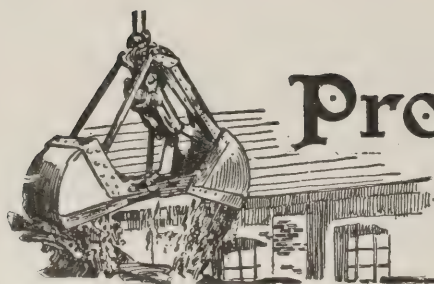
The sale of the Lehigh & Wilkes-Barre Coal stock by the Jersey Central to the Reynolds syndicate was approved by the United States District Court on August 8.

The Court dismisses the objections of Isaac T. and Mary T. W. Starr that the stock was sold to the Reynolds syndicate for an inadequate price and in violation of the dissolution order because there had been an agreement between the directors and Reynolds that the coal tonnage would be continued over the Jersey Central.

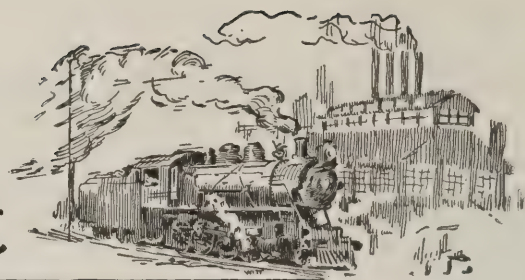
Judge Davis, who wrote the opinion, said in part: "Fraud has not been proved and the price was not so inadequate, if inadequate at all, as to be a badge of fraud. The directors acted in good faith and used their best judgment and in the absence of fraud the Court will not substitute its judgment for that of the directors."

The Court points out that there is a difference of less than a quarter of a million dollars between the bids of Reynolds syndicate and the Lehigh Coal & Navigation Company for a property worth at least \$32,000,000. The burden of establishing that stock was not sold in good faith or at a fair market value was not met by the objectors.

Plaintiffs in the Lehigh & Wilkes-Barre Coal case have six months in which to appeal from the decision of the Federal Court approving the sale of the Jersey Central stock to the Reynolds syndicate.



Production and the Market



Weekly Review

The middle of August may be considered to mark the turning point of this season's soft coal summer market. From the beginning of the coal year last April a steady demand has been met by a steadier supply and the spot price has continually softened. There have been few periods when soft coal production has been as uniformly high as it has been this year and the price so uniformly low. Figures published from time to time by the Geological Survey show that the demand has been quite generally distributed—no field has taken an exceptionally large share of the trade and none has suffered, in tonnage, disproportionately.

The general state of business, starting out with great promise early in the year has lived up to expectations. A slump in July from which recovery is now in progress was anticipated. It was a slump only by comparison with May and June, for as compared with other years the records were high. There is abundant indication that the fall business all around will be good. That means that consumers will need the stocks of soft coal they have been putting down this summer and that buying during the next two months will depend on what happens to price. The trade is looking forward to a period of car shortage within the next forty days that will serve the useful purpose of stiffening soft coal prices to where there is a new dollar to be had for the old on spot sales.

COKE PRODUCERS WATCHING SITUATION

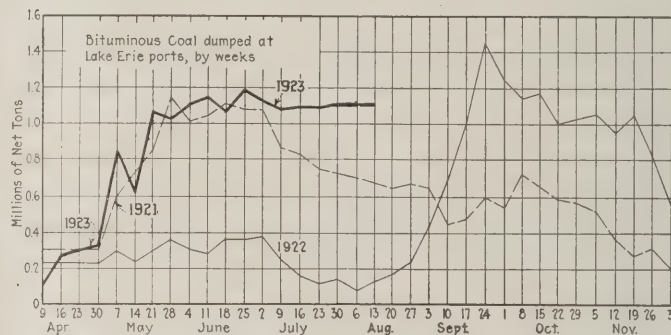
For the next few weeks the market will be unsettled to the degree that a strike in the anthracite region is in prospect. If it appears that a prolonged suspension is inevitable that fact will react on the bituminous coal market, stiffening prices in the East. Coke producers are watching this situation with interest, because coke will be the substitute in greatest demand.

Production of both anthracite and bituminous coal was curtailed last week out of respect for President

Harding. Mining in all fields was generally suspended on Friday, Aug. 10, the day of the funeral at Marion, Ohio. The Geological Survey reports that during the week ended Aug. 4 anthracite production is estimated at 2,018,000 net tons.

Coal Age Index of spot prices of bituminous coal gained one point to 196 on Aug. 13, with an average price of \$2.37 at the mine.

There is practically no change in the Chicago market. Southern Illinois screenings were a trifle steadier and domestic demand grew gradually. A fairly brisk market exists for anthracite and for domestic smoke-

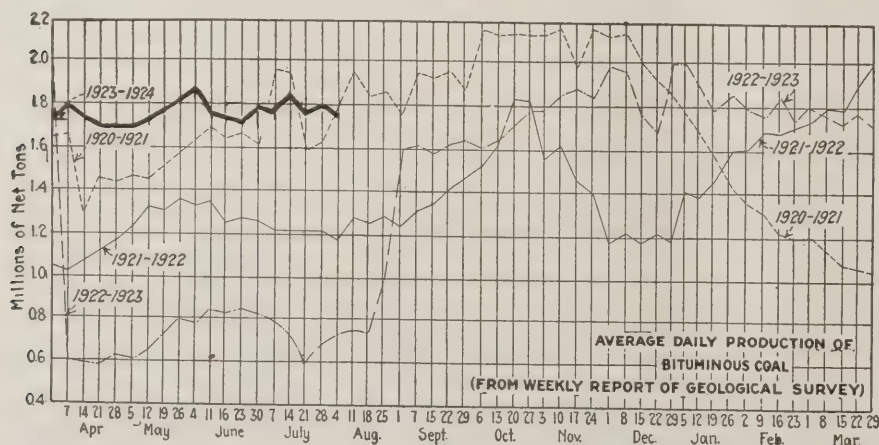


LAKE COAL DUMPED
(Net Tons)

	Week Ended Aug. 13	Season to Aug. 13
Cargo	1,047,197	16,019,285
Fuel	54,126	805,806
Totals	1,101,423	16,825,091

less coals in Chicago and vicinity, while the St. Louis dealers are doing practically nothing. In New England buying is almost at a standstill and consumers seem content with their present reserve stocks.

The anthracite situation continues to increase in activity. With Sept. 1 drawing closer consumers are becoming anxious about their winter coal. Although



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
July 21	3,692,000	10,676,000
July 28 (b)	3,952,000	10,804,000
Aug. 4 (a)	4,313,000	10,579,000
Daily average	719,000	1,763,000
Calendar year	207,608,000	324,998,000
Daily av. cal. year	1,131,000	1,776,000

ANTHRACITE

July 21	28,000	2,005,000
July 28	27,000	2,080,000
Aug. 4	29,000	2,018,000
Calendar year	23,464,000	60,903,000

COKE

July 28 (b)	111,000	361,000
Aug. 4 (a)	110,000	345,000
Calendar year	3,738,000	11,888,000

(a) Subject to revision. (b) Revised from last report.

retail dealers have comparatively little of the domestic sizes in their yards they admit having received heavy shipments during the summer, all of which have been applied on customers' orders. The steam coals are moving in good shape. All three sizes gained strength during the past week and some heavy buying of the better grades of independent product was done.

Lake shipments continue to average near 1,000,000 net tons weekly. Reports from Ohio indicate that the congestion at the lower lake ports is gradually passing away.

Dumpings for all accounts at Hampton Roads during the week ended Aug. 9 amounted to 397,173 net tons, a decrease of 41,560 tons when compared with the previous week.

Midwestern Business Moves Slowly

Coal trading on the Chicago market continued at mediocre pace during the past week without important changes

in quotations. Southern Illinois screenings steadied a trifle so that few if any sold under \$1.50 and the average ran around \$1.65@1.75 and eastern smokeless began to get tighter. Domestic demand grows gradually. Orders are signed for shipment early in September at prevailing prices to outlying dealers, while city yards continue to buy a little here and there at rock bottom. Mine running time in Illinois and Indiana is a little improved since two weeks ago when railroad orders slumped off leaving the industry at its lowest point.

While anthracite and domestic smokeless business is fairly brisk in Chicago and vicinity, it remains quiet in St. Louis. There, dealers are doing practically nothing. There is only about 15,000 tons of anthracite in storage in St. Louis and inquiry has dropped off entirely. Neither is smokeless or coke in demand. Country trade in both steam and domestic is flat.

Illinois fields generally are quiet because of the lightness of railroad demand. Southern Illinois is centering its efforts on domestic sizes with a trifle of success. Association prices on lump are still quoted at \$4.10@4.35 with independents running down to \$3. The Du Quoin and Jackson

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

		Market Quoted	Aug. 14 1922	July 30 1923	Aug. 6 1923	Aug. 13 1923†			Market Quoted	Aug. 14 1922	July 30 1923	Aug. 6 1923	Aug. 13 1923†
Low-Volatile, Eastern							Midwest						
Smokeless lump.....	Columbus....	\$6.15	\$5.85	\$5.85	\$5.75@	\$6.00	Franklin, Ill. lump.....	Chicago.....		\$3.65	\$3.65	\$3.50@	\$4.35
Smokeless mine run.....	Columbus....	5.75	3.00	3.00	2.75@	3.25	Franklin, Ill. mine run.....	Chicago.....		2.85	2.85	2.75@	3.00
Smokeless screenings.....	Columbus....	5.65	2.80	2.35	2.25@	2.50	Franklin, Ill. screenings.....	Chicago.....		1.65	1.65	1.50@	1.85
Smokeless lump.....	Chicago.....	5.85	6.10	5.75	5.50@	6.00	Central, Ill. lump.....	Chicago.....		2.60	2.60	2.50@	2.75
Smokeless mine run.....	Chicago.....	5.75	3.60	2.75	2.75@	3.25	Central, Ill. mine run.....	Chicago.....		2.10	2.10	2.00@	2.25
Smokeless lump.....	Cincinnati..	5.60	5.75	5.75	6.00		Central, Ill. screenings.....	Chicago.....		1.35	1.35	1.35@	1.40
Smokeless mine run.....	Cincinnati..	5.50	3.35	3.25	2.50@	3.00	Ind. 4th Vein lump.....	Chicago.....		3.35	3.35	3.25@	3.50
Smokeless screenings.....	Cincinnati..	5.40	3.00	2.85	2.50@	3.25	Ind. 4th Vein mine run.....	Chicago.....		2.60	2.60	2.50@	2.75
*Smokeless mine run.....	Boston.....	10.15	5.45	5.35	5.50@	5.75	Ind. 4th Vein screenings..	Chicago.....		1.60	1.60	1.50@	1.75
Clearfield mine run.....	Boston.....	8.00	2.35	2.35	2.00@	2.75	Ind. 5th Vein lump.....	Chicago.....		2.85	2.85	2.75@	3.00
Cambria mine run.....	Boston.....	9.00	2.85	3.00	2.50@	3.25	Ind. 5th Vein mine run.....	Chicago.....		2.10	2.10	2.00@	2.25
Somerset mine run.....	Boston.....	8.40	2.60	2.60	2.25@	3.00	Ind. 5th Vein screenings..	Chicago.....		1.45	1.45	1.40@	1.50
Pool 1 (Navy Standard)...	New York....		3.35	3.25	3.00@	3.50	Mt. Olive lump.....	St. Louis....		3.00	3.00	2.75@	3.25
Pool 1 (Navy Standard)...	Philadelphia..		3.45	3.40	3.25@	3.65	Mt. Olive mine run.....	St. Louis....		2.00	2.00	2.00	
Pool 1 (Navy Standard)...	Baltimore....						Mt. Olive screenings...	St. Louis....		1.75	1.50	1.50	
Pool 9 (Super. Low Vol.)...	New York....		2.75	2.55	2.20@	2.75	Standard lump.....	St. Louis....		2.55	2.30	2.35@	12.50
Pool 9 (Super. Low Vol.)...	Philadelphia..	8.25	2.60	2.60	2.50@	3.00	Standard mine run.....	St. Louis....		1.85	1.85	1.85	
Pool 9 (Super. Low Vol.)...	Baltimore....	7.50	2.40	2.45	2.50		Standard screenings...	St. Louis....		90	1.05	1.00@	1.10
Pool 10 (H.Gr. Low Vol.)...	New York....	8.15	2.25	2.25	2.00@	2.50	West Ky. lump.....	Louisville...	6.35	2.25	2.25	2.15@	2.50
Pool 10 (H.Gr. Low Vol.)...	Philadelphia..	8.00	2.15	2.25	2.10@	2.50	West Ky. mine run.....	Louisville...	6.25	1.60	1.60	1.50@	1.85
Pool 10 (H.Gr. Low Vol.)...	Baltimore....	7.50	2.25	2.25	2.25@	2.30	West Ky. screenings...	Louisville...	6.10	1.05	1.05	90@	1.25
Pool 11 (Low Vol.).....	New York....	7.65	2.00	1.80	1.65@	2.00	West Ky. lump.....	Chicago.....	7.15	2.10	2.10	2.00@	2.25
Pool 11 (Low Vol.).....	Philadelphia..	7.85	1.85	1.95	1.75@	2.15	West Ky. mine run.....	Chicago.....	7.10	.95	1.30	1.25@	1.35
Pool 11 (Low Vol.).....	Baltimore....	7.10	2.00	2.00	2.00@	2.10							
High-Volatile, Eastern							South and Southwest						
Pool 54-64 (Gas and St.)...	New York....	7.60	1.80	1.80	1.65@	1.90	Big Seam lump.....	Birmingham..	4.75	3.25	3.50	3.40@	3.65
Pool 54-64 (Gas and St.)...	Philadelphia..	7.75	1.80	1.80	1.75@	2.00	Big Seam mine run.....	Birmingham..	3.85	1.95	2.00	1.75@	2.25
Pool 54-64 (Gas and St.)...	Baltimore....	7.50	1.70	1.70	1.75		Big Seam (washed).....	Birmingham..	4.00	2.35	2.35	2.25@	2.50
Pittsburgh sc'd gas.....	Pittsburgh...		2.65	2.65	2.60@	2.75	S. E. Ky. lump.....	Chicago.....	5.85	2.85	3.10	2.75@	3.50
Pittsburgh mine run (St.)...	Pittsburgh...		1.95	2.05	2.00@	2.15	S. E. Ky. mine run.....	Chicago.....	5.75	2.10	1.85	1.60@	2.00
Pittsburgh slack (Gas)...	Pittsburgh...		1.45	1.55	1.50@	1.60	S. E. Ky. lump.....	Louisville...	5.85	2.90	2.85	2.75@	3.00
Kanawha lump.....	Columbus....	5.90	3.00	3.00	2.75@	3.25	S. E. Ky. mine run.....	Louisville...	5.75	1.75	1.75	1.50@	2.00
Kanawha mine run.....	Columbus....	5.50	1.85	1.85	1.75@	2.00	S. E. Ky. screenings...	Louisville...	5.60	1.00	1.00	.75@	1.25
Kanawha screenings.....	Columbus....	5.40	1.10	1.05	1.00@	1.15	S. E. Ky. mine run.....	Cincinnati..	5.60	3.10	3.10	3.00@	3.25
W. Va. lump.....	Cincinnati..	5.60	3.10	3.10	2.75@	3.25	S. E. Ky. mine run.....	Cincinnati..	5.50	1.55	1.55	1.40@	1.85
W. Va. Gas mine run.....	Cincinnati..	5.60	1.55	1.60	1.50@	1.75	S. E. Ky. mine run.....	Cincinnati..	5.35	.85	.90	1.00@	1.20
W. Va. Steam mine run...	Cincinnati..	5.50	1.55	1.60	1.50@	1.75	Kansas lump.....	Kansas City..	6.00	4.00	4.00	3.50@	4.50
W. Va. screenings.....	Cincinnati..	5.40	.85	1.05	1.00@	1.10	Kansas mine run.....	Kansas City..	6.00	3.25	3.25	3.00@	3.50
Hocking lump.....	Columbus....	6.15	2.75	2.75	2.50@	3.00	Kansas screenings...	Kansas City..	6.00	2.60	2.60	2.50@	2.75
Hocking mine run.....	Columbus....	5.75	1.85	1.85	1.75@	2.00							
Hocking screenings.....	Columbus....	5.35	1.15	1.10	1.00@	1.20							
Pitts. No. 8 lump.....	Cleveland...	7.25	2.50	2.55	2.15@	3.00							
Pitts. No. 8 mine run...	Cleveland...	7.25	1.80	1.90	2.00@	2.10							
Pitts. No. 8 screenings...	Cleveland...	7.25	1.25	1.25	1.20@	1.30							

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

* Gross tons, f.o.b. vessel, Hampton Roads.

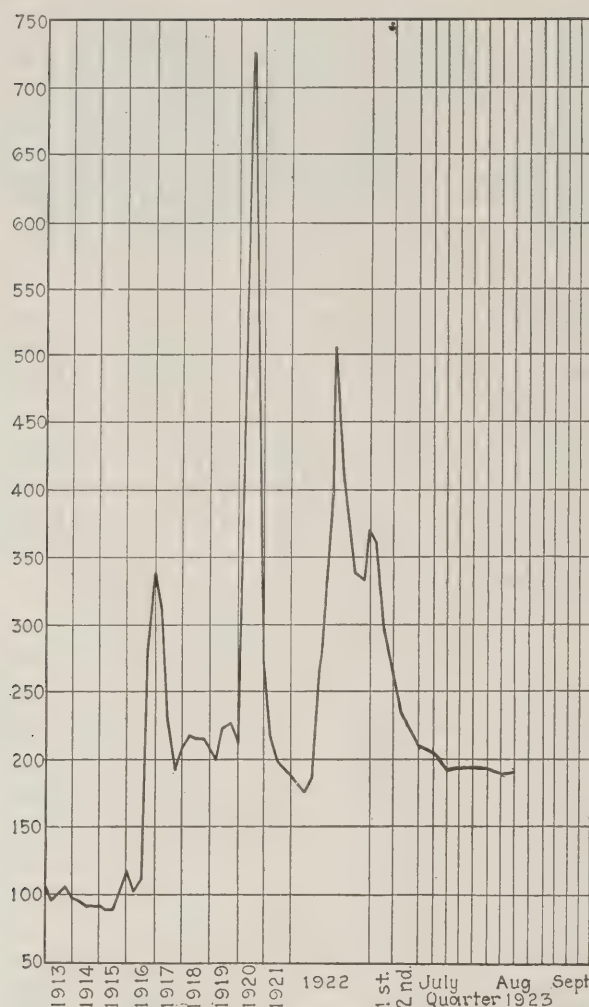
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Aug. 6, 1923		Aug. 13, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34		\$9.00	\$7.75@	\$8.25	\$7.75@	\$8.35	\$7.75@
Broken.....	Philadelphia..	2.39			7.90@	8.10	7.90@	8.10	7.90@
Egg.....	New York....	2.34		9.25@	12.00	8.00@	8.35	8.00@	8.35
Egg.....	Philadelphia..	2.39		9.25@	11.00	8.10@	8.35	9.25@	11.00
Egg.....	Chicago*	5.06		12.50@	13.00	7.20@	8.25	8.50@	12.00
Stove.....	New York....	2.34		9.25@	12.00	8.00@	8.35	8.50@	13.00
Stove.....	Philadelphia..	2.39		9.25@	11.00	8.15@	8.35	9.25@	11.00
Stove.....	Chicago*	5.06		12.50@	13.00	7.35@	8.25	8.50@	12.00
Chestnut.....	New York....	2.34		9.25@	12.00	8.00@	8.35	8.50@	13.00
Chestnut.....	Philadelphia..	2.39		9.25@	11.00	8.15@	8.35	9.25@	11.00
Chestnut.....	Chicago*	5.06		12.50@	13.00	7.35@	8.35	8.50@	12.00
Ranges.....	New York....	2.34			8.25				8.30
Pea.....	New York....	2.22		7.00@	11.00	6.15@	6.30	6.00@	6.30
Pea.....	Philadelphia..	2.14		7.00@	8.00	6.15@	6.20	7.00@	7.50
Pea.....	Chicago*	4.79		7.00@	8.00	5.49@	6.03	7.00@	8.50
Buckwheat No. 1.....	New York....	2.22		4.00@	5.00	4.00@	4.10	3.00@	3.50
Buckwheat No. 1.....	Philadelphia..	2.14			5.00				3.50
Rice.....	New York....	2.22		3.00@	3.25	2.75@	3.00	2.25@	2.50
Rice.....	Philadelphia..	2.14		2.50@	2.75	2.75@	3.00	2.50	2.50
Barley.....	New York....	2.22		1.75@	2.00	1.50@	2.00	1.25@	1.50
Barley.....	Philadelphia..	2.14		1.00@	1.75			1.50	1.50
Birdseye.....	New York....	2.22			2.10	1.25@	1.60	1.60	1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923	1922
Index	Aug. 13 196	Aug. 14 550
Weighted average price	\$2.37	\$2.36
	Aug. 6 195	July 30 197
		\$2.37
		\$6.66

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

County fields, with less business, get \$2.50@\$3.25 for lump. Mt. Olive region remains almost inactive. This region gets very little steam business.

Warm weather has practically stopped movement of everything from the Standard district. Railroad tonnage remains light. Prices are: 6-in. lump, \$2.35@\$2.50; 3x6 egg, \$2.35@\$2.50; 2-in. lump, \$2.10@\$2.35, steam nut, \$1.75@\$1.85; steam egg, \$1.85@\$2; screenings, \$1@\$1.10.

Kentucky Tries to Raise Prices

Kentucky demand looked more promising last week when several steam buyers entered the field, and when domestic demand improved, but the increase was short lived, and is claimed to have been driven out partly by an immediate price boost. Perhaps operators are not to be blamed when it is considered that average realization on West Kentucky coal is only \$1.76 and the mine run average in eastern Kentucky, \$1.85@\$1.90. The highest eastern Kentucky prices quoted were \$3.50 for prime 6-in. block, while screenings are low at 75c. a ton for non-gas, and as high as \$1.40 for best gas screenings. Mine run is \$1.75@\$2.25, good machine cut mine run selling at \$2@\$2.25, especially for gas coal.

Kentucky movement continues scattered to all sections, with no especially heavy buying from any one line of industry. Prepared coal has been in better demand and screenings

have been moving slightly better, especially gas screenings, while mine run has been rather slow. The Hazard field, in shipping large quantities of prepared coal to the Lakes has been steadily long on screenings, resulting in a low market.

Almost half the better western Kentucky mines are down, and the mushroom mines haven't been operating for some time past. A little coal is moving South, with a fair movement to Louisville, Nashville, and some movement to Michigan and the West. However, the west end of the state finds business slow.

Northwest Gets Less Coal

Duluth receipts for the season at the docks show that 6,048,593 tons of coal have been brought up this season to Aug. 1. Shipments from the docks during July exceeded the shipments in June—18,911 cars as compared to 15,157. Receipts at local docks fell off last week. Only 45 cargoes were received; eight of these were hard coal. The report of cargoes en route shows 26 cargoes in route and none of them anthracite.

The bituminous market at the Head-of-the-Lakes is irregular. The tendency is to weakness, with screenings selling lower than before this season. Prices are as follows: Youghiogheny and Hocking: lump, \$6.25 to \$6.50; run of pile, \$5 to \$5.25; screenings, \$3.75 to \$4. Splint; lump, \$6.75; run of pile, \$5.75; screenings, \$4. Kentucky: lump, \$7.50; screenings, \$4.25. Pocahontas: lump, \$10; run of pile, \$6.50; screenings, \$6.

Anthracite demand at Duluth remains strong and every chance of a short supply. Two of the companies are asking an advance of 20 cents, but this is not general.

At Milwaukee coal, more especially anthracite, is moving at a good pace. Pocahontas and the domestic grades of bituminous coal are on par with hard coal in point of demand. Business in steam coal is also picking up, the demand being mainly from remote points, however. Soft coal must move out more freely if the present volume of receipts by lake is to be maintained much longer, as the dock yards are becoming congested. The August record thus far embraces six cargoes of anthracite, aggregating 41,468 tons, and ten cargoes of soft coal, aggregating 70,420 tons, making cargo receipts since the opening of navigation 494,776 tons of anthracite, and 1,619,166 tons of soft coal.

Western Trade Improves

Coal business throughout Colorado and Utah is picking up slightly but the markets cannot be said to be lively in any particular. All Colorado bituminous domestic sizes have advanced 25c. a ton, though mine run and slack remain unchanged. Utah prices have not increased. Improved domestic demand thus far has been absorbed out of dealers' stocks and has not worked back to the mines yet. Lump moves from the mines with some readiness, but all other sizes drag. Pacific coast and Northwest business is fair for Utah producers but Idaho trade has fallen flat.

Better Outlook in Ohio

The Columbus market boasts of a healthier tone. After a month and a half of dull market things are beginning to look upward. There has been a reduction in the volume of distress coal, and the production south of the river has gotten back in the traces. Retail business is dull. Smokeless lump and egg is being quoted at \$10.50@\$11, run-of-mine \$7.50, bituminous lump, \$7.75@\$8.25 and slack, \$5. West Virginia 2-in. lump is quoted the same as last week, \$2.50@\$2.75 and southeastern Kentucky 2-in. lump at \$2.75, as compared with \$2.50@\$2.75 last week.

Householders in Central Ohio are showing a disposition to come into the market, which has tended to put a little more life into the retail situation. Replenishing the retail dealers' supplies has been fairly brisk, with Pocahontas and Splints the most popular grades. Steam coals are rather quiet as there is still some distress coal to be had at low prices, but the tonnage is being gradually reduced. Mines continue to close. While there is apparent little hope shown for any great change in the steam trade situation some believe there will be a spurt about Sept. 1.

There has been no change in the steam trade at Cleveland.

Consumers buy coal as they need it, and no indication has been shown to do any storing. The retail business shows some increased activity, operators reporting inquiries from that source as more numerous.

The market at Pittsburgh shows improvement, with slightly better demand and prices for steam grades and gas slack. Heavier production by the larger mines has more than balanced the closing of the small mines during the past four months. The market has preserved the improved condition of a week ago. Car loadings in the Central Pennsylvania District during the week ended Aug. 5 amounted to 17,881 cars, as compared with 17,892 cars the previous week. Production in Virginia picked up slightly, "no market" losses not being so heavy.

Dullness Continues in New England

In New England there are few developments of interest. Inquiry remains much the same, with buying power practically removed from the market. Textile and other manufacturers are content with present reserves and in view of the large amount of over-buying in the spring it is likely they will be slow entering the market in the fall. Midsummer dullness continues undiminished so far as steam coal is concerned. A few stray cargoes are being purchased, especially for out-of-the-way points, but the aggregate tonnage is small and has no effect on prices.

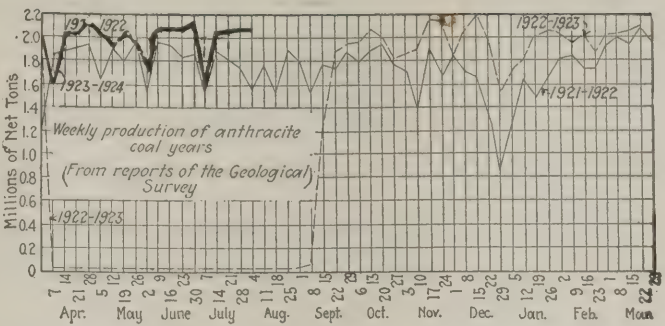
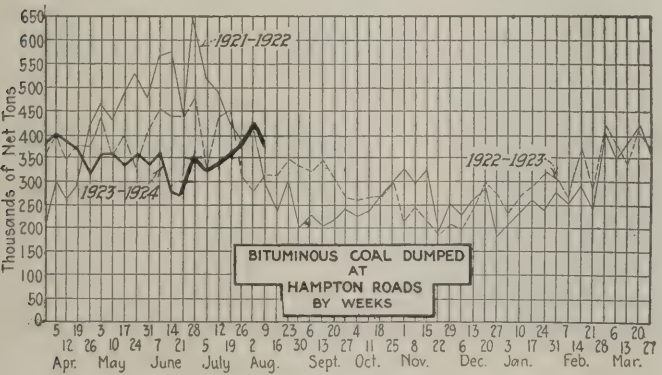
The Hampton Roads shippers report a better outlook for the balance of August than was anticipated. More coal is dumped for coastwise movement and there are enough inquiries off-shore to keep the range of quotations reasonably steady. Navy Standard grades are being held at \$5.50@ \$5.75 per gross ton f.o.b. vessel, but occasionally there are sales at 15@25c. less than the minimum open price.

All-rail from Central Pennsylvania movement to New England shows a light average. Mining has fallen off with slack inquiry and even producers of most favorably regarded coals are again canvassing for late August business. Prices were established on a minimum basis, costs considered, at the beginning of summer and since then there has been no opening for any advance. New England is still unresponsive to substitutes for anthracite. Receipts of the latter are large under the conditions and here there seems increasing confidence that somehow in the anthracite region a working arrangement will be patched up.

The flow of steam grades via the New York and Philadelphia piers, especially via the latter, has shown a steady decline since August 1. There is now practically no anxiety over transportation conditions in December and January and most of the utilities in this territory have as large stocks as it has ever been their practice to carry.

Seaboard Market Quiet

Bituminous market conditions along the Atlantic seaboard remain dull, although there is a trifle better feeling. At New York inquiries were numerous, but there was scarcely any increased activity. At Philadelphia the better feeling was attributed to the unrest in the anthracite situation. More inquiries were received, and it is apparent that consumers are reaching the conclusion that it is well to have some coal on hand. Offerings of screened and sized coals are becoming more frequent. Inquiries for coke for domestic use are gradually increasing. Large consumers in Baltimore seem to have decided to buy in the open market instead of entering into contracts. The prospects at Birmingham are brighter. A better inquiry is reported and



more interest is being taken in the contract situation, some extending from six to eight months having been reported as closed within the past two weeks. Commercial mines report a shortage of equipment for loading, especially mines on the Southern Ry. The L. & N. is also unable to furnish the necessary number of cars to its independent operations.

Export demand remains quiet. There were a few charters closed for Italian and Dutch ports, and a similar activity prevailed with regards to South America. There was also a little business to the St. Lawrence and Cape Breton. During the first ten days of August 12,958 tons of cargo and bunker coal was loaded at Baltimore in three vessels.

Demand for Anthracite Strong

While there is a feeling with consumers that there will be no strike in the anthracite fields this fall, the demand for the domestic coals continues strong and those users who have not yet received their winter supply are just as insistent as ever about obtaining it. The steam sizes are becoming stronger. While reports are occasionally heard at New York of some offerings of independent domestic coals as high as \$14 for straight lots of stove coal the general market is about 50c. lower, and there is not a great deal of coal at that price being received in that market. At Philadelphia quotations as high as \$14.25 for egg, stove and chestnut have been heard. Some shippers are not willing to accept orders for August delivery, claiming to be sold up to the end of the month. The steam coal demand has tightened, with independent product sold up to the end of the month. Consumers at Baltimore want their winter supply of domestic coals and are urging the dealers for deliveries.

The demand for heating coke is gaining strength, the increase coming from regular customers as well as from winter consumers, chiefly factories, who usually begin stocking up in July. There has been considerable inquiry from dealers in domestic fuels. The coke trade does not expect an anthracite suspension and do not attribute the increased demand to that source. Output of beehive coke production during the week ended Aug. 4 is estimated at 345,000 net tons, by the Geological Survey, a decrease of 16,000 tons from the previous week.

Virginian Asks Case Be Reopened

Declaring that the recent decision of the Interstate Commerce Commission refusing permission to the Virginian Railway Company to extend its Guyon branch in West Virginia to open up new coal mines amounted in effect to confiscation of property without due process of law and therefore was unconstitutional, the Virginian Company filed a petition to reopen the case August 11.

The decision of the Interstate Commerce Commission was based upon the assertion by the Commission that the bituminous coal industry is over-developed and that the Virginian Railway last year was not able to supply sufficient cars to the mines already in operation along its lines.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended July 28, 1923.....	1,041,044	194,546		
Previous week.....	1,028,927	190,788		
Same week in 1922.....	848,858	76,295		
July 31, 1923.....	76,453	6,546	9,570	4,774
Same date in 1922.....	174,927	131,267		
July 21, 1923.....	79,710	5,167	7,891	3,676

Foreign Market And Export News

British Coal Production Has Upward Turn; Welsh Market Stronger

British coal production increased 512,000 tons during the week ended July 28, as compared with the previous week, says a cable to *Coal Age*. The output for the week was 5,112,000 tons, while for the previous week it was 4,600,000 tons, and is the first increase in a couple of months.

A dispatch to a newspaper says that a large order has been placed by a gas company for Durham coal, with Kanawha gas coal as an optional substitute.

The Welsh coal market continues steady with a slight tendency to improve. Foreign buyers have been holding off because of the difficulties created in connection with the Ruhr and the condition of foreign exchanges.

Moderate business continues with France, and a considerable amount of other business is in hand, but shipment is held up until exchange rates make payment more favorable to buyers. Italian business is quiet, but there is a slight improvement in the demand from Germany and Belgium.

Orders for Wales include 20,000 tons of Monmouthshire large for the Palestine Railways; 50,000 tons (not described) for the Brazilian Railways; and 30,000 tons of large and small steams for the French State Railways.

The Newcastle market continues uncertain. There is still considerable delay in tonnage arrivals, owing to the effects of the dockers' strike, and coal which has accumulated can be bought at concessions in price.

Ruhr Coal and Coke Shipments

There were delivered to France and Luxemburg from Ruhr during June 219,500 tons of coal, 226,400 tons of coke and 19,400 tons of lignite patent fuel, while up to July 25 there had been received from the same source 52,800 tons of coal, 59,700 tons of coke and 2,500 tons of patent fuel.

Imports of coal during June was 2,561,000 tons, as compared with 2,193,300 tons in May, of which 177,000 tons came from the United States. Coal imports from the United States in May

amounted to 102,200 tons. Total exports in June amounted to 158,000 tons, as compared with 232,100 tons in May.

There were 378,000 tons of coke imported by France in June, as compared with 382,000 tons in May, of which 33,000 tons came from the United States, as compared with 76,700 tons in May. Exports of coke in June amounted to 47,000 tons in June, as compared with 33,400 tons in May.

Export Clearances, Week Ended Aug. 11, 1923

FROM BALTIMORE	
For Belgium:	Tons
Nor. SS. Balto.....	10,772
For Canada:	
Nor. SS. Thomas Hoaland	4,877
For Cuba:	
Swed. SS. Gothia	2,924
Swed. SS. Gothia (coke).....	179
For Italy:	
Ger. SS. Arcurus	5,993
For Porto Rico:	
Am. SS. Major Wheeler.....	539
FROM HAMPTON ROADS	
For Algeria:	
Ital. SS. Clara, for Algiers.....	5,823
For Bolivia:	
Nor. SS. Cedric	521
For Canada:	
Br. SS. Leicester, for Sydney, N. S. . .	3,646
For France:	
Sp. SS. Artagan Mendi, for Marseilles	6,905
Ital. SS. Nomentum, for Marseilles...	6,112
For Holland:	
Br. SS. Belgrade	6,500
FROM PHILADELPHIA	
For France:	
Nor. SS. Hektor, for Marseilles.....	...

Stimulating French Coke Production

Efforts made by the French coke industry to increase its production have been limited by the inability to count upon an assured market, and as a result the extension of the French coke industry and even the recovery of the production lost reached in 1912 has been impossible, says Commercial Attache Chester Lloyd, in a report to the Department of Commerce, at Washington. French cokeries produced about 3,660,000 tons in 1912 and only 2,400,000 in 1922, whereas coke consumption in France increased from 6,000,000 tons

before the war to almost 7,000,000 in 1922.

In order to relieve these conditions an agreement has been made between the metallurgical industry and the French cokeries by which for five years from April 1, 1923, the production of the latter will be taken over at conventional prices. The coal companies owning the chief cokeries undertake to deliver to the metallurgical companies which take part in the agreement tonnages of metallurgical coke at least equal to those which the metallurgical companies have recently been taking.

The metallurgical companies on their side agree to take all the coke which the coal companies may produce in their cokeries at a basis price of 107 francs f.o.b. factory, this price to be varied according to the wage rates paid for labor and to be based on coke analyzing 82 to 84 per cent carbon. Metallurgical and coke manufacturing interests hope that from the stability of the market thus created in France coke production may show a very appreciable increase which will carry the totals well beyond those reached under pre-war conditions.

Hampton Roads Market Firm

The market at Hampton Roads continued firm last week, in spite of lack of demand. Dumpings for the week ended Aug. 9 were lower than during the previous week and prices also showed a decline. Several cargoes to foreign countries were reported for early shipment, but they were not sufficiently large enough to change the market's tone. On Aug. 10 it was said vessels were waiting to load about 35,000 tons of coal.

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:		Aug. 2	Aug. 9
Cars on hand.....		1,629	1,692
Tons on hand.....		89,803	93,730
Tons dumped for week.....		148,161	160,964
Tons waiting.....		31,925	.....
Virginian Ry. Piers, Sewalls Pt.:			
Cars on hand.....		1,746	1,679
Tons on hand.....		100,330	95,691
Tons dumped for week.....		121,793	83,816
Tonnage waiting.....		2,666	23,805
C. & O. Piers, Newport News:			
Cars on hand.....		1,742	2,607
Tons on hand.....		94,285	141,285
Tons dumped for week.....		121,772	109,839
Tonnage waiting.....		18,024	2,115

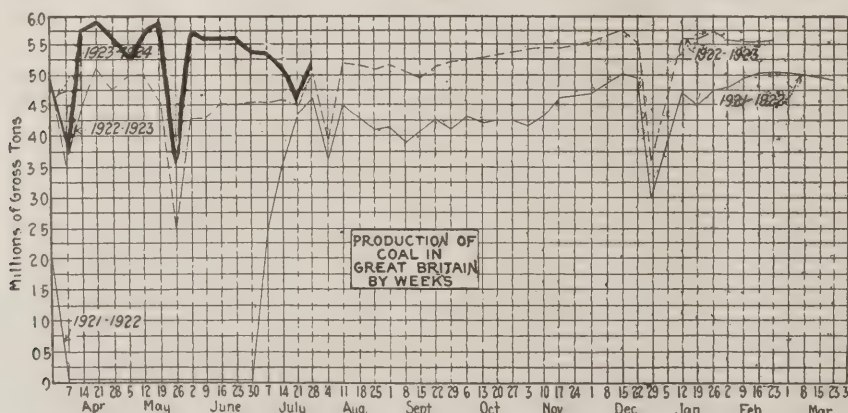
Pier and Bunker Prices, Gross Tons

PIERS		Aug. 4	Aug. 11†
Pool 9, New York.....	\$5.35@ \$5.85	\$5.35@ \$5.65	
Pool 10, New York.....	4.90@ 5.25	4.90@ 5.25	
Pool 11, New York.....	4.50@ 5.00	4.65@ 4.85	
Pool 9, Philadelphia.....	5.30@ 5.80	5.30@ 5.75	
Pool 10, Philadelphia.....	4.60@ 5.30	4.60@ 5.35	
Pool 11, Philadelphia.....	4.10@ 4.70	4.15@ 4.70	
Pool 1, Hamp. Roads.....	5.25	5.10	
Pools 5-6-7, Hamp. Rds.	4.50	4.80	
Pool 2, Hamp. Roads.....	5.00	4.90	
BUNKERS			
Pool 9, New York.....	5.65@ 6.15	5.65@ 5.95	
Pool 10, New York.....	5.20@ 5.55	5.20@ 5.55	
Pool 11, New York.....	4.80@ 5.30	4.95@ 5.15	
Pool 9, Philadelphia.....	5.70@ 6.05	5.70@ 6.00	
Pool 10, Philadelphia.....	4.90@ 5.65	4.90@ 5.70	
Pool 11, Philadelphia.....	4.35@ 5.00	4.35@ 5.00	
Pool 1, Hamp. Roads.....	5.35	5.10	
Pool 2, Hamp. Roads.....	5.15	4.90	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age		Aug. 4	Aug. 11†
Admiralty, large.....	30s. @ 32s.	30s. @ 31s.	
Steam smalls	20s. @ 21s.	21s.	
Newcastle:			
Best steams.....	25s. @ 27s.	24s. @ 25s.	
Best gas	27s.	27s.	
Best bunkers	26s.	25s.	

† Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

CONNECTICUT

Stanley H. Bullard, president of the Connecticut Chamber of Commerce, in an address before the members of the State Association of Secretaries of Chambers of Commerce at Seaside Park recently, urged support of the state chamber's investigation of the coal situation. The purpose of the special committee, Mr. Bullard declared, will be to learn the price of coal at the mines, railroad rates, quality of coal, prices asked by merchants in various places, comparison of prices with other parts of the state, different ways in which to utilize the family coal supply and the best way to burn the different kinds of coal.

A survey of the coal requirements for Fairfield County will be made by the Fairfield County sub-committee of the Federated American Engineering Society, in conjunction with other committees throughout the country. The object of the survey is to ascertain the demand for the homes and for the country's industries, the favorable time to transport coal from the mines to Bridgeport and vicinity, prices at the coal mine and prices charged by dealers and by operators to manufacturers, and much other data.

GEORGIA

The General Council of Atlanta has rescinded a resolution adopted some time ago establishing municipal coal yards. Some speakers denounced it as socialistic and unfair competition for legitimate business.

ILLINOIS

The contract to supply coal for the city of Moline, has been awarded to the W. G. Block Co. at a price of \$1.75 f.o.b. mine, which is 50c. a ton less than in May. The maximum freight rate is fixed at \$1.66 a ton.

The annual picnic of the employees of the Springfield, and Taylorville, divisions of the Peabody Coal Co. was attended by 1,500 persons. It was held in Lincoln Park, Springfield. A score of officials of the company attended. A company band played during the day and a baseball game by teams representing the two divisions proved of interest, the Springfield team winning by a score of 3 to 1. The first-aid teams competed, being judged on their ability to rescue men from common mine accidents and in giving emergency treatment to injured persons. J. F. Monahan, manager of the Springfield division, was master of ceremonies.

Four drilling outfits are at work on leases east of Johnson City, owned by the Madison Coal Corporation, which is the name of the mining company controlled by the Illinois Central R.R. for fuel coal. Twenty-four holes are to go down. Some of them are to be 2,500 ft. deep. There are 13,000 acres in the tract through which the proposed I.C. cut-off will run. Indications point to the probable sinking of at least two mines in the near future on this tract.

What are said to be the largest rotary dumps in the world are now being manufactured at the Chicago plant of the Ramsay Dump & Machine Co. for the Lemont mines of the H. C. Frick Coal Co. There are two of these dumps with a capacity of 35 cars each. The Ramsay dump was invented and placed in use about 23 years ago by Erskine Ramsay, of Birmingham, Ala., vice-president and chief engineer of the Pratt Consolidated Coal Co., industrial leader and capitalist, and these dumps are now in use throughout the United States and in some foreign countries in the handling of coal, ore and other minerals.

Mine No. 15 of the Old Ben Coal Corporation at Weaver, near Marion, has resumed operation after a shutdown of several weeks. During the time the mine was idle, all boilers and other equipment of the steam plant were dismantled and taken out with the exception of one boiler to be used during the winter for heating. In place of the steam hoist, electrical hoisting machinery has been installed and will be used exclusively in the future at the plant. The change will make a marked difference in the number of men employed on top at the

plant as well as a large decrease in the tonnage consumed by the steam plant. Practically all machinery about the mine, both top and bottom, will be electrically operated under the new system.

A huge lump of coal is now owned by the Bell & Zoller Coal Co. at Zeigler. The lump is 11 feet long, 5 feet high and 4 feet and 8 inches wide and weighs 11 tons 1,500 lbs.

The Miller Coal Co. of Marion, capital stock of \$15,000, has filed articles of incorporation at Springfield. The company will take over and operate the Ingram mine near Marion. Many improvements will be made at the plant, including complete electrical installations and electrical coal cutting and hauling machinery. The incorporators of the new firm are: George B. Dodds, Carrier Mills, manager; Dr. J. B. Miller, Mrs. Ima Miller and W. T. Harris, all of Marion. Main offices of the new company will be maintained at Marion.

The Shed Coal Co. of Marion has incorporated for \$100,000 and will mine coal near Marion. Following are the officers of the new company: E. E. Allen, H. J. Faust and P. H. Williams.

The Caloric Coal Co. has purchased 82 acres of coal land immediately adjoining its strip mine property near Herrin. The purchase of the land has nothing whatever to do with the sale of its mine to the U. M. W. of A.

The Kortkamp mine of the Indiana & Illinois Coal Corporation at Kortkamp has resumed operations after an idleness since May 1. Five hundred men have gone back to work. The West End Coal Company's mine near Springfield is also in operation, having been idle since May 1, giving employment to 350 miners.

Work has been resumed at the old Pryce mine near Coal Valley. In times past this was one of the more prosperous mining communities and this mine was a factor.

Plans are under way to open up a large stripping field between Lewistown and Cuba along the lines of the Burlington. The Tiger Mining Co., the principal operator, is beginning to ship in machinery.

Five drillings on the William Butler and J. D. Smith farms, north of Knoxville, have revealed the presence of a good vein of coal at 250 ft.

The office of the Monmouth Coal Co. at Brereton was destroyed by fire recently with loss of \$3,000.

The mine of the O'Fallon Coal Co. has resumed work after being idle for three weeks or more.

Development of the strip mine of the Hartshorn interests at Elkhaville is increasing daily and by cold weather the company expects to have a fair size daily output. The outfit is one of the largest in the state.

Fred W. Price, who resigned as superintendent of the Tamaroa-Little Muddy Coal Co., at Tamaroa, several months ago, on account of ill health, has again resumed his duties in that capacity.

J. C. Bloomfield, who for a number of years was with C. H. Hart & Co., Chicago contractors, has now taken charge of the Industrial Works Chicago office at 1051 McCormick Bldg., handling the sale of industrial equipment in that territory.

The name of the Electric Steel Co., Chicago, was changed to Nugent Steel Castings Co. at a stockholders' meeting held in Chicago, May 28. There is no change of management, ownership, or personnel. Charles Piez is president of the company, W. J. Nugent is vice-president and general manager; Prentiss L. Coonley is treasurer, and C. A. MacDonald is secretary.

Damages to the extent of \$175,000 are asked in a suit filed against Williamson County by the Southern Illinois Coal Co. A claim for a similar amount filed by the same company several months ago was not allowed by the county board of supervisors. The suit is the result of the union rioting in June, 1922, when 22 men were killed and a score or more injured.

The Consolidated Coal Co. of St. Louis, has closed Mine No. 8, near Herrin, for a few weeks, repairing the tippie. The Wisconsin Bridge & Iron Co. of Milwaukee, Wis., is doing the work.

The Freeman Coal Co. of Herrin, has removed its offices from the Walker Building in that city to the mine east of town. The Burton Coal Co. Chicago, now occupies the rooms formerly used by the Freeman Coal Co. E. Skaggs is in charge of the office.

INDIANA

Miami No. 10 mine team which recently won the cup offered by the Indiana Operators' Association for the best work at the State meet held recently at Sullivan, was instructed by Matthew Kerr, instructor for the Clinton Joseph A. Holmes Association, of Clinton. Kerr has been interested in first aid work since 1912. He was one of the original members of the Clinton first-aid workers and was a member of the team that won the cup for the best mine rescue work at the national meet at Terre Haute in 1914. He was captain of the Dering Mine No. 6 team that won first honors at the Indiana State meet in 1920, took the team to the national meet held at Denver the same year and scored high, and the following year took a winning team to the national meet at St. Louis.



MIAMI NO. 10 TEAM, INDIANA OPERATORS' CUP

About seventy-five coal men were guests of the **Cosgrove Coal Corporation** of Pennsylvania and Illinois, at a conference of owners and controllers of mines operating under the company, the conference being held at West Baden, Ind., sixty miles north of Louisville, Ky., July 29 to 31. There were short business sessions on Monday and Tuesday mornings, the rest of the time being given over to golf and recreation.

C. L. Rader, of the Rader Coal Co., with offices in the Traction Terminal Building, Indianapolis, has been appointed receiver for the **Queen Coal & Mining Co.** He succeeded J. B. Sample, a banker, of Lafayette, who was appointed receiver last year. The Queen Coal & Mining Co. controls two of the largest Fourth Vein mines in the state, according to Mr. Rader. They are located in Jasonville, in Greene County. Offices of the company are in Lafayette. The appointment of a receiver last year was due largely to strikes and dull markets. Assets of the company are said to be between \$750,000 and \$1,000,000 and liabilities approximately \$150,000.

IOWA

An 8-ft. vein of coal has been found on the Nussbaum farm one and one-half miles south of Lacona, Ia. The vein is half a mile from the Burlington railroad and switch connections will be made.

The new mine of the **Pearson Coal Co.** recently opened near Clarinda is one of the modern shafts in that section of Iowa. The vein is 22 inches thick. A modern tippie 40 feet high, electrically equipped throughout, is an innovation there. This mine has a capacity now of 200 tons per day and on account of the good working conditions and modern equipment will rapidly increase its tonnage. The old Pearson mine has been abandoned. Mine No. 4, one of the old-time small tonnage type, is still in operation.

KANSAS

A recent purchase was that of the **Hamaker coal holdings**, comprising about 420 acres, west of Scranton, by the Capital Coal & Mining Co., of Topeka, a new concern with a capital of \$200,000. The price paid for the Scranton property is reported to have been \$125,000. Development will soon begin and the installation of modern, electrically operated equipment is being planned.

KENTUCKY

Vaiden M. Lackey, secretary-treasurer of the **Dixie Fuel Co.**, and holding the same position with the Douglas and Phoenix mining companies, of Louisville, operating West Kentucky mines, was married at Nashville, Tenn., on July 31, to Miss Mildred Adel Harrington.

The **Rowe Coal Co.**, Madisonville, Hopkins County, has been incorporated by Lee S. Rowe, H. D. Rutledge and David Kirkwood, all of Madisonville.

At Mannington, in the western Kentucky field, the **Jericho Coal Co.**, capital \$50,000, has been chartered by W. Mineter, of Memphis, Tenn., Dolph Woodruff, and B. D. Williams, Jr., of Mannington.

A threatened tie-up in river shipping of coal by low water has been averted by a couple of excellent rains over the past week, and the August 1 river stage is reported as the best that has been known in years. In most seasons there is very little coal moved over the midsummer season, but this has been an unusually rainy year.

W. B. Gathright, of the St. Bernard Mining Co., has returned to the Louisville office after visiting a number of retailers down in the state.

MARYLAND

New coal developments have been started at Barton by James J. McDonald and Arthur P. Hoffa. A survey of the mining property has disclosed an excellent vein of Bakertown seam coal. Mr. McDonald and Mr. Hoffa are also interested in another new development at Phoenix, near Barton.

MASSACHUSETTS

The Joint Special Coal Investigating Committee of Massachusetts has sent a communication to the anthracite operators and miners, serving notice that in the event of another strike on Sept. 1 it proposes to inaugurate and vigorously push a permanent boycott against the use of anthracite and that it will seek the aid of other anthracite-consuming states by placing its plans for the boycott before a conference of the governors of the New England states, which is to be held in Boston on Aug. 23.

MINNESOTA

The **Village of Hibbing** has purchased 10,000 tons of Elkhorn screenings for public utility use at a price of \$5.20.

The dock interests have asked a delay of ninety days in which to put in their answers to the charges made before the **Federal Trade Commission** relating to their alleged attempts at a monopoly and operation in restraint of trade. The hearings strung along for about seven weeks, from about June 1 to the close of July, with evidence introduced to support the charges, in the shape of endless documents, letters, circulars, minutes and a considerable amount of verbal testimony. Coal history from the dawn of creation was submitted to sustain the charges made. A ten days' continuance was granted on the ground that an attorney for the defense was ill, and this has been followed with a request for continuance for ninety days.

The **B. & B. Fuel Co.**, 1601 Washington Avenue North, Minneapolis, has a record for being burglarized. The fifteenth robbery in six years, the other night netted \$100.

MISSOURI

The inroads made by electricity on the steam coal business in St. Louis is well illustrated in the matter of the ice plants in St. Louis. The **Polar Wave Ice & Fuel Co.** has in the last few years electrically equipped and is operating all of its ice plants with current from the Union Electric Light & Power Co. and part of this current comes from Keokuk and is generated by water. There are five companies in St. Louis engaged in the refrigeration ice business. In the plants of these five the current aggregates 11,560 horse power. The **Polar Wave** has eight ice plants with an average of 600 kw. to each plant. The **Merchants Ice & Fuel Co.** has two plants. The **Mound City Ice & Cold Storage Co.** has one plant. The **St. Louis Refrigerating & Cold Storage Co.** has one and the **Federal Cold Storage Co.** has a new plant. With the exception of the last two companies and the **Mound City Ice & Cold Storage Co.** all of these plants were formerly supplied with coal from coal companies' yards, using screenings principally.

MONTANA

The **Chicago & Northwestern Ry.** is about to build a line from Belle Fourche, S. D., to Miles City, tapping a rich coal field.

The U. S. Land Office at Billings was directed July 18 by the Secretary of the Interior to offer for lease a tract of 1,600 acres of public coal land in Montana. The land is in Carbon County in the vicinity of Joliet and is underlain by the Bridger seam. Lease for this tract will be at a government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of \$50,000 during the first three years of the lease, and a minimum production of 20,000 tons of coal a year beginning with the fourth year of the lease.

NEW YORK

Thomas MacLachlan has been appointed manager of the New York office of the **Vulcan Iron Works**, of Wilkes-Barre, Pa. Mr. MacLachlan succeeds M. E. Davis, who has gone into other lines of work.

Samuel B. Flagg has been made special representative in New York of the **Sanford Riley Stoker Co.**, of Worcester, Mass. Mr. Flagg for several years was engaged in fuel studies for the U. S. Bureau of Mines. For the past six years he has been a fuel specialist on the staff of the **Electric Bond & Share Co.**

OHIO

Glen White Coal & Lumber Co., of Baltimore, have removed their offices from 209-211 Union Trust Building to 10 East Pleasant Street.

As a result of extensive investigations of the coal field around Wellston, a vein of No. 4 coal has been found 600 feet beneath the surface.

A first-aid and mine-rescue training school has been opened at Marion. Organization and instruction is under the supervision of Thos. Rogers, of Herrin, of the state mine-rescue and first-aid department. The school is open to all who care to attend, the course is free and certificates will be issued to all who complete the course.

Among the operating and jobbing concerns chartered in Ohio recently are the **Turkey Foot Coal Co.**, Canton; capital, \$10,000; to mine and sell coal; by Ida Weisend, James E. West, J. F. Dougherty,

L. A. Brill and Marie Bedard. The **Brenn-witt Coal & Coke Co.**, of Toledo, capital \$25,000, to produce and sell coal and coke, by Lee J. Brenneman, Albert H. Miller, A. E. Wittwer, James P. Schrider and Daniel J. O'Rourke. The **Alliance Acme Coal Co.**, Alliance; capital, \$20,000; to mine and sell coal, by T. C. Tessem, R. A. Evans, E. M. Evans, M. H. Tessem and G. R. White. The **Northeast Coal Co.**, Youngstown, capital, 5,000 shares, no par value designated, to mine and sell coal, by Charles F. Smith, J. P. Huxley, T. Lamar Jackson, Charles J. Jackson and Norman A. Emery. **Everybody's Coal & Iron Co.**, Dayton; capital, \$10,000; to buy and deal in coal; by Joseph Sandmel, Joseph Tandy, Anna Sandmel, William Tandy and Kate Tandy.

The **Carrollton Coal Co.**, of Canton, has been chartered with a capital of \$50,000 to operate in the Upper field by S. D. Valley, T. F. Kuckelman, Abel Lourdot, Arthur L. Nebel and Edward Reinhart.

The **Case Coal & Mining Co.**, of Akron, has been incorporated for \$60,000 by H. R. Stevenson, C. Lloyd Case, W. E. Davis, Thomas Williams and W. L. Case.

PENNSYLVANIA

The **Henderson Coal Co.** of Pittsburgh, Pa., has contracted with the **Roberts & Schaefer Co.** for the installation of a new Marcus screen at its tippie at Henderson.

The appraised valuation of the property and plants of the **American Coke Corporation** fixed by the Board of Appraisers appointed by the U. S. Court for western Pennsylvania has been placed at \$2,161,000, with indebtedness of about \$3,000,000.

A state charter was issued at Harrisburg recently for the **Underhill Coal Mining Co.**, of Tyler, Clearfield County, the purpose of which is mining, buying, selling and dealing in coal. The company's capital stock is \$25,000, and Donato DiSalva, Tyler, is treasurer. He, John Palumbo and Anna Palumbo, of Force, are the incorporators.

The **Phoenix Park colliery** of the Philadelphia & Reading Coal & Iron Co. has resumed operations after several weeks' idleness, due to a dispute between the miners and the company as to the duties of men who were transferred from town locals to colliery locals.

John V. Berry, well known through his work throughout Pennsylvania and other states with the U. S. Bureau of Mines, has been appointed chief of the first-aid and mine-rescue division of the **Bethlehem Mines Corp.**, with headquarters at Johnstown.

Sinking a shaft for the **Springfield Coal Mining Co.** on the David Black farm in Cambria township, Cambria County, near Ebensburg, is well under way and the company will start shipping fuel this fall. The new mine will have an outlet over the Pennsylvania and the Cambria & Indiana railroads. New houses are being erected for the accommodation of miners.

The first meeting of the New State Workmen's Compensation Board was held at Harrisburg, July 10. Paul W. Houck, acting chairman since the resignation of Harry A. Mackey, presided and the two new members, Chairman T. Henry Walnut, Philadelphia, and John L. Morrison, Greenville, watched the proceedings. Fifteen cases were heard at the initial session.

James J. McNulty, who is Burgess of Throop, has been appointed claim agent for the **Price-Fancoast Coal Co.**, of Throop, and the **West End Coal Co.**, of Mocanaqua with office at Scranton, and his duties are to settle all workmen's compensation cases originating at the collieries of the companies and to adjust damages done to houses or other real estate by mining operations.

Thomas Kennedy, president of District No. 7, United Mine Workers of America, upon solicitation of a committee of the Non Partisan League, has been urged by his most intimate friends to become a candidate for the office of sheriff of Luzerne county. Although Mr. Kennedy has not committed himself upon the matter, it is generally believed that he will throw his hat into the ring in the scramble for the office.

Thomas McCaffrey, of Brier Hill, Fayette County, who recently resigned as president of the **Brier Hill Coke Co.**, a subsidiary of the **Brier Hill Steel Co.**, when that company was absorbed by the **Youngstown Sheet & Tube Co.**, has removed his place of residence to Pittsburgh, where he has entered the iron and steel sales business.

Negotiations are on, and the price is said to be satisfactory, between the **Pennsylvania Coal & Coke Corporation** and the owners of the coal underlying the **Newton Pryce** farm between Ebensburg and Car-

rolltown, Cambria County, for the purchase of the valuable site. This tract will be developed on a large scale by the corporation seeking it.

William H. Blight of Elmira, N. Y., has recently been elected president of the **Eagle Mining Corporation**, of Ridgeway.

Gus Carlson, **Edward Gustenon** and **Emil Johnson**, miners, are dead as a result of a cloudburst which struck Plumville July 30. The three men were working in the mine of the Sottern-Rinn Company when the cloudburst caused water to run into the shaft after doing great damage to the town itself. A score of other men were employed in the mine, but escaped the rush of the water.

John B. T. Jones has been appointed assistant general manager of the **Hudson Coal Company**, with headquarters in Scranton. For the last three years he has been superintendent of Pine Ridge, Delaware and Laurel Run collieries of that company. Mr. Jones is succeeded by E. B. Wilhain, formerly superintendent of Gravity Slope colliery at Archbald. Mr. Jones has been with the Hudson Coal Company since boyhood. In 1890 he started as a messenger boy at Scranton. He was sent to the Wilkes-Barre division in 1910 as mining engineer. He was appointed superintendent of the Lafin colliery in 1916 and four years later was given charge of the Pine Ridge, Delaware and Laurel Run operations.

Hudson Coal Co. has purchased a several acre tract of land in Throop, formerly owned by the Price-Pancoast Coal Company. The land is improved with several dwellings and was sold for \$20,000. The Hudson Coal Company previously owned the coal under the land in question.

Payment of the Hostetter-Connellsville Coke Company bonds was made on Aug. 1, amounting to \$80,000. The original issue of \$1,500,000 was sold Feb. 1, 1892. The bonds were issued to become due Feb. 1, 1942, but a sinking fund was provided for the redemption before maturity, being made up by setting aside 10 cents per ton on each ton of coal mined and 15 cents per ton on each ton of coke manufactured.

The Hockensmith Wheel & Mine Car Co., Penn., announces that F. C. Hockensmith, one of the founders and for many years the president of the company, is now chairman of the board of directors. He is succeeded by W. D. Hockensmith, formerly vice-president, whose title is now president and general manager. C. L. Herbster, formerly second vice-president, is now vice-president. D. M. Wagoner, who with F. C. Hockensmith, founded the company, remains treasurer, and F. L. Shallenberger continues to be secretary. W. K. W. Hansen retains his position as general superintendent, while a new position, that of assistant plant manager, has been created for G. E. Ogilvie, who was formerly assistant general superintendent.

Sixteen hundred acres in the Blue Lick field in Somerset County recently acquired by Rowe Brothers, prominent Myersdale operators, is being prepared for operation. The tract contains high grade Pool 9 coal lying along Blue Lick Creek, near Myersdale. This is the largest undeveloped coal tract in southern Somerset County. Four miles of railroad track is being laid and connections will be made with both the Western Maryland and the Baltimore & Ohio railroads. The land was acquired from Daniel B. Zimmerman by Frederick Rowe, Jr., and Frederick Rowe, Sr., will become the directing head.

Uehling Instrument Co., Paterson, N. J., manufacturers of CO₂ recorders and draft and vacuum gages, have named the **Amsler-Morton Co.**, Fulton Building, Pittsburgh, as agents for western Pennsylvania and **John A. MacDowell**, 2039 Railway Exchange Building, St. Louis, Mo. for eastern Missouri and southern Illinois. **H. R. N. Johnson**, who formerly represented the Uehling Instrument Co. in Minnesota and the Dakotas, has joined the W. P. Nevins Co., 120 South Ninth Street, Minneapolis, Minn., which company is now the official Uehling representative in that territory.

In order to provide more adequate facilities for an increasing volume of business in the Pittsburgh district, the **Pennsylvania Crusher Co.** recently moved its offices to more adequate quarters in the Oliver Building, where operations will be continued under the management of **H. M. Hallett**, as District Manager. The business of the Pittsburgh office is largely concerned with coal-preparation machinery for mines, byproduct coke plants, central stations and industrial power plants, and with heavy duty primary and secondary crushers for large cement and lime plants.

Hugh P. Mullen, of Johnstown, was named receiver for the **Heshbon Coal Min-**

ing Co. on June 4 by C. Randolph Myers, of Ebensburg, referee in bankruptcy. The Heshbon company's schedule shows total assets of \$87,000, made up of \$57,000 worth of real estate and \$30,000 in stock in trade, including tipples, mining cars, a leasehold and various operating equipment. Liabilities aggregate \$122,262.12 mostly in secured claims. **Fred G. Beiter**, of Johnstown, is secretary and treasurer of the concern. The company owns and has been operating about 380 acres of coal in West Wheatfield township, Indiana County.

The American Briquet Co. is reported to have started construction on a new plant to make briquets from anthracite culm at Lykens. It will cost \$350,000 and be ready for operation in September. It will be of steel and concrete construction, and will replace the company's property destroyed by fire several months ago. Fifty-five men will be employed, and the plant will turn out 10,000 tons of briquets monthly. **A. D. Parker**, of Westchester is president of the company, which disposed of its products mainly in New England and states adjacent to Pennsylvania. The company purchases its culm from the **Susquehanna Collieries Co.**

Sale of the Lehigh & Wilkes-Barre coal stock by the directors of the Central Railroad of New Jersey to the Jackson E. Reynolds Syndicate of New York, under the Reading segregation decree, for \$32,490,980, was approved Aug. 8 by the Federal District Court at Philadelphia. Objections to the sale by Isaac T. and Mary T. W. Starr, minority stockholders of the Jersey Central, were dismissed by the court, which held that they had failed to prove allegations that the stock was sold to the Reynolds Syndicate at an inadequate price.

Plans of the United Mine Workers for a demonstration in Scranton on Mitchell Day, October 29, at the unveiling of the memorial to **John Mitchell**, have been temporarily abandoned. The monument will not be completed by that time. The original plans for the monument called for two sculptors to work on the memorial at the same time, but because of the desire for absolute uniformity throughout, only one artist is to do the work. Under this arrangement the work will not be completed before the middle of December. Officers of the miners have not decided whether they will hold the celebration in December or postpone it until April 1 next, the anniversary of the eight-hour day.

Prof. Homer G. Turner, of Lehigh University, whose tests showing the structure of anthracite have been noted in *Coal Age*, will make a trip this summer through the Pennsylvania anthracite fields from which new scientific results are expected. Results obtained by applying the Turner method to specimens found on the trip may enable coal operators to determine, with a few minutes' work, the particular coal bed from which a sample has been obtained, without necessity of long and expensive drilling operations. Professor Turner also will collect samples of coal from various beds in the different fields with the hope that he may show development of plant life during the long period of coal formation in Pennsylvania.

Rinaldo Cappellini, who on Aug. 1 became president of District No. 1, **United Mine Workers of America**, at Scranton, has named **Alexander Campbell**, **Anthony Surovich** and **Thomas John**, members of the wage scale committee, to succeed **M. J. McGowan**. **A. J. Franey** and **James Hennessey**, who were appointees of former President **W. J. Brennan**. **Miss Luch Breuche** was appointed secretary to President Cappellini. Former President **Brennan** has been appointed an international organizer.

Directors of the People's Fuel & Supply Co., of York, with mines in Bedford County, will ask stockholders to approve an increase in capital stock from \$100,000 to \$350,000.

Appointment of several prominent Philadelphia coal operators to important committees of the National Coal Association has been announced by **John C. Brydon**, president of the organization. **S. Pemberton Hutchinson**, president of the Westmoreland Coal Company, No. 224 South Third Street, is chairman of the finance committee. **G. Dawson Coleman**, Sr., president of the Marshall Coal Company, No. 1448 Land Title Building, and **R. H. Knode**, vice-president of the Stonega Coke & Coal Company, No. 1727 Land Title Building, are named for the foreign trade committee. Mr. Hutchinson also will serve on the Government relations and railroad relations committees.

Frank A. Vershinski, 17, was instantly killed Aug. 6 in a stripping operation at the Sayre colliery, Mount Carmel, when

he was covered by several hundred tons of coal dislodged by a heavy charge of dynamite. His presence in the vicinity was not known and when he failed to return home at the usual time a friend became apprehensive and went to the stripping where the youth's dinner pail was found.

RHODE ISLAND

George H. Webb, Commissioner of Labor for Rhode Island, is making a survey of the coal supply in that state and has sent to retail dealers questionnaires asking for the amount of coal on hand and the probable supply during the winter. The questionnaire also asks for the amount of coal received since April 1, 1923, and the estimated amount required from Aug. 1 to April 1, 1924.

TENNESSEE

The tenth annual miners' field day and first aid contest, given under the auspices of the coal operators of Tennessee, Tennessee mine inspectors and the U. S. Bureau of Mines, was held Aug. 4th at Knoxville. The first aid teams demonstrated four problems: One one-man event, one two-man event, and two full-team problems. **Black Diamond Collieries Company Team No. 4** won the first prize of \$50, **W. H. Sharp**, captain. The second prize of \$45 went to Team No. 3, of the **Black Diamond Collieries Company**, **C. F. Bennett**, captain. The third prize of \$40 went to the **LaFollette Coal & Iron Company** team of **LaFollette**, **N. D. Wilson**, captain. The fourth prize of \$35 was won by the **Highland Coal & Lumber Company** team, of **Davidson**, **H. B. Holmes**, captain. **J. M. Webb**, of the U. S. Bureau of Mines, Rescue Sta., trained the teams in their work.

UTAH

In order to facilitate the distribution of cars to and the handling of coal from mines located on the **Denver and Rio Grande Western R.R.**, **Receiver J. H. Young** will at once construct a telephone line extending from Soldier Summit to Kenilworth, with lines to the Spring Canyon branch, which will be an addition to the present service between these points and is to be used exclusively in the distribution of empties, handling of coal loads, and otherwise serving the various coal operators in that section. It is expected the line will be in operation by Sept. 15. The following mines will benefit most: **Kinney**, **Scofield**, **Utah Central**, **Utah Mine**, **Clear Creek**, **Winter Quarters**, **Mutual**, **Rollapp**, **Peerless**, **Storrs**, **Standard**, **Liberty**, **Castle Gate**, **Rains** and **Kenilworth**. Offices of R.R. agents will be connected with the new circuit and booth phones for use of train crews will be provided at **Hales**, **Spring Canyon**, **Junction** and **Kenilworth Junction**. Great improvement is expected to result in the handling of the car supply in the territory. It will eliminate the indirect method of communication now obtaining with the dispatchers at Soldier Summit through the local agents. The train crews handling coal trains, as well as the mine operators, in direct communication with dispatchers and car distributors and will make possible the handling of special and emergency conditions arising from time to time. The improvement is said to be evidence of the increased interest taken in Utah coal output by the **Rio Grande road**. Other improvements are being considered.

The mine of the **Columbia Steel Corporation** is now ready to produce. The railroad is finished to the tippie yard and all ballasted. The construction of the company's steel plant itself is also making good progress.

WEST VIRGINIA

The Ohio County Fuel Co., of West Virginia, has purchased 3,350 acres of coal in the Richland district in the "Pan Handle," including 29 tracts, for a consideration of about \$839,000. The fuel company is an associate of the **American Gas & Electric Company** and the **West Penn Power Company**, and it is understood the acreage was bought to assure the **Windsor power plant** owned by these companies a supply of coal for their power operations.

Deeds have been filed at Fairmont showing the transfer of 1,000 acres of **Sewickley** coal, the entire plant of the **Rivesville Coal Company** and other interests to **Mortimer L. Hudson** of Chicago, secretary of the **Edward Hines** interests. The deeds convey limited holdings of the **New England Fuel and Transportation Company**, comprising **Sewickley** coal on **Pharaoh's** run, just north of **Rivesville**; holdings of **John F. Phillips**, **C. D. Robinsort** and **Jacob F. Straight**, as well as the property of the **Rivesville Coal Company**. The mining plant is known as the **Hood mine** and lies between **Rivesville**

and Fairmont and the Cleveland Coal Company's property. The Hines interests own other large coal acreage in the Fairmont region.

WASHINGTON

The Cinebar Coal & Coke Co. has been incorporated with a capital of \$100,000 by Morgan G. McBride, L. B. Pearce and L. B. McBride, of Seattle, and Cleo N. Henriot and J. W. McBride, of Chehalis, to operate two sections of coal land at Cinebar, 23 miles east of Shehalis.

WISCONSIN

An explosion in the benzol distillation unit of the Milwaukee Coke & Gas Co.'s plant on Wednesday afternoon, Aug. 1, wrecked that portion of the works and caused a loss estimated at approximately \$250,000. Three men lost their lives. The coke unit and the coal handling appliances escaped practically unharmed and little delay will result to these activities of the company. The fire at one time threatened the entire plant, the destruction of which would have seriously curtailed the city's gas supply, as the Milwaukee Gas Light Co. receives all the gas produced by the coke plant. Over 400,000 tons of coal have been handled over the Coke & Gas Co.'s dock thus far this season.

Coal contracts were let by the city of Milwaukee on Thursday, Aug. 2, to the Fellenz Coal & Dock Co. for 1,600 tons of anthracite at \$15.55 for egg and stove sizes, \$13.55 for pea and \$11.05 for buckwheat. These prices are \$1.10 above the prices the city paid last year. The Milwaukee-Western Fuel Co. and the Great Lakes Coal & Dock Co., bidding jointly, were awarded a contract for 21,000 tons of bituminous coal at \$6.20 per ton. The price paid last year was \$5.90 per ton. The United Coal & Dock Co. will supply the city with 20,000 tons of bituminous coal at \$5.54 per ton. The coal embraced in the contracts will be delivered at the various city institutions, including the schools, as required.

WASHINGTON, D. C.

Chairmen of committees of the National Coal Association appointed for the coming year are as follows: Policy committee, J. C. Brydon, president Quemahoning Creek Coal Co., Somerset, Pa.; executive committee, J. C. Brydon (by virtue of by-laws); finance committee, S. Pemberton Hutchinson, president, Westmoreland Coal Co., Philadelphia; foreign trade committee, T. F. Farrell, second vice-president, Pocahontas Fuel Co., New York; government relations committee, Walter H. Cunningham, president, Cunningham, Miller & Enslow, Huntington, W. Va.; membership committee, Walter Barnum, treasurer, Pacific Coast Co., New York; publicity committee, C. E. Bockus, president, Clinchfield Coal Corporation, New York; railroad relations committee, C. H. Jenkins, vice-president, Hutchinson Coal Co., Fairmont, W. Va.

The crew of mine-rescue car No. 2 of the Bureau of Mines, Department of the Interior, has completed a month's work of conducting mine-rescue and first-aid training in various Colorado coal mining camps. Following this work the car proceeded to southern Wyoming to do similar work in that region. The personnel of mine-rescue Car 3 recently conducted training at Russellton, New Castle, Sinnemahoning and State College, Pa. Training has been given at Collinsville, Ill., by the crew of Car 4. Car 5 has been conducting training in Ohio, holding classes in first aid at Coshocton, Zanesville and Cambridge. A class of students at the Case School of Applied Science, Cleveland, was given first aid and mine rescue training. Car No. 6 spent some time in giving first aid training at Waukegan, Moran and Melcher, Iowa. The majority of those attending the classes at Moran were of foreign birth, and unable to speak English intelligently, but in spite of this drawback 18 miners completed the course of instruction. The crew of car No. 7 has conducted training at plants of the Davis Coal & Coke Co. at Thomas, Davis, Kempton, Henry and Coketon, W. Va. Miners taking special courses at the University of West Virginia, Morgantown, have been given training, as have students at the summer session of the New River State School. Every man on the payroll of the Kempton, W. Va., plant of the Davis Coal & Coke Co. has at some time completed the Bureau of Mines first-aid course of training. Car No. 8 recently conducted classes at Henryetta, Okla., during the progress of the King Coal Carnival.

A description of the Wheat electric cap lamp, a recent addition to the list of electric lamps placed on the permissible list of the Bureau of Mines, Department of the In-

terior, is given in Serial 2493, recently issued. The Wheat lamp is the seventeenth lamp to be placed upon the permissible list.

A description of one of the recent additions to the list of permissible electric cap lamps approved by the Interior Department, through the Bureau of Mines, is given in Serial 2500, "The 'model E' Edison electric cap lamp," by L. C. Hsley, electrical engineer, and A. B. Hooker, assistant electrical engineer. This lamp has been given approval No. 18 by the Bureau of Mines. Serial 2500 may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

CANADA

The Canadian Pacific Railway has not announced its decision in regard to reduced rates on western coal to eastern Canada in line with the policy of the Canadian National Railways. Sir Henry Thornton, president of the C. N. R., announced in the West a few days ago that the government lines would grant an "experimental" rate of \$7 a ton on coal to the East. It is understood that the Canadian Pacific Railway has this question under advisement, and that a decision in favor of or against the experiment may be made within a few days.

H. Greenfield, Premier of Alberta, expresses confidence that Alberta coal can be shipped into Ontario and sold at a price that will be lower than that paid for Pennsylvania anthracite. The success of selling Alberta coal in Ontario depends upon what rate the railway companies will fix for carrying the fuel, Premier Greenfield writes. The recent experiment of shipping Alberta coal for demonstration purposes in Ontario was so successful that the Alberta government is hopeful that the railways will see their way clear to cut the present rate of \$9 per ton.

A four-foot seam of coal has been discovered at Block Brook, Boularderie, Cape Breton, Nova Scotia. The discovery promises a possibility of a deposit of upward of 3,500,000 tons of excellent coal. The property is situated about 500 feet from the main road and less than 500 feet from the deep water of the Bras d'Or, and is so situated that a trestle can be constructed to deep water of the Bras d'Or where there is sufficient water to accommodate any steamer that could navigate the channel.

The fuel authorities of the Dominion Government are watching the United States coal situation. The Advisory Fuel Committee, established by the government last summer, is still in operation and is working in harmony with the Dominion Fuel Board set up last winter for the investigation of the general question of fuel supply. Touch is also being maintained with such of the provincial fuel controllers as are still in office. According to the latest returns available at the Dominion Bureau of Statistics, imports of fuel into Canada during the present season have been kept up to the average. The imports of anthracite from the United States for the first quarter of the coal year were 1,303,000 tons, as compared with 260,000 tons in 1922, and 1,238,000 tons in 1921. The imports of bituminous coal from the United States for the same period have been 3,392,000 tons this year, as compared with 1,580,000 tons in 1922, and 2,516,000 in 1921.

Association Activities

Coal and coke agents of the railways operating in the states of Indiana and Illinois are to hold their September meeting in Cincinnati, according to an announcement made in Cincinnati by Fred Reigel, agent for the Southern Railway. Rates and general traffic matters concerning the movement of coal will be gone over. This is the first time that these agents have held their meeting outside of Chicago for years.

Shippers in upper Wisconsin and Michigan and coal dock operators at various lake ports in those regions have issued a pronouncement against "any form of compulsory consolidation of railroads." They hold that more economy can be effected and greater good done to the business interests, as well as to railroads of the country, by the removal of even a small part of the unnecessary expense now placed upon the carriers by some of the useless federal and state regulations than can be brought about by any scheme of consolidation.

There is a movement on foot to bring about a unification of rail terminals at Milwaukee. This is of interest to the coal trade, as fully 80 per cent of the coal business of the port is handled over the rails of one railway line. The unification, when brought about, will result in a large saving in switching charges on coal alone.

Obituary

Harry C. Mason, land agent for the Lehigh & Wilkes-Barre Coal Co., died at his home in Wilkes-Barre on Aug. 2, after several months' illness. He had been land agent for the company since 1899, previous to that time having been a member of its engineering corps.

A. H. F. Mitchell, pioneer coal man of Utah, died recently at Logan at the age of 88. Mr. Mitchell was interested in the development of the first coal mines at Coalville. He was a native of England.

Charles S. Cannon, of the C. S. Cannon Coal Co., of Seattle, was drowned in Hoods Canal near Union City, Washington, July 17, while trying to save a 13-year-old girl who had fallen out of a rowboat in which they had been riding.

Recent Patents

Bearing Box for Mine Cars. W. T. Miller, Park Place, Pa.; 1,457,384. June 5, 1923. Filed Sept. 15, 1921; serial No. 501,009.

Powdered-Coal Apparatus. Aubrey J. Grindle, Chicago, Ill., assignor to the Grindle Fuel Equipment Co., Chicago, Ill.; 1,457,522. June 5, 1923. Filed July 29, 1919; serial No. 314,137.

Mine Alarm Instrument. Charles W. Hurl, Nanty-Glo, Pa., assignor to the Miners' Supply & Equipment Co., Johnstown, Pa.; 1,458,060. June 5, 1923. Filed Dec. 6, 1921; serial No. 520,245.

Manufacture of Coal or Like Briquettes. Henry G. Lloyd, Surbiton, England; 1,458,716. June 12, 1923. Filed June 1, 1921; serial No. 474,202.

Miners' Knife. J. H. Widas and F. S. Widas, Caspian, Mich.; 1,458,789. June 12, 1923. Filed Sept. 16, 1922; serial No. 538,710.

Mounting for Mine-Car Wheels. Alfred R. Anderson, Rock Springs, Wyo., assignor of one-half to J. F. Dominick, Rock Springs, Wyo.; 1,459,134. June 19, 1923. Filed March 14, 1923; serial No. 625,114.

Attachment for Miners' Lamps. Goichi Date, Sublet, Wyo.; 1,459,576. June 19, 1923. Filed May 31, 1922; serial No. 564,782.

Mining Machine. Cyrus S. Oldroyd, Cincinnati, Ohio; 1,460,077. June 26, 1923. Filed Jan. 8, 1921; serial No. 435,821.

Coming Meetings

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the International Safety and First-Aid Meet. Secretary, Benedict Shubart, Denver.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 24

NEW YORK, AUGUST 23, 1923

Number 8

The Deadlock Broken

NEGOTIATIONS between the anthracite operators and miners were at a standstill for three weeks. The Coal Commission called both sides to New York and in three days got the wheels in motion again. That summarizes the situation, but it does not tell the story.

On July 26 John L. Lewis told the conferees, in session at Atlantic City since July 6, that unless the miners' demand for the adoption of the "principle of complete recognition and the check-off" be granted at once negotiations would be terminated. The operators the following day refused and the party broke up.

In the time that intervened until the Commission called them to New York the country has been wondering what it was all about and has been calling loudly for the government at Washington to do something. The press was petulant toward both parties but was beginning to say that the union was going too far in depriving the country of coal just because the operators would not collect its dues for it.

Whatever it was that Mr. Lewis and his advisers had expected would happen as a result of their surprising stand did not come to pass. They were losing ground at home and gaining none with the public. Back in the mining regions the men and their wives could get up no enthusiasm over another strike, and for such a cause. Lewis' famous luck was failing and the breaks were going against him.

Last week the Coal Commission took a hand. It asked the two interests to meet with it—not together but separately. It maintained a position of fact finding. No attempt at mediation, no effort to suggest that this or that would be a good way to settle the matter. The Commission wanted to know what it was and why that kept the parties from completing their negotiations and preventing a strike. The Commission announced that it was going to keep its fingers out of the machinery; would write no contract. It was after the big "why," and would report back to President Coolidge. He might tell the people.

Lewis opened the proceedings with two proposals, one stating the conditions under which he would drop the demand for the check-off, the other providing for keeping it. The second was impossible, and maybe he thought the operators would not accept his first. He was in a jam over the check-off issue and was hard after some way to drop it and save his face. The operators accepted his proposal to drop the check-off all around. They agreed to take cash for what the miners bought from them instead of deducting it from their pay.

That would not do at all. It would be most unpopular in the region. So over night Lewis did the Houdini act none too gracefully and squirmed out. He had to.

Two days gone, leaving the Commission "frankly discouraged" and but little wiser, the public gratified one morning with "No Strike" headlines and perplexed

the next with "Danger Not Averted." What was going on was that negotiations had been resumed with every move a public note with all that that implies—one thought for result and two for effect. To have pursued that course would soon have involved the Commission in the negotiations.

The Coal Commission held and still holds the trump card. Both sides know that whatever they may hold to be the facts, if and when the Commission states its opinion its position will come pretty near being the last word with the country. So, when on the morning of the third day the Commission asked them to report by night whether it was not possible to resume negotiations, they lost no time in announcing that negotiations would be resumed almost at once. Not a word about the check-off; that is dropped for the time being.

Matters are back where they were on July 26, when Lewis issued his ultimatum. Nothing has been gained save delay, a provoked public, and a feather in the cap of the Coal Commission.

The Unfair Assigned Car

THERE seems to be no end to the argument over the assigned car. The Interstate Commerce Commission having disposed of it, the beneficiaries of the condemned practice arise en masse saying that there must be some mistake and ask for a rehearing and re-argument of their case. The Interstate Commerce Commission must answer them one way or the other soon.

The essence of the matter is that the use of the assigned car is unfair. It is unfair because it gives to a few consumers a great advantage in point of regularity and assurance of supply of coal and, not quite incidentally, an advantage in price. It is unfair because it gives to a few producers a larger proportion of transportation service than to the remainder and at a time when transportation service is the most valuable thing they desire.

The case with respect to the private car hangs on the same principle. The title to these cars rests with a consumer or producer and not with the railroad. The owner may say where these cars shall be placed and where transported. But because of this control he may not concentrate his cars at one mine in such manner as to give that mine better running time than other mines similarly situated. Transportation service as a whole must be equitably divided among the mines, and cars are but a part of that service. Motive power, trackage and all other facilities are involved. The Interstate Commerce Commission has decreed that private cars may not be used on an assigned basis because they thereby absorb an unfair amount of the limited transportation service afforded.

The arguments of the railroads and others for the assigned car consist mainly in assertions that they are better served thereby and do not see how they can get

along without the privilege. Nor, apparently, will they find a way until they have to.

It is no solution for the problems of intermittent operation and overdevelopment of the bituminous-coal industry to regulate it through the railroads. That was tried at the beginning of war control and signally failed. Abolition of the assigned car in all its forms makes for freer and more openly competitive conditions in soft coal—the condition contains the cure within itself.

Justice Takes Sides

CRITICS frequently, and with cause, have questioned the symbolic correctness of the blindfolded figure of justice on our court houses. Justice, say they, is never blind and if she is she should be deprived of her sword. Justice is not impartial; she takes sides—after determining the right. She is not blind but of keen sight. Blindness and impartiality are not attributes of justice, and what is more they do not make for peace. So long as justice is blindfold and visionless what is left for contending parties but to fight? It is solely because justice is able to see and takes action according to her vision that we have peace. We shall never have peace if justice takes the position that a quarrel is something about which she should have no opinion, that all quarrels are private and that quarrelers are all of a sort and that bad.

When the war commenced that was the attitude the American public took. Some, it is true, said merely that it was not our quarrel, but others judged the quarreling itself was wrong and said that France as a quarreler was no better than Germany, another quarreler. At a first-aid meet in the anthracite region a learned judge told his hearers that the United States was superior to the nations of Europe (including France, Belgium and Great Britain) because while his auditors were busy in the preparation for rendering first aid, Europe was busy preparing for slaughter.

The war kept on, nevertheless, no matter how much we reprobated and deplored it, because the United States did not see fit to take sides. The judge of whom we have spoken had been taking sides daily in the settling of the affairs brought before him. The judge's decisions were a power for peace, but entirely forgetting that he gave advice to his auditors at that first-aid meet, which was of a kind that, being so frequent here, prevented action that would have caused a discontinuance of the war.

The public is like the judge in his first-aid speech and like the symbolic figure of justice over the court house. It says in the present controversy that the miners and operators probably are alike to blame. It refuses to take sides. It prides itself on its colorless opinion. It is not really interested to inquire who is right. It has gone only so far as to declare that the difference should be settled. How it should be settled is none of its business. So the disagreement goes on and will go on till the dominant factor, the public, decides who is right or until one of the quarrelers is more badly stricken than the other, and has to give way, right or wrong.

The public cannot avoid its responsibility. It cannot take the attitude that it is not the public's business who is right. The public can keep out of the matter as the United States kept out the war, but if it does so it must be content to see the disagreement go on. So long as it says a quarrel is a quarrel and

that both sides are to blame, it is necessary for it to wait until one side beats down the other, and it cannot complain if the rounds last too long or are too many.

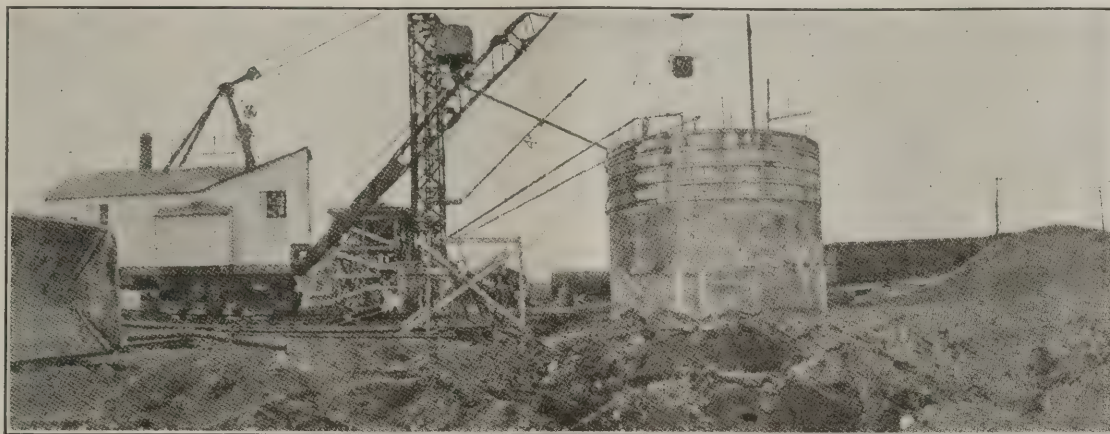
Coal Age is not much in favor of official interference. Wages are determined unsatisfactorily by arbitration. It is difficult to tell which wage is right. But if it is too hard for the public to tell, it is surely a difficult problem for prejudiced parties. It is natural they quarrel. If the issues are indeed undeterminable and unjustifiable, let the public make up its mind that this dispute is a natural and not a vicious one on either part and if the quarrel is not of that character let the public take a hand at ending it. But to say there should be no quarrel is to say that the millennium should be reached in which every one will see with the eye of his neighbor, and to say that there should be no inquiry as to who is right but that both should be condemned is to make provision for a winter with no anthracite on the market.

Even without executive action a well informed public with fixed notions as to the right could do much to prevent a strike or end one speedily should it be started. But so long as it has no notions about the matter, it is as futile as was the United States subsequent to its declaration of neutrality of mind and deed and prior to its entry into the war. Only Mr. Ford believed the reprobation of both parties would have a favorable effect. It is at least debatable whether the war would have been prosecuted by Germany if Americans even without being aggressive had been as positive then as they are today that Germany did wrong to invade Belgium and France and had protested accordingly.

All this is said because of the ridiculous editorials of the daily press and in view of the announced intention of the New England consumers to punish both parties by a boycott. Despite all their knowledge of the conditions the dailies steadily proclaim that to stand up for one's rights is criminal and shows an indifference to the public interest. The press boldly proclaims that it knows nothing and wants to know nothing, except that both miners and operators delight in quarreling, profit by it, rejoice in it as we declared the Allies and all Europe did up to and until the day we declared war on Germany.

So long as the princes condemn both Capulet and Montague for quarreling and make self-defense against aggression a crime, setting up no tribunal to discover the aggressor, so long will there be brawls in the street and the city will be "profaned" with "steel." Our American public refuses to give judgment either as to criminal or civil dissension. It is neutral, negative and therefore powerless. This is not the stand of justice. Justice takes sides or it ceases to be justice and becomes a feeble poltroon.

Commissioner Marshall is reported to have said "What the public wants is justice to both sides and plenty of coal. Anything that can be done will be done, but the thing we are not going to do is to write their contracts for them." The last statement means that the public does not want to dispense justice but intends to satisfy itself with demanding peace. The pleasure loving and badly stricken Mercutio may be excused for saying on the spur of the moment, "A plague o' both your houses," but it is not the function of princes or the public to deliver a ban that so completely overlooks justice and makes necessary the private arbitrament which it so freely condemns.



Main or Hoisting Shaft of Grasselli Chemical Co., Terre Haute, Ind., Under Construction

In Sinking Spelterville Shafts Through Wet Sand Sizes Are Increased to Offset List of Caisson

Many Shafts in District Have Crooked Guides and Are Not Successfully Sealed Against Water—Pressure in Spelterville Caisson Reached Limit of Human Endurance—Listing Prevented by “Kickers” and Blocking

By ALPHONSE F. BROSKY

Assistant Editor, *Coal Age*, Pittsburgh, Pa.

WHEN shafts have to be sunk in loose water-bearing soils the unfavorable conditions frequently seriously interfere with a close adherence to specifications, making changes necessary in the design of the shaft and modifying the methods by which it was at first proposed to sink it. To provide against difficulties in the sinking of shafts, boreholes should be drilled and their records carefully studied in the light of previous experience. Such a study will enable the shaft sinker to anticipate his problems and to prepare to solve them, but at best the difficulties may be so many and so perplexing as to tax the resourcefulness of men who are well experienced in the art of sinking in loose water-bearing strata.

When the Grasselli Chemical Co., in 1921, opened up its Spelterville mine in the No. 4 coal seam, five miles north of Terre Haute, Ind., and awarded the contract for the sinking of two shafts to the Dravo Contracting Co., of Pittsburgh, Pa., that firm decided to forecast to the best of its ability the difficulties that might arise, and to plan expedients for every emergency. Accordingly, a study was made by this company of the shaft-sinking methods that had been employed at mines in the vicinity of the properly. However, most of these mines are in the Clinton district to the north of Spelterville and on the west side of the Wabash River, where in most cases the shafts were sunk in timber by the open method, no serious difficulty being encountered.

In a few instances steel jacking plates, followed by skin-to-skin timber sets, were employed. In a number of cases, however, the shafts were not plumb when finished, and in others it was impossible to shut off the

water at the rock because of the methods employed. After inspecting the timber lining in these shafts and noting the unsatisfactory performance of the hoisting cages consequent on the crookedness of the guides, the contracting company concluded to employ pneumatic caissons in sinking the shafts of the Spelterville mine.

Boreholes on the site of the auxiliary shaft showed a bed of sand and gravel 140 ft. thick that overlaid solid rock in which a permanent seal could be made. Of this thickness 111 ft. was water-bearing. Boreholes at the location of the main shaft revealed that it would be necessary to sink through 160 ft. of sand and gravel and that 105 ft. of this thickness was wet.



FIG. 1—REINFORCING RODS AND LUBRICATING PIPES IN AUXILIARY SHAFT

One block is in position and is ready for the placing of forms for the next block. The eight so-called lubricating pipes emit water, steam or air and loosen the sand and gravel around the caisson, thus enabling the shell to slide down more freely than if the material were packed around it.

NOTE—In the headpiece the pile of sand on the right is an accumulation from the blowpipes. It represents the sand and gravel which occupied 48 ft. of the shaft excavation.

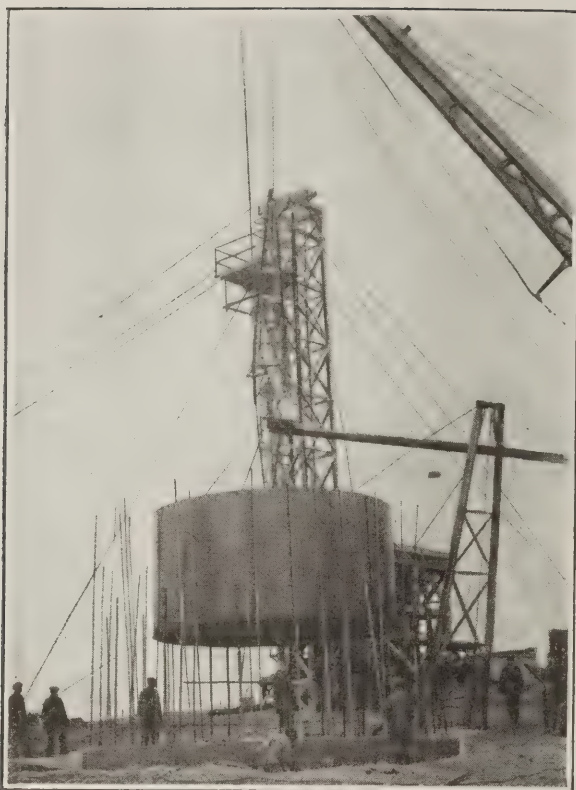


FIG. 2—PLACING INSIDE FORM AT AUXILIARY SHAFT

The forms are built on the ground and placed by a derrick. As soon as the outer and inner forms have been set and secured, concrete is poured from the tower in the rear.

Hydrographs of the Wabash River were studied, and the hydraulic gradients at various stages were plotted. Data on other water problems also were carefully considered.

Finally it was decided that pneumatic caissons would successfully penetrate this sand and gravel but that a pressure of 51.5 lb. per square inch would be required in the working chamber to overcome the hydrostatic head at these depths. Though two shafts had to be sunk the construction program permitted the sinking of one shaft at a time, so that the compression machinery used for the auxiliary shaft could be used for the sinking of the main shaft as soon as the former had been sealed at the rock.

An inside diameter of 13.5 ft. with a concrete lining of 18 in. was specified by the coal company for the auxiliary shaft. Profiting by the experience of those in the vicinity whose shafts, when completed, were out of plumb, the contracting company planned to sink this shaft with a diameter of 16 ft. on the inside, thus allowing a clearance of 15 in. all around.

Incidentally, this provision was a wise one in that the shell was out of plumb but within the clearance when the shoe was finally sunk to a footing of solid rock. As the caisson walls were 4 ft. thick, the outside diameter of the shell was 24 ft. Steel rods, placed horizontally and vertically, were used to reinforce the shell, which also was fitted with lubricating pipes at eight equidistant points in its periphery to lubricate the outside surface with water, steam or air, injected under pressure from the top of the shell. In the course of sinking the shaft lining these pipes were used frequently to reduce the skin friction and thus insure an even downward motion with the cutting edge at times crowding the diggings.

From the top elevation of 491 ft. the shaft was sunk by the open method to an elevation of 458 ft., a depth

of 33 ft. below the surface, at which stage the concrete deck was put on at a height of 35 ft. above the shoe. An orange-peel bucket was employed to remove the excavated material. The lining of concrete was lengthened in lifts of 8 ft. At a depth of 58 ft. below the surface, equipment was added to furnish air at an initial pressure of 16 lb. per square inch.

The crews worked in three 8-hour shifts. Whenever the materials excavated were sand and gravel they were blown out in 6-in. blowpipes. Where the caisson tended to stick, the skin friction was reduced by means of the lubricating pipes.

The buoyant effect of the high air pressure coupled with the lack of resistance of the fine sand through which the caisson was sunk caused the latter to be unstable and difficult to control. It was badly out of line just before it reached the rock, and in consequence much labor was spent to land within the clearance of 15 in. allowed all around.

At the surface "kickers" were used on the low side between the soil and the lining, and diametrically opposite an excavation was made with the orange-peel bucket from the surface to the upper water level. On the inside a system of blocking was placed under the shoe to retard the downward movement of the low side.

When the shell landed on a coal seam 22 in. thick which lies above a bed of fireclay next to the rock the lining was 10½ in. out of plumb. Moreover, it was discovered that the bottom of the shoe leaned in the direction of the dip of the coal, but not to the same degree. The dip, in fact, amounted to 12 in. in a length equal to the outside diameter of the caisson. Taking into account the difference in levels of the high and low side of the shoe, the low side hung at a height of 10½ in. above the coal, yet was slanting with the dip nevertheless.

Because the coal seam dipped in a direction that hindered rather than aided in obtaining an even bearing, the 10½-in. gap on the low side of the shoe was blocked up and the coal was dug out under the high side of the shoe. Thus the shoe was adjusted to an even bearing without disturbing the alignment of the shaft. The process of dropping the caisson through the coal to the fireclay was essentially slow because it became necessary

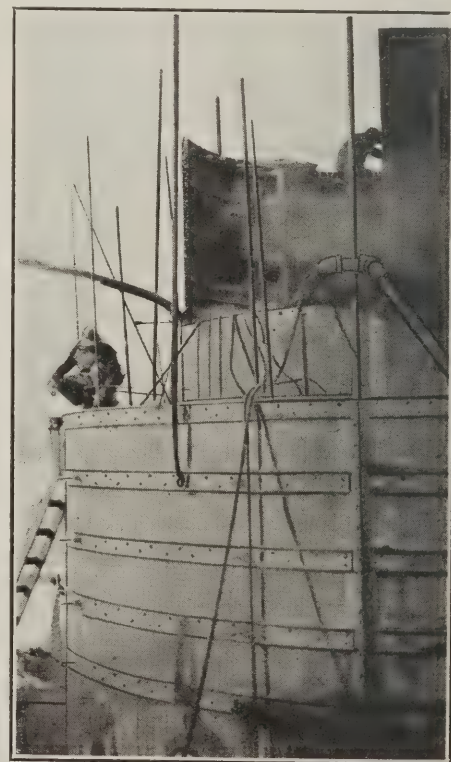


FIG. 3—BLOWING DRY SAND FROM AUXILIARY SHAFT

At one stage in the operations dry sand was raised from the working chamber to the surface, through a 4-in. pipe, the air having a pressure of 19 lb. per sq.in. It was found that it was easier to bring the sand up when dry than when wet.

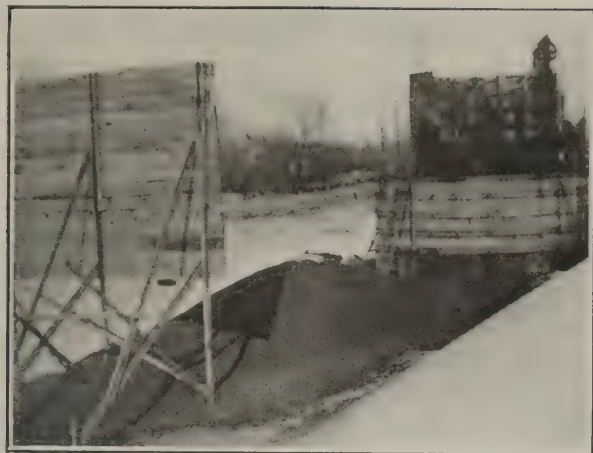


FIG. 4—ANOTHER VIEW OF BLOWPIPE IN ACTION

The shoe was at this point 79 ft. below the top of the concrete. A hoarding has been erected to precipitate the material blown from the pipes.

to "lock out" the coal in buckets as it was dug. At this level the shifts were changed every half hour, as the men were working under pressures of from 49 to 51 lb. per square inch, nearly three and one-half atmospheres. After much effort the caisson finally was leveled up in the fireclay, and preparations were then made to drop it to the rock. By this time the shell had become very light.

After numerous "blow-downs," or reductions in pressure, were made within the air chamber the shell finally landed evenly on an elevation of 353.5 ft., which was the horizon to which the excavation had been squared up in the fireclay. Each "blow-down" was accompanied by an inrush of sand and water; in some cases as much as fifty bucketfuls had to be removed between successive attempts to drop the shell to its final resting place.

No difficulty was experienced in caulking the shoe, which was accomplished by the use of oakum and an unusually stiff grout. The rock was excavated $2\frac{1}{2}$ ft. lower than the shoe, and in it forms were placed for the first half of the seal. Concrete was poured and then held in place under a pressure of 51 lb. per square inch for four days to allow it to set sufficiently.

After the compressor was stopped and the air was gradually cut down to normal, it was found that the hole made 13 gal. of water per minute, which, it was felt, could be closed off in the second seal. At bedrock the hydrostatic head was 115.65 ft., equivalent theoretically to a pressure of 50.2 lb. per square inch. The maximum air pressure carried in this work, as before mentioned, was 51.5 lb.

Upon completion of the first seal in the auxiliary shaft the air equipment was removed. Excavation proceeded in the open in preparation for the second seal which extended in solid sandstone for a depth of 2 ft. below the level at which the first seal was made. The leakage of 13 gallons per minute which found its way through the first seal was closed off almost entirely by the second seal, as was proved by closing the stop cocks on the grout pipes placed in the wall. Grouting through these pipes was the last step in the highly successful undertaking of sealing the shaft. The time required for the work to this point was about five months.

A detailed account of the work of sinking the main shaft is unnecessary inasmuch as many of the difficulties encountered have been already described in relation

to the auxiliary shaft. Similar methods were employed in the sinking of both shafts. Work on the main shaft had been going on for nearly two months simultaneously with the work being done on the auxiliary shaft, and the two jobs were so nicely scheduled that the main shaft was ready for the use of the air equipment at the time the auxiliary shaft was first sealed. The specifications provided that the finished shaft should have an inside diameter of 18 ft.

It was sunk, however, with an inside diameter greater than that specified by the coal company, namely 20 ft. This gave a clearance of 12 in. all around, which was less than that allowed in the sinking of the auxiliary shaft. The contracting company felt sure that the main shaft would not show a list beyond the limits allowed, reasoning that the smaller shaft when it landed on the rock was off less than 12 in., and that the crews, being more familiar with the conditions to be met, would be able to sink the second shaft more accurately.

From a surface elevation of 519 ft. the shaft was sunk to an elevation of 428 ft. before the caisson deck was installed and preparations were made for pneumatic sinking. A massive sandstone which pitched slightly was reached at an elevation of 362 ft. This was squared up and penetrated for a depth of 10 in. to form a footing for the shoe.

When sealed the leakage amounted to no more than two gallons per minute. The maximum working pressure in the air chamber to counteract the final hydrostatic head of 105 ft., or 45.5 lb. per square inch, was 47.5 lb. This pressure, by the way, was increased to 49 lb. while concrete was being placed.

As one might well realize, no little difficulty was experienced in sinking the shell so that it would land on the solid rock within the limit of 12 in., which was the maximum displacement allowed. As in the sinking



FIG. 5—POURING CONCRETE INTO EIGHT FOOT FORM

The shaft is only just started, this being only the second block to be poured, no air being used at this stage of the operations.

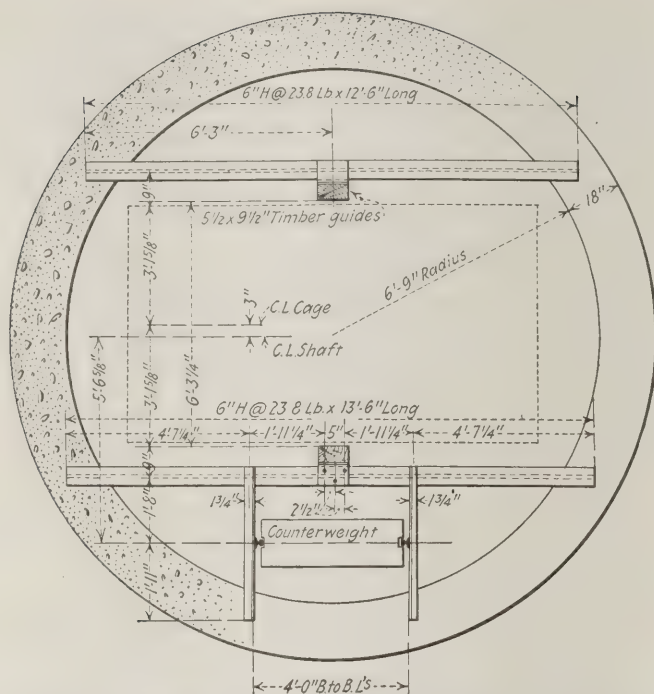


FIG. 6—CROSS-SECTIONAL PLAN OF AUXILIARY SHAFT

This shaft is only 13 ft. 6 in. in internal diameter. It is intended to accommodate a single counterweighted cage. The center line of the cage is 3 in. south of the center line of the shaft. In consequence the southern buntion is 12 in. shorter than the other.

of the auxiliary shaft, the caisson naturally was difficult to control by reason of its deck, which had an area of 616 sq.ft. and was 35 ft. above the shoe. The bottom of the shell was not at any time really fixed, due to the buoyancy of the air chamber.

Consequently when the top listed from the vertical, the caisson was righted only with great difficulty. In fine sand and in the presence of water the skin fric-

tion, which is slight enough at best, is made less by the upward movement of escaping air, and as a result the pneumatic caisson frequently founders. Closest attention to the manipulation of the blocks on the inside and "kickers" on the outside is essential to keep the caisson erect. With each "blown-down" the "kickers" were adjusted, and the top, which at one time leaned 24 in. out of plumb, was "kicked back" to within 10 in. of being plumb when the shell was finally landed.

No further trouble was encountered in extending the shafts to the No. 4 seam of coal. The depths to coal are 181 ft. and 197 ft. for the auxiliary shaft and main shaft respectively. Figs. 6 and 7 show in plan the general arrangements of compartments in both shafts as specified by the engineers for the coal company. As is evident from an inspection of Fig. 7, the ultimate capacity of this mine is not meant to be large, or a single counterweighted skip would not have been selected. This provision though unusual is in accord with good engineering practice.

The success of this shaft-sinking job emphasizes distinctly the need of forethought in putting down shafts through alluvial deposits and soft ground. In spite of all that is known of the technique of shaft sinking, many failures in this work have been reported and many shafts have been sunk at undue cost.

As a rule shafts cannot be made too large, but in many cases they are constructed too small. Had these shafts in Indiana been sunk to correspond with the exact needs for the hoisting equipment, they would when they were completed, unless irregularities in the guides had been tolerated, have had a plumb diameter about 2 ft. less than that specified.

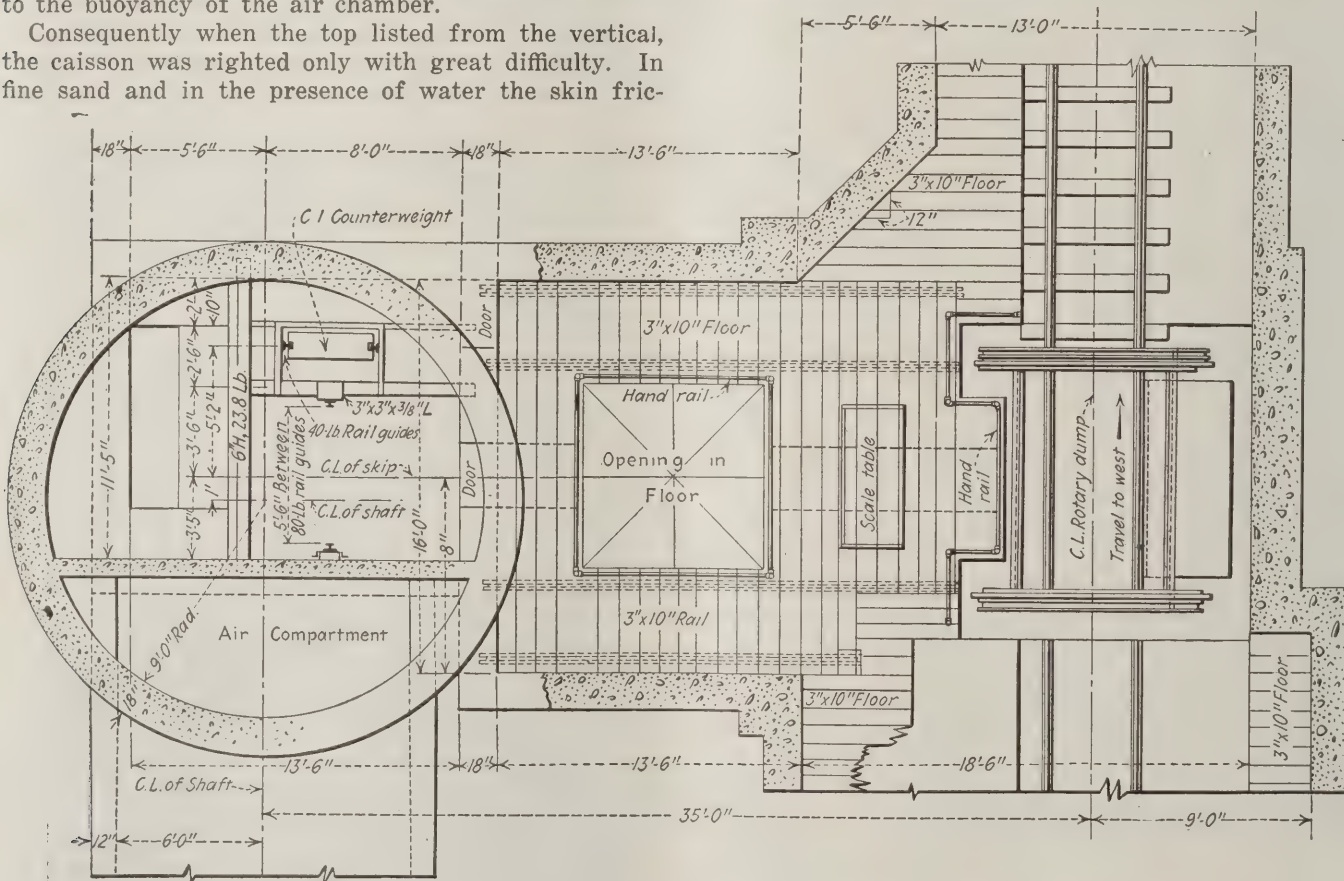


FIG. 7—CROSS-SECTIONAL PLAN OF FOOT OF MAIN SHAFT SHOWING ROTARY DUMP

The shaft has a segmental air compartment which is formed by the introduction of a concrete partition. The counterweight is placed on the opposite side. A buntion is placed at right angles to this partition between it and the shaft wall, and this in turn supports another buntion placed parallel to the partition. The skip guides are placed on this wall and on the second buntion.

Can Expel Water from Wet Slack by Oils and Pressure; Much Ash Leaves the Coal with the Water

Use Only Three to Ten per Cent of Oil for Flocculation—Addition of Oil and Pressure of One Ton per Square Inch Reduces Water in Pulp from 130 to 10 per Cent of Solids—Coal Briquets Well Without Further Drying

BY C. H. S. TUPHOLME
London, England

TWO important developments have recently been made in rendering the concentrates from the froth-flotation system of coal washing more suitable for industrial purposes. It is obvious, from a study of the froth-flotation process, that the resultant concentrates are finely divided coal particles mixed with a large quantity of water, and it is naturally essential that these concentrates should be at least substantially separated from the water with which they are originally in such close association. After conducting a number of investigations, Minerals Separations, Ltd., the operators of a froth-flotation method, have discovered two ways to separate the coal particles from the associated water.

In the first method the froth flotation concentrates or other powdered coal particles associated with water are suspended in sufficient water to make a mobile pulp. This pulp is then subjected to agitation, usually with aeration. To this is added an oil, tar or some other hydrocarbon or carbonaceous liquid, which has the property of coating the coal particles and also of causing the coal particles coated, to flocculate together, after which the coated and flocculated particles are separated from the water by draining or filtration without being compressed into blocks or briquets.

It has been found that certain oils, tars and other hydrocarbons or carbonaceous liquids, which are incapable of forming briquets of carbonaceous materials, possess these coating and flocculating properties.

NEED BUT LITTLE FLOCCULATING MATERIAL

It has also been determined that this flocculating effect occurs with very small quantities of these agents when in water. The quantities of the reagents may be small, (from 3 to 10 per cent of the weight of the coal, for example) sufficient only to coat the coal particles with a fine film like a varnish, and a quantity quite insufficient to fill the interstitial spaces between the particles.

The flocculated particles include in the interstitial spaces a large proportion of water, but owing to the fact that their surfaces have become repellant to the water, it is possible to remove the contained water by filtration or draining, preferably assisted by pressure, and thus the drying of the particles becomes a simple matter.

It may be said here that Minerals Separations, Ltd., makes no claim to the use of the Trent process where coal particles are agitated with a quantity of liquid hydrocarbon up to 40 per cent of the coal to form an amalgam of the coal and oil with the exclusion of the water.

The removal of the water from the coated and flocculated particles may be assisted by pressure. However, it must be remembered that the coating and flocculating

agent does not act as a binder and therefore will not suffice as a binding medium in the manufacture of briquets.

This method offers particular advantages when the coal particles are subsequently to be made into coke, because the hydrocarbons in the flocculating agent are distilled in the coking operation and may therefore be recovered. Moreover, the presence of these hydrocarbons in the mass of the flocculated coal particles constitutes an addition of volatile matter which assists the coking of special types of coal, which would otherwise be unsuitable for the manufacture of coke.

The quantity of the agent employed is sufficient to produce the flocculation at the temperature of the circuit water. It may be reduced by using a heated circuit, but the treatment is better performed at atmospheric temperature. From 3 to 5 per cent has been found sufficient when anthracene oil, coal-tar, coal-tar oil and other reagents are used. The following are examples illustrating the application of this process.

Coal from a Durham shaft mine was ground to pass a screen of 0.1 in. aperture. The ground coal was concentrated by flotation, using 0.5 lb. of creosol and 0.125 lb. of paraffin per ton of coal. The concentrates removed had a water-to-solid ratio of 1.3 to 1.

The concentrates with their associated water were placed in a vessel of square horizontal section, and were agitated by an impeller rotating with a peripheral velocity of about 600 ft. per minute. Coal tar from coke ovens was added during the agitation, the quantity of tar amounting to 4 per cent of the weight of the dry concentrates. The test was made at room temperature. The coal became intensely flocculated and readily separable from the water.

PRESSURE AND LITTLE HEAT ALMOST DRIED COAL

The bulk of the water was removed by draining, but it would be assisted, if desired, by subjecting the flocculated coal to compression. Under a pressure of 2 tons per square inch, the coal became substantially free from water, and in drying it in a water oven at a temperature of 100 deg. C. for a period of 3½ hours, the weight diminished by 2.7 per cent, which indicates the small quantity of water remaining.

The coal was thus formed into a cake which, however, could be easily crumbled between the fingers. It will be understood that it is not essential to compress the coal into cakes in this way although this may be done both to assist removal of the water and to facilitate handling of the treated material.

In the second case, coal from the Powell Duffryn mines was ground to pass a screen with an aperture of 0.1 in. The coal was concentrated by flotation using ¾ lb. of creosol and 0.5 lb. of paraffin per ton of coal, in which operation the ash content was reduced from

15 per cent to 5 per cent. The concentrates removed had a water-to-solid ratio of 1.35 to 1.

These concentrates with their associated water were transferred to a vessel, in which they were agitated as in the first example and during the agitation anthracene oil was added, the quantity of oil being 3 per cent of the weight of the dry concentrates. This operation was performed at room temperature. An intense flocculation was produced, and when some of the flocculated coal and water was placed on a 60-mesh screen, clear water ran through, and the greater part of the contained water drained away.

When the mixture of flocculated coal and water was placed in a mold having slits for the egress of the water and subjected to a pressure of 0.5 ton per square inch, some further water exuded, and a cake was formed which contained 12 per cent of water.

A pressure of 1 ton per square inch produced a cake containing 9 per cent of water. In either case the cake crumbled easily between the fingers.

When treating powdered coal not already concentrated to separate the coal particles completely from gangue or other ash-forming materials, it is possible to effect not only the flocculation of the coal particles and the removal of the water, but, also, in the same operation, it is possible to separate the gangue and other ash-forming materials from the coal particles.

Thus, in this method, the finely divided coal particles mixed with gangue or other ash-forming materials, are suspended in sufficient water to make a mobile pulp. This pulp is then subjected to vigorous agitation with a similar flocculating agent in a quantity insufficient to form an amalgam, in which the interstitial spaces between the particles are filled with the flocculating agent, but sufficient to coat the coal particles and flocculate them in water with the aid of the agitation.

The gangue particles are not coated or flocculated, but remain in suspension in the water, and are separated from the coal with the water by draining or filtration. The coal particles cling together in masses which will not pass the screen, and the gangue particles, being unflocculated, pass through in suspension in the water. The draining may be assisted by pressure, or not, but in any case durable briquets are not produced.

REDUCES ASH IN COAL FROM 23 TO 13 PER CENT

In another case waste coal or duff from the Powell Duffryn mine in South Wales and containing 23.04 per cent of ash was made up into a mobile pulp with an equal weight of water, and the pulp was agitated, a quantity of coal tar equal to 4.75 per cent of the weight of the crude coal being added so as to produce flocculation.

The mixture was then transferred to a press and subjected to a pressure of 2 tons to the square inch, thereby causing the water to exude. It carried a large proportion of the gangue away with it in suspension. The resulting cake contained only 13 per cent of ash and 5.56 per cent of moisture. This test was carried out at normal atmospheric temperature.

Again the process of flocculating the coal particles may be done in such a way that the coated or flocculated coal particles are floated in the form of a froth, while the gangue remains in the water.

The same material as in the previous example, viz.: pulverized waste coal or slack from the Powell Duffryn mine in South Wales, was mixed with its own weight of water to form a mobile pulp. To this pulp were

added the following reagents: 4.7 per cent of coal tar, 0.075 per cent of creosol and 0.075 per cent of paraffin oil, these percentages being based on the weight of the crude coal.

After agitation and aeration the flocculated coal was removed as a froth and subjected to a pressure of 2 tons to the square inch. The resulting cake contained only 5.76 per cent ash and 3.87 per cent of moisture. This test was carried out at normal temperature.

In the second method the coal is made readily separable from water and briquets easily prepared either from powdered coal or from the froth flotation concentrates by a cold process.

During investigations it was found that if pitch in a molten condition be mixed with naphthalene, the mixture remains liquid but viscous at ordinary temperatures. Very slight warming thoroughly melts it. This material was used as a binding agent, and in coating the coal particles with it they become readily separable from associated water and can be pressed into briquets.

In this process a mobile pulp of the coal and water is agitated with a binding agent consisting of pitch which contains naphthalene or phenanthrene so as to coat and flocculate the particles as in the previous method. On introducing the pulp into a press, also at normal atmospheric temperatures, and subjecting it to a pressure of 2 tons per square inch, an excellent briquet is produced, substantially free from moisture. The briquets are hard and durable, and become harder with time, and it is also found that naphthalene volatilizes out of them.

COAL, PITCH AND NAPHTHALENE QUICKLY HARDEN

In the course of investigations it was found that if naphthalene is mixed with molten pitch in the proportion of 1 part of naphthalene to 3 or 4 parts of pitch, the mixture remains liquid for a long time, but if powdered coal be added, solidification occurs after a short time.

It will be understood that this process is applicable to the briquetting of finely powdered coal from various sources, but it is particularly applicable to the production of briquets from coal concentrates produced by froth-flotation, these concentrates being already in admixture with water.

The following is a description by way of example of the application of this invention to the production of briquets from Powell Duffryn slack.

In one test 1,200 g. of Powell Duffryn slack in a finely divided state was treated by froth flotation, the agents added per ton of slack being $\frac{3}{4}$ lb. of cresol and $\frac{1}{2}$ lb. of paraffin. The froth removed contained 1,000 g. of coal in a pulp of 1.3 water to 1 of solid.

To this pulp was added the molten binding agent containing 5 per cent pitch and 2 per cent naphthalene, based on the weight of the coal, and the mixture was agitated, at normal atmospheric temperature under a pressure of 2 tons to the square inch. The water ran away clear from the flocculated material which formed an excellent briquet with a crushing strength of one ton per square inch. In place of naphthalene, phenanthrene may be used.

It will be understood that the expression "pitch" includes such substances as the pitch obtained from petroleum distillation. The expression "finely divided coal" includes all coal of the sizes dealt with in briquetting processes or in the flotation concentration of coal or mixtures of various grades suitable for such treatments.

Why Artificial Lightning Is Produced

Study of Lightning Characteristics—Practicality of Power Transmission at Higher Voltages—Lightning Generator and Its Uses

IN THE production of high-voltage electricity approximating that of lightning, which has caused so much interest in scientific circles, the practical significance of the tests has to a certain extent been overlooked.

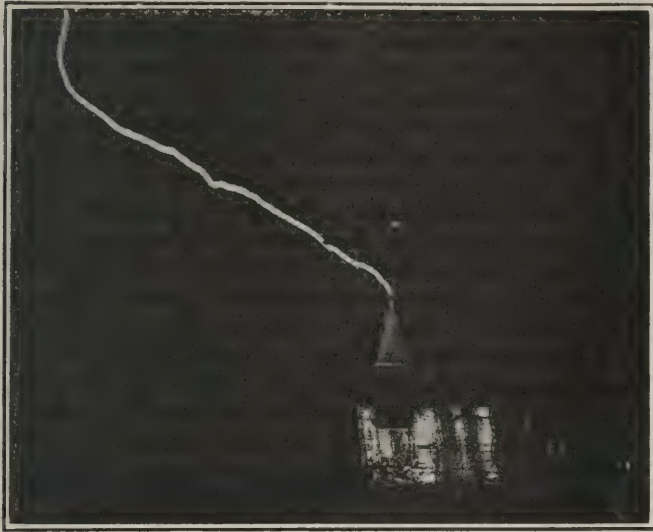


FIG. 1—LIGHTNING FLASH

The church steeple in a miniature village is shown here being struck by a 2,000,000-volt lightning bolt.

Man-made lightning is a phrase with which to conjure. Yet the Pittsfield engineers of the General Electric Co., who spent years of study in the production of these highest known artificial electric pressures, did not do so simply to produce a pretty picture of an electric arc or an artificial thunder storm. They had a very definite end in view, namely the devising of more improved methods for protecting electrical systems from the damaging effects of real lightning, particularly on long transmission lines carrying power.

Some of the things which mean much to the engineer in considering the phenomena of lightning were described at a meeting of the American Institute of Electrical Engineers by F. W. Peek, Jr., who conducted the recent spectacular tests, as follows:

"During a thunder storm lightning voltages that reach the transmission line, produce high electric strains across insulators, transformers and other apparatus at the extremely rapid rate of millions of volts per second. With this rapid rate of application the voltage may reach a very high value in a microsecond (millionth of a second). Hence since there is always a delay or lag in the breakdown of insulation, quite peculiar effects result from these voltages. For instance, some remarkable phenomena that take place are: Much higher lightning voltages usually are required to jump a given distance than voltages at normal operating frequencies; conductors at normal frequency voltages often are good insulators for lightning voltages; water may be punctured like oil; the wet and dry spark-over voltage of insulators are equal; the lightning discharge has a markedly explosive effect, etc. In addition to these characteristics a study also has been made of the

change in voltage and of the shape of a lightning wave as it travels over a transmission line at the velocity of light.

"In order that a laboratory study may be of practical as well as theoretical interest, it is necessary to be able to reproduce lightning voltages in the laboratory on a large scale and of known characteristics. This investigation was started some years ago with a 200-kv. generator. This generator has been added to from time to time until now 2,000,000 volts are available and some single lightning strokes can be obtained that increase at the rate of fifty million million volts per second. The power is of the order of millions of kilowatts. It is believed that this generator closely approximates the voltage and other conditions that usually occur on transmission lines. The lightning voltages used in the investigations were far in excess of any heretofore produced in a laboratory.

"Photographic studies have shown the lightning spark-over of insulator strings that are of such length as rarely to spark over in practice even in bad lightning country. The photographs of the flashes show all the characteristics of lightning, such as a zigzag path, side flashes and the like. These studies are of interest in that they indicate a certain protective which must or should be taken in practice. With such voltages and currents possible therefore it is practical to investigate the protective value of ground wires and lightning rods. It is such an investigation as this that is now under way.

"Along with the production of 2,000,000-volt lightning, further studies of our original production of high voltage at 60-cycle frequency have been continued.

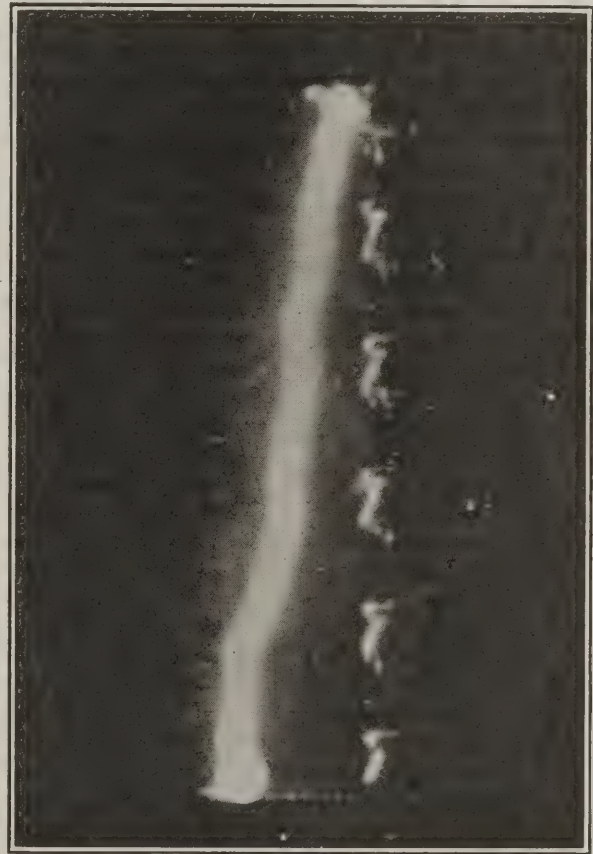


FIG. 2—INSULATOR TEST

Under storm conditions long strings of insulators may be tested. In this photograph the discharge has cleared the insulators. Note how the drops of water between the insulators have been illuminated.

Even if transmission at 1,000,000 volts is not definitely in sight at the present time, there are, of course, many uses for such high voltages in the laboratory from the standpoint of research. But it may not be out of place to indicate just what are the possible uses of 1,000,000 volts in practical transmission.

"On such a system the conductor probably would be about 6½ in. in diameter. If it is assumed that this is a hollow tube with copper equivalent to a 1-in. diameter rod it is possible to transmit 3,000,000 kw. 1,000 miles with about 12 per cent loss and 1,000,000 volts at each end. If 5-in. tubes were used there would be very little loss in fair weather, but during a rain storm the loss would be of the order of 1,000 kw. per mile.

"The striking fact that this brings out is the large amount of power necessary to make such a line economically desirable. It also emphasizes the enormous size of the apparatus units necessary. If present practice were followed, 1,000,000-kw. transformer units would be necessary. This probably would mean erecting in the field. The problem of size and transportation becomes greater than the problem of voltage. However, only a little over ten years ago the 200-kv. line was in a laboratory stage similar to the 1,000,000-volt line discussed here."

Use Concentric All-Rubber-Covered Cables

BY L. C. ILLSLEY* AND H. B. FREEMAN†

IN CONNECTION with the approval of coal-cutting machines for service in gaseous mines the engineers of the U. S. Bureau of Mines have been somewhat concerned as to the type of trailing cables that could safely be used on permissible outfits. Though no final action has been taken on this question and tentative approvals have been granted pending investigations the Bureau has been endeavoring to collect data and information on this problem which would permit a fair yet safe ruling to be made.

For this purpose arrangements were made to visit certain of the mines of three coal companies in order that the cables and cutting machines could be observed in operation. In all twenty mines were visited. A questionnaire covering the operations of trailing cables was filled out at each of these mines. In a few instances no personal inspection was made, the information being supplied by mine officials after conferences with the Bureau's engineer. At other mines the information given by mine officials was supplemented by personal observation inside the mines, usually at a time when the cutting machines were in operation.

The points covered by this questionnaire and a digest of the replies to each are presented in the following summary: Fourteen of the mines used voltage from 500 to 550; the others from 250 to 275. The machines were chiefly of the shortwall type, although a few breast machines were in use. Two general types of cables, "twin" and "concentric," were being used. Most of the twin conductor was insulated with rubber and protected by an outer weatherproof braid. Most of the concentric cables were rubber-insulated and further protected by a special rubber outer covering. In many of the mines investigated the twin braid-covered cables were being replaced by the concentric, all-rubber insulated type.

The length of the cables varied from 200 to 500 ft., 250 and 300 ft. being the most usual lengths. The size of cable varied from No. 8 to No. 4, No. 6 for 500-volt and No. 4 for 250-volt being more commonly used. No reliable cost figures were obtained. In most mines the all-rubber protected type of cable had been in service only a few months, and no fair estimate could be made as to its ultimate life as compared with the cheaper braid-covered cables formerly in general use.

ALL-RUBBER-COVERED CABLE OUTLASTS BRAIDED

The life of the braid-covered cable generally was given as 6 to 18 months; in one instance, however, a life of four months, and in another of three years was reported. In several mines the all-rubber-covered cable had been in service about two years and showed little wear. In general the cable of the latter type had not been in service long enough to permit an estimate of its life, but nearly everyone seemed satisfied with its wearing qualities during the time it had been in service and expressed a marked preference for it.

From a safety viewpoint some of the answers to the question, "When are cables discarded and by whose order?" are of interest; for example: "Cable is discarded when the tendency of the cable to blow up becomes too great;" "Cable is discarded when cable blows up too often." The electrician or machine boss usually is the man who decides whether a cable should be discarded.

A cable reel was used in all but one of the mines. In one mine no reel was used on breast machines. This mine reported the shortest cable life of any investigated. Cables deteriorate by being run over, by kinking, by rubbing against coal, etc. The braid-covered cable, especially, deteriorates from becoming water-soaked, also from kinking. Once the braid has become broken deterioration is quite rapid. Twin cables "kink," but concentric cables do not.

INQUIRY DISCOVERS MANY CAREFUL MEN

A good machine man seldom runs his machine over a cable. For some mines the number of times a cable is run over was stated as "once a month," and for one mine the answer was "once a year." In one mine the cable reel was too small for the cable, and the cable was run over "once a week."

Cables usually are repaired by the electrician or machine boss and splices are made by the machinemen. Practically all repairs are made inside the mine. In several mines special splicing clips were used, but knots and Western Union splice were used in many cases. In all cases the splices were taped. No difficulty had been experienced in splicing cables except in one mine that reported the concentric cable as being difficult to splice. The repairs to the all-rubber-covered concentric type of cable were very much less frequent than those to the twin braid-covered conductor.

The voltage regulation was reported as not good in two mines, fair in five mines, and good in the remainder. It generally takes from 15 to 30 minutes to make a cut. One mine reported 5 minutes to sump, 15 minutes to cut, 10 minutes to unload and 5 minutes to load.

Several mines reported some heating of twin cable, but in general no trouble had been experienced with concentric all-rubber-covered cable, either on or off the reel. One mine reported heating of concentric cable

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on the reel and said that the cable was cooled by pulling it off the reel. This heating evidently was due either to low voltage or to using too small a conductor for that particular service.

Usually either improvised or commercial hooks were used to attach the cable to the power supply. In a few mines clamps were used. In nearly every case a wood or fiber handle was provided to permit the operative to handle the hook without shock. In a few cases tape or a rubber hose served as protection.

In six mines the trailing cable was protected by a fuse, the fuse generally being placed in the insulated handle of the hook. About the same quality of cable was used for the hand cable as for the reel cable, the tendency being toward the concentric all-rubber-covered type of cable. In mines having water the twin braid-covered cables were seriously affected by wet conditions, but no trouble had been experienced with all-rubber-covered concentric cables.

At a previous conference of representatives of these industries and of the Bureau, it was suggested that the Bureau devise tests to determine the suitability of cables for service in gaseous mines. The data obtained in this field investigation would seem to make such tests, especially on any considerable scale, unnecessary, as in almost every instance the concentric all-rubber-covered type of cable proved to be the safer.

Summed up, such cables have a longer life, require less repairs, do not kink, do not become water-soaked, can be handled with less liability of shock to the machine operative and are gradually replacing the older type of twin conductor which has an outer protection of weatherproof braid.

It is believed that for use on permissible outfits where a high degree of safety is desired, the Bureau would be justified in rejecting cables so constructed that they have a tendency to kink or that are so insulated that they have a comparatively short life.

Magazine Explodes in Drumheller, Alberta

ABOUT 1,000 lb. of black blasting powder and 200 lb. of high explosives are believed to have been in the blast that completely destroyed a powder magazine at the Gibson Colliery, Drumheller, Alta. It is believed that two workmen, W. McKinnie and H. Rees, went to the magazine for powder, one of them with an open light. Fig. 1 shows all that was left on the scene after the explosion occurred. The magazine was a small drift into the hillside about 100 ft. in the hill. Other illus-



FIG. 1—RUINS OF THE MAGAZINE AFTER EXPLOSION

The explosion killed both McKinnie and Rees, who probably were in the magazine at the time.



FIG. 2—WASH HOUSE 300 FT. FROM MAGAZINE

J. B. Scott and H. L. Jones, who were in the wash house at the time of the explosion, escaped with bruises, Scott having a contusion over the left eye and Jones on the side of the face.

trations show the Gibson surface plant and what was left of the wash house after the explosion. One cannot favor the use of an underground magazine, for it is almost necessary to use a light when entering it. No light should be allowed in a powder magazine. All illumination should be exterior—that of the sun or of an



FIG. 3—SURFACE PLANT OF GIBSON COLLIERY

Plant has a capacity of 1,000 tons per day. The coal in the seam worked, No. 5, is 4 ft. thick and the cover runs from 60 to 200 ft. The headframe of the shaft can be seen on the right. The hoisting frame was moved about 6 in. by explosion.

outside electric lamp. The risks run at mining plants are frequently altogether unnecessary and occasionally even criminal. Instances such as this add force to the plea for more care in planning powder houses. The company probably believed that it had a safe powder magazine—well back in the hill. The explosion showed the irony of its belief!

Can Ammonia Be Made, as Well as Saved, from Coke-Oven Gas?

FROM the time of the first recovery of byproducts from the coal in the coke oven, the aim has been to get if possible all the ammonia the gas contains and perhaps still better all the nitrogen as ammonia that is contained in the coal. As there is but little nitrogen in coal the greatest expectation of ammonia output bears only a trifling ratio to the tonnage of coal coked; thus with nitrogen comprising 1.5 per cent of the coal weight which is a big percentage the quantity of ammonia that it might possibly be converted into by combination with hydrogen would be 1.82 per cent.

Assuming that we get 25 lb. of sulphate of ammonia from a net ton of coal, we get 6.58 lb. of ammonia or about 0.329 per cent, roughly $\frac{1}{3}$ or $\frac{1}{4}$ of what might be hoped for. The nitrogen of the coal evidently does not appear in any large measure as ammonia in the coke-oven gas. About three times as much is obtained in the manufacture of producer gas by the Mond process.

It is easy to get any quantity of nitrogen from the atmosphere, but it is less easy to fix it, that is, to combine it with something else to form something for which we have a use such as with carbon to form cyanogen or with hydrogen to form ammonia. However, it is now found possible to combine nitrogen with free hydrogen. Now, free hydrogen can be made from water, but when it is obtained it is in admixture with oxygen and ready to combine explosively with it to form water. It is, however, a large constituent of coke-oven gas. It forms about 5 per cent of the weight of many dry coals, whereas the nitrogen content is barely 1.5 per cent.

Moreover hydrogen goes further in the manufacture of ammonia than nitrogen, weight for weight, and that is what we are considering. Three pounds of hydrogen are needed to make 17 lb. of ammonia, but 14 lb. of nitrogen must be supplied for that purpose. The advantages, therefore, of combining free hydrogen from coke-oven gas with free nitrogen from the air would seem great provided that the operation was not too expensive and the gas was not needed for fuel purposes as it usually is everywhere but at coal mines.

USES HYDROGEN FROM COKE OVENS FOR AMMONIA

M. Claude, a native of France, declares that he has such a process for combining nitrogen and hydrogen and that he can treat the coke-oven gases so as to get free hydrogen combining that gas with nitrogen to make synthetic ammonia. For the facts which follow we are indebted to *Chemical & Metallurgical Engineering*. M. Claude has succeeded in dissolving in ether under pressure most of the coke-oven gases and the volatilized liquids, thus leaving hydrogen as a residuum. Near the end of 1921, Claude at the Montereau works with the use of a simple apparatus of his designing succeeded in producing 230 cu.m. (9,122 cu.ft.) of hydrogen hourly from 300 cu.m. (10,595 cu.ft.) of water gas. He was able to use this hydrogen directly in his production of ammonia. This first apparatus has now been replaced by one having twice that capacity, and the present apparatus is supplying a plant producing 5 metric tons (5.51 short tons) of ammonia daily. The treatment of water gas was but an intermediate step toward the utilization of coke-oven gas.

Nothwithstanding the small quantity of coke-oven gas heated (850 cu.m. or 30,018 cu.ft. per hour), the working pressure of the apparatus at the Béthune plant is somewhat under 24 atmospheres, or 353 lb. It is hoped that a pressure of below 15 atmospheres, or 220 lb. may be obtained with a new type of apparatus now being studied, which is designed to treat 5,000 cu.m. or 176,578 cu.ft. of gas per hour, equivalent to a daily production of 20 metric tons or 22.05 short tons of ammonia.

At Béthune, the gases treated are compressed on coming from the debenzolizing appliances, to a pressure of approximately 25 atmospheres, or 367 lb. The succeeding apparatus for treatment consists of a series of towers. In the first the gas comes in contact with a flow of heavy oil controlled by a small pump. Here any remnants of benzol still carried by the gas are scrubbed out. Thence the gases run into a second column, where they are decarbonated by means of a flow of lime water delivered by a centrifugal pump. The next stage in the process carries them to separators, where the water is taken out as well as any other condensable product.

Ethylene, C_2H_4 , one of the most precious of these, can be recovered separately. The hydrogen taken out is then sent on to a gasometer, and the other gases carrying high methane contents are sent back to the works for utilization. So low is the cost of the hydrogen obtained as above described that it is possible in common practice to use the nitrogen produced in any one of the usual processes.

HALF THE BÉTHUNE GAS WAS CRUDE HYDROGEN

Below are given certain of the results obtained at the Béthune collieries. When 850 cu.m., or 30,018 cu.ft. of gas were treated per hour the quantity of hydrogen obtained was approximately 425 cu.m. or 15,009 cu.ft., per hour, or 50 per cent. This analyzed about 90 per cent pure hydrogen, 1.6 per cent carbon monoxide, and a remainder of approximately 9.4 per cent of nitrogen. Ammonia was produced at the rate of 150 kg., or 330.7 lb. per hour, of which 140 kg., or 308.6 lb., was in the liquid state.

The power required for this operation, including the heating of the tubes, debenzolizing and decarbonization, was approximately 460 kw. The physico-chemical method of decarbonization is to be replaced by a purely chemical method that will reduce the consumption of power below that of the present apparatus.

Claude claims for his process great simplicity, as well as low construction and labor costs. The fact that the gases are compressed for the purpose of recovering the hydrogen from them may be of advantage in carrying out the whole process of debenzolizing under pressure. The yield in benzol would then be increased by 10 to 15 per cent, while the size of the absorption and distillation appliances would be reduced. Naturally, the quantity of solvents or scrubbing oil and unavoidable losses and the consumption of steam, etc., would also diminish.

As the various component parts of the gases are recovered and can be used separately, it is likely that from 150 to 200 kg. (330.7 to 440.9 lb.) of ethyl alcohol will be produced per metric ton of ammonia. The increase of the yield of benzol and the production of ethylene are alone sufficient to make up for the cost of compressing the gases for the separation of hydrogen.

They Used to Scrape a Little Dirt in Kansas Strip Pits, But Now—

BACK in 1898 when the Clemons Coal Co., Pittsburg, Kan., was young, the overburden was removed from the coal as shown in the top picture on the page following. Twenty feet was about the limit of stripping. In the illustration, Ira Clemens, now president of the company, is shown on the left in white shirt sleeves driving a scraper team. Today gigantic steam and electric shovels as big as any used anywhere move 50 ft. of overburden handling 4,000 to 6,000 cu.yd. a day with 6-yd. dippers working on an 80-ft. boom. They turn the flat country into regions of hills as can be seen in the lower picture of the opposing page. Today also strip-pit loaders almost dispense with hand shovels and "elbow grease." The type of loader shown in the center illustration follows the shovels and operates its $1\frac{1}{2}$ cu.yd. dipper horizontally and thus can part coal along cleavage lines without cutting into the tough fireclay "horsebacks" which afflict Kansas operations. Mechanism has eliminated from stripping much of its hard, hot work.

Strip-Pit Operations in the Kansas Coal Fields Today and in Yesteryears



Safety Switch at Slope Mouth Catches Runaway Cars

A Simple Precaution at the
Mouth of the Dolomite Mine
Would Have Prevented Explosion

THAT for an expenditure of \$500 or less made once and for all, a majority of the runaways at slope mines with their trains of calamities to life and property, could be avoided is the opinion of A. J. Moorshead, president and general manager of the Madison Coal Corporation, Chicago, Ill.

A safety switch built on the slope, just outside the mouth of the tunnel, is the safety device upon which Mr. Moorshead pins his conviction. Such a switch with a short track running into an upgrade at the end could be used to catch runaway trips with such ease that it is a matter of wonder that this installation is not standard at every slope mine in the country. A bill is now before the State Legislature of Alabama making safety switches part of the required mine layout.

When Mr. Moorshead's company (a subsidiary of the Illinois Central R.R.) took over No. 11 mine, an eight per cent slope operation at DeKoven, in western Kentucky, he found upon inquiry that many runaways from the knuckle of the dump had occurred with nothing but the chance of a derailment to stop the trip from going to the bottom of the slope or to the face of the workings in the mine. Upon inquiry he found that many such runaways had taken place at DeKoven and that injuries had resulted therefrom, and he immediately directed that a safety switch be constructed near the month of the slope, as shown in the illustrations. This construction cost approximately \$500. Although there have been several runaways from the knuckle since that time, they have all passed to the safety switch, and no persons have been in-

jured nor property been damaged aside from the wrecking of a few cars.

No. 11 slope is approximately 6,000 ft. from dump to bottom. It is 500 ft. from the mouth of the slope to the knuckle. That distance is the most dangerous part of the entire haulage system. Most of the runaways start right at the knuckle after the trip has been hauled to the top, the rear car has been scotched and the cable has been detached so that the front cars can be uncoupled and run to the dump. When this is done the tail end of the trip may hang back over the end of the down grade to the dump and on the steep incline leading back into the mine.

Runaways are usually caused by careless spragging, which allows the trip to coast down into the mine, gaining momentum and the power to do frightful destruction with every turn of the wheels.

It is seldom that any very serious damage is done through the rope breaking or from any other cause when the trip is being pulled up the slope, because when thus being pulled a steel trailer is attached to the rear car and its crows-foot dragging along behind the trip is always ready to stop the train by digging into the ground or ties before any backward momentum is attained. The danger is much greater near the knuckle because it is here that the trailer is removed.

At No. 11 Mine, the trip rider on the rear car of outbound trips takes off his trailer at the mouth of the slope and throws the safety switch. He then waits right there for the next trip of empties going down, and as long as that switch is thrown no runaway cars can run back into the mine.

There are other precautions and safety devices in use at Mine No. 11, such as an automatic engine stop to prevent the hoist from pulling the trip through the tippie, but the "safety switch" is regarded as the most important protection the mine has against damage.

Following the terrific explosion of mine dust at the

Top of No. 11 Slope

Trip rider at switch, detaches trailer and sets safety switch.



Trips Take Sidetrack

The switch on the incline leads the trip up a steep hill slowing down its speed without damage.

Dolomite slope in the autumn of last year, in which more than seventy men lost their lives from a runaway trip which cut an electrical circuit, State Mine Inspector Nesbitt of Alabama had a bill introduced in the Alabama Legislature requiring safety switches at all slope mines, and a further bill providing that lines carrying electric current into mines be concealed. These requirements would tremendously increase the margin of safety in Alabama against a repetition of the Dolomite disaster.

In that unfortunate mine a runaway trip rushed down a rock slope 850 ft. long, pitching 30 per cent. The point of ignition was about 100 ft. from the bottom. There the cars smashed an armored cable, causing an inside contact which blew through the armored covering. This not only produced the spark which ignited the dust in the slope, but stopped the main fan for about twelve minutes until auxiliary power for the fan could be hooked up.

Men with Open Lights Ignite Gas in Shaft Abandoned and About to Be Reopened

An explosion of a pocket of gas at the base of a 200-ft. shaft at the Marcoll mine of the Maher Collieries Co., near Clarington, Monroe County, Ohio, Aug. 2, was responsible for the fatal burning of two men and for the serious burning of others of a party of six men who descended the shaft which was being reopened. The shaft was sunk two years ago and had never been used. At the bottom, entries had been driven about 30 ft. in two opposing directions. The shaft had been allowed to fill with water awaiting the time when the mine would be completed and the hoist installed. There is not as yet any connection between the main shaft and the mine. Mining has been conducted in the property, but up to the present coal has been hoisted through the air shaft except that taken from the 60 ft. of entry just mentioned.

Recently the company decided to install a hoist in the main shaft. On the day of the explosion, Thursday, Aug. 2, the water had been lowered to within 2 ft. of the bottom, and the pumps were still working, endeavoring to lower the water still further. Men had gone down the shaft frequently but had detected no gas. Even as recently as 12 o'clock noon on Thursday three men had been inspecting the pumps at the bottom of the shaft. They carried open-flame lamps and stayed down a half hour or so without any mishap.

At 1:30 p.m. a party of six descended the shaft steps. In the group were William Maher, general manager of the mine; James F. McCurdy, a salesman for the Gee Electric Co., of Wheeling, W. Va., both of whom are now dead; Daniel Maher, a brother of the manager and in charge of the Rosemary mine nearby and L. F. Read, engineer for Allen & Garcia Co., of Chicago, Ill., both of whom are seriously burned but will recover, Harry W. Gee and David H. Parker, both of Wheeling.

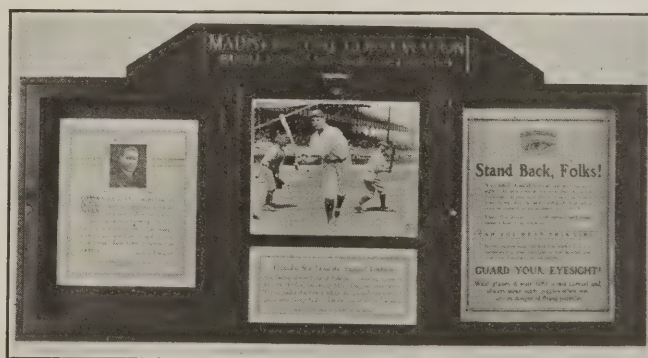
Before the unfortunate six started down the stairs, William Maher borrowed two carbide lamps at the surface, and Read carried his own, making three open-flame lamps in the party. It is probable that William Maher was first to arrive at the bottom with McCurdy and Read close behind. They no sooner had reached the bottom than the gas ignited and sent a burst of flame up the shaft which mounted 10 or 15 ft. into the air

above it. The men on the surface gathered round the opening and were rejoiced to see five of the six men make their way alone and unaided up the stairs to the top. Will Maher and Read appeared first and were led down the short stairs from the top of the shaft collar to the ground. The others came up later, but Parker failed to make his appearance. Miners rushed down the stairs and found him lying at the bottom. They got several lungfuls of carbon monoxide helping him out. Though unconscious he needed little aid to bring him round. A doctor from Clarington and a trained nurse reached the mine soon after and treated the burned men before they started to Wheeling by train from Woodlands, a station across the Ohio River from the mine. At first it was hoped that all would recover.

An engineer who was at the mine two days after the accident said that in his opinion the explosion was a deplorably unfortunate occurrence with no blame to be attached to anyone. He said: "It is easy now to say that the shaft should have been ventilated and safety lamps used but who would ever have perceived that necessity before the explosion happened."

Bulletin Board with News Photographs, Personal Message and Welfare Cartoons

WITH increased interest in safety, the bulletin board has become an important factor in most mines. Some have wished that, besides carrying the safety message, it might have a story of a somewhat different character that, being changed with frequency, would draw the men to a more frequent perusal of its contents. To this end the Elliott Service Co., 244 West 49th Street, New York, has introduced an industrial service which includes the placing of a three-section glass-enclosed green-enameled steel-framed bulletin board at the mines, displaying 14x17-in. news photographs which are changed every day. These news photographs occupy the central panel of the bulletin board



and on the left side is placed an inspirational paragraph on safety, health, education and like subjects delivered by a man of national fame and made personal by the use of his photograph. On the right are placed several safety bulletins and also perhaps some objects of local interest in connection with safety. Here may be displayed a piece of a shirt or overalls that have been torn off by some machine, carelessly left unguarded, or goggles which have served to protect the eyes of a workman from a flying piece of steel.

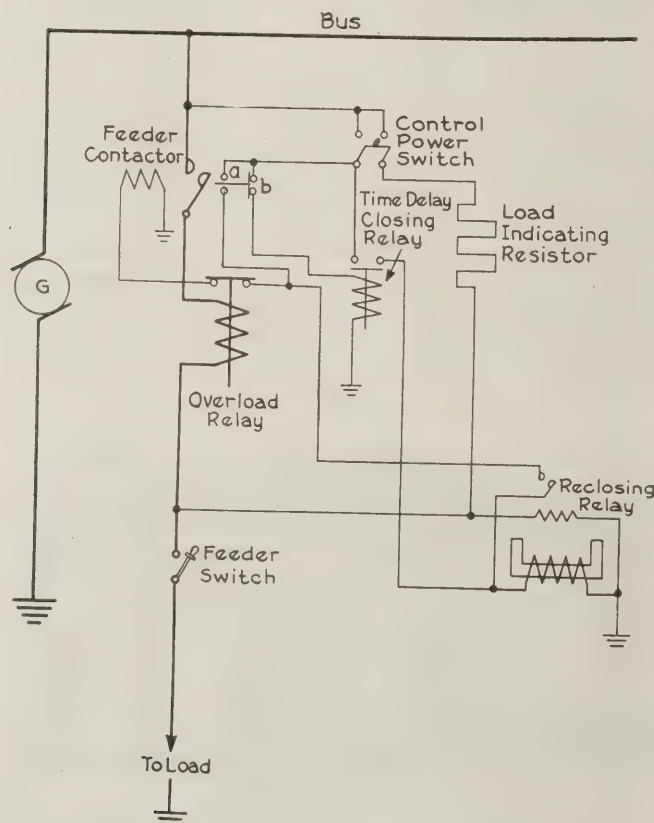
This service also provides a printed sheet "Introducing Jim Kelly." That worthy gives utterance to a number of wholesome and plain truths in a pleasant and inspiring manner. The board measures 32x64 in.

New Equipment

D.-C. Automatic Reclosing Equipment

AUTOMATIC reclosing equipments have recently come into use in mine installations for use on circuits supplying power to hoists, cutting and drilling machines, mine trolley systems, etc., in industrial plants, and on street railways. The reclosing feature insures continuity of power at the load under normal conditions and at the same time is a reliable protection to the main-line apparatus in case of a disturbance on the feeder. The automatic character of the reclosing apparatus eliminates delays that might arise from the necessity of reconnecting the load manually.

An automatic reclosing equipment of such a character for use on direct-current circuits of 300 and 600 volts was recently developed by the General Electric Co. Its function is to protect apparatus in case of short-circuits or heavy overloads occurring on the feeders, while in-



AUTOMATIC RECLOSING BREAKER EQUIPMENT

Continuity of service has become an important factor in coal mining. This breaker restores service to a line immediately the line is cleared of the cause of the interruption. Furthermore, no attempt is made to reclose when a high load remains on the line; this prevents serious peak loads being thrown on the machine at closing.

insuring continuity of service when the trouble is only temporary. It is designed for use on circuits employing stub-end feed, a combination of stub-end and multiple feed, or in combination with a sectionalizing switch, or sectionalized feeder.

The operation on stub-end feed, where there is only one source of power to the load, is typical, and its description will serve to give an idea of how the appara-

tus functions. The devices that go to make up the equipment are a shunt contactor, an instantaneous overload relay, a reclosing relay, a control power switch and a load-indicating resistor. These devices are connected in accordance with the wiring diagram.

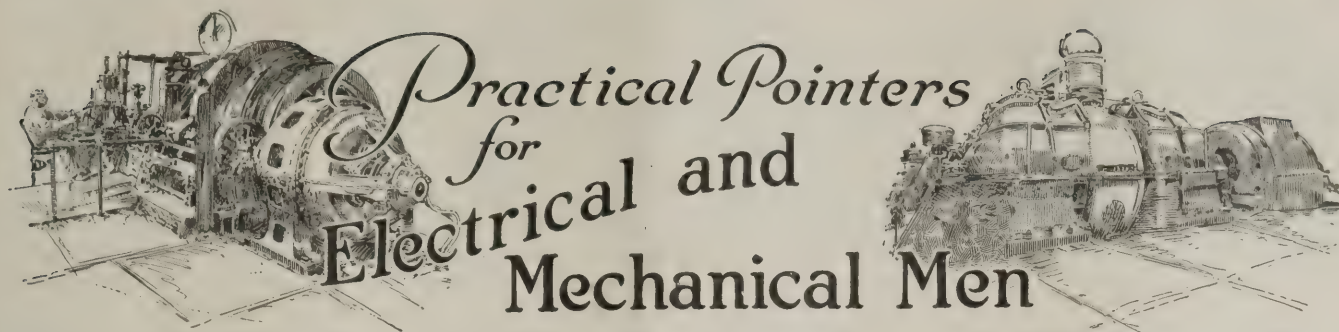
The sequence of the operation of the equipment in case of short-circuit or heavy overloads on the feeder is as follows: The overload relay opens its contacts, de-energizing the coil of the contactor, which opens, disconnecting the load from the source instantaneously. When the contactor opens it closes auxiliary switch (b) which energizes the coil of the time-delay circuit closing relay, which starts to close. The time delay is inserted at this point in the sequence of operation in order to allow conditions on the feeder to become stable. The closing of this relay completes the circuit through the lower coil of the reclosing relay.

The reclosing relay has two coils, and to operate must have both of them energized. Its operation somewhat resembles that of a voltmeter, the lower coil being analogous to the permanent magnet of the meter, and the upper furnishing excitation to the movable element on which the contacts are mounted. The relay contacts will close only when the drop in voltage across the load, with which the upper coil is in parallel, becomes enough to cause that coil to excite the movable element sufficiently to close them. When the load resistance is zero, as in case of a short-circuit, there is no voltage across the upper coil, but when the load resistance is infinity, or open-circuit conditions exist, there is practically full voltage across the upper coil, because its resistance is so much greater than that of the load-indicating resistor. Therefore it is possible to obtain an intermediate point, and calibrate the reclosing relay so that with a definite value of resistance in the load-indicating resistor the equipment will not close on a load in excess of a predetermined value.

As long as the trouble on the feeder continues the reclosing relay will remain open, even after the time-delay relay has closed, because the voltage across the load is not enough to close the contacts. As soon as the trouble has cleared and the load resistance has passed the predetermined point, the relay will close, energizing the coil of the feeder contactor, which closes, causing the closing of the auxiliary switch (a), which seals it in. The closing of the contactor reconnects the load and de-energizes the time delay relay, which opens its contacts.

The equipment for circuits having a combination of stub-end multiple feed makes use of a contact-making voltmeter to indicate when the potential difference between the feeder and the source has fallen to a safe reclosing value. When the voltage has so fallen, the feeder contactor recloses in the same sequence as in the former case. A relay connected in parallel with the contact-making voltmeter determines whether the equipment is to operate on multiple or stub-end feed.

EXCELSIOR—BALES OF IT—is now being used by anthracite shippers to make tight the bottoms of coal cars, particularly for the shipment of fine sizes. It is readily stuffed into cracks and holes and makes a better filling than hay, straw, stones, old iron or planks. It has the further advantage that if it becomes mixed with the coal when unloaded no damage is done to conveying machinery or stokers. It can be had at a little over 1c. per pound. Some companies are reported to be using it by the carload.



Electric Braking on Mine Locomotives

I WAS greatly interested in the article entitled "Theory and Operation of Electric Braking" which appeared in the July 5th issue of *Coal Age*, and am therefore prompted to use your columns to give some interesting experiences along this line which I had some few years ago.

Believing in the possibilities of electric braking for mine locomotives, I made some experiments on a Goodman 4-ton locomotive which was driven by a single motor. I took the locomotive to the top of a grade, hooked down the trolley pole, grounded the trolley cable to the frame of the locomotive, reversed the controller and released the brake. I was greatly pleased with the manner in which I could control the speed of the locomotive while going down the grade. By operating the controller handle the braking effect could be varied over a wide range. Later I tried out the scheme with a loaded trip and had the same results.

When it came to trying out this idea with a locomotive with two motors the results were different. The two motors or generators, as they should properly be called under these conditions, would not build up together, in parallel. The first generator to "pick up" would force a current through the other dynamo and tend to drive it as a motor in a direction opposite to that which the locomotive would be moving at the time; the result was a very quick dead stop. To overcome this difficulty I arranged a connection in the controller as shown in Fig. 1 which in effect established an equalizer connection between the two dynamos while operating as generators in parallel. This arrangement seems to have no particular objectionable features and is quite simple and shown in Fig. 2. With this connection, when the fields are in parallel, no matter which armature would start generating first, both fields would become excited and the same amount of current would flow through each field, thus both generators would build up and generate a current which would flow through the external circuit, through the resistance and controller where it could easily be varied.

With the courtesy of our general superintendent I was permitted to give this scheme a thorough tryout. At our No. 4 mine there is an outside haulage or tramway a mile and a quarter long between the mine and the tippie which has an even heavy grade. It is the usual custom of haulage to have brakes set on most of the loaded mine cars when dropping the trip down this grade and to use the hand brake on the locomotive or power from the trolley line when necessary to control the speed. A 10-ton locomotive ordinarily will not control more than twelve loaded cars on this grade with the locomotive hand brake alone and no brakes set on the cars. I equipped a Westinghouse Type 58, 10-ton

locomotive with a heavy single-pole double throw switch on the trolley cable with the one position grounding the cable to the frame and used the equalizer connection. It was a very simple matter to handle a trip of fifteen loaded cars without the use of any mechanical braking, being able to check from maximum ordinary speed to a dead stop in a length of fifty feet, of course using the hand brake after the final stage of the electric braking was reached. I feel positive that a trip of twenty-five cars could easily be handled in this same manner, although we have never tried so many without some of the car brakes set.

The controller was the ordinary series and parallel type. The equalizer connection was permanently established by brazing a copper jumper between two segments of the reverse cylinder on the parallel position. The series position can also be used independently. This jumper on the parallel position does not interfere with the hauling in the opposite direction (up grade) in fact, this equalizer seems to be a great aid in hauling in parallel, as explained below.

Ordinarily it happens that, during a heavy haul when sand is used on the rails one truck will start spinning, which requires shutting off the controller and starting up again. It is easily understood why a series wound motor will race when it loses its load and, when the wheels start spinning the friction decreases and the speed increases, due to the weakened field under a lighter load. But, with the use of the equalizer, both fields are always excited the same amount and the tendency for one truck to race when the other is down to a heavy haul is greatly lessened. This, of course, prevents a considerable amount of the lost friction and increases traction. So, why not use the equalizer in hauling as well as in braking?

I can find only one disadvantage in having the equalizer connection permanently established. This is in case of damage or injury to either an armature or field of either motor. Ordinarily, when one motor fails, it can be cut out of the circuit easily and the locomotive can then "limp" in for repair on the other motor. But, with a permanent equalizer either the armature or the field or both on the damaged motor must be disconnected before the locomotive can be moved on its own power to the repair shop or motor pit.

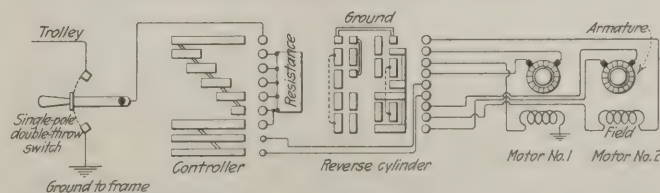


FIG. 1—CONTROLLER WITH EQUALIZER-CONNECTION

The dotted lines show where the equalizer was tapped in. Note that it is necessary to put an equalizer on the forward and reverse parallel positions.

I am offering this method on account of its simplicity. Its use will make possible electric braking on any locomotive without changing the type of controller. If the double-throw switch could be mounted so that it could not be thrown without shutting off the controller it should be done, as throwing the switch while the locomotive is using power will cause a heavy arc with disastrous results.

E. L. HOLSOPPLE.

Electrical Department, Knickerbocker Mines,
Hooversville, Pa.

Where the single motor drive is used, Mr. Holsopple has met all the requirements for electric braking by simply grounding the trolley cable and reversing the controller so that it is operated the same way as it would be if climbing a grade with the assistance of the power system in that direction instead of descending a grade. That is, the direction of rotation is the same as motoring down grade but the field has been reversed thus making the motors function as generators.

In the case of two motors acting as generators in parallel and with an equalizer circuit between them, there are some disadvantages which must be considered. With any two motors there is a variation in the magnetic circuit and in the resistance of the windings due to manufacturing limitations. With the equalizer connection the current will divide between the fields in proportion to the resistances of the field windings.

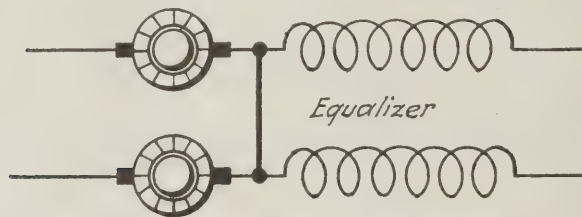


FIG. 2—SIMPLIFIED EQUALIZER DIAGRAM

This sketch shows how the current generated in either armature may divide and excite both fields.

Even when these resistances are approximately equal the ampere-turns for setting up the magnetic flux of the poles will be approximately equal only when the turns of wire in the field coils are equal. Furthermore the flux set up by equal ampere-turns is a function of the magnetic circuit which is variable in all motors. Therefore unless the flux is exactly equal there will be a circulating current between the armatures through the equalizer which will tend to overload one of the motors. This condition exists both when motoring or generating. Care should therefore be taken whenever an equalizer circuit is used instead of transposing the fields, as the overloading of one of the motors may become serious.

Other causes for unbalancing may occur. One such cause may be the difference in diameters of the driving wheels connected to each motor. When the motors are operating as generators, the generator connected to the set of wheels having the greater diameter would run a little slower than the other set and since the fields are balanced by the equalizer between them, the slower generator would generate a lower voltage than the other. The amount of unbalancing therefore would vary with the difference in wheel diameters.

Most locomotive motors could ordinarily stand the slight unbalancing which might occur under general conditions. However these are factors which must be considered so as to be on the safe side.

How Best to Undercut Commutators Of Direct-Current Armatures

THE object of undercutting commutators is to clean out the mica between the copper segments from the face of the commutator to a depth of $\frac{3}{8}$ in. This gives a smooth, even surface, which is not always possible when the mica is not undercut. Hard mica will not always wear down with the copper bars and thus leaves ridges on the commutator surface. The completed armature, after being rewound, soldered and banded, has the commutator trued up and all excess solder removed from the neck and face, and is then turned over to the undercutter. If undercutting were done before soldering, the excess solder might fill up the grooves and short-circuit the commutator bars.

The most efficient machines for doing this work are special lathes with either motor-driven or belt-driven circular saws clamped on an arbor which is mounted on a head that moves on slide rails. By means of a hand-operated lever or a foot pedal controlled by the operator the revolving saw is carried over the face of the commutator. The head carrying the arbor is fitted with an adjusting screw to adapt the height of the saw to commutators of different diameter. An air hose and hood sometimes are provided to carry off the mica dust. A less expensive equipment to do this work consists of an air- or power-driven (through a flexible shaft) circular saw, which is guided over the commutator face by hand. A handsaw consisting of a piece of hacksaw blade mounted in a holder for doing this work, also a small cutter to clean the slots of small particles of mica left by the circular saws often are used.

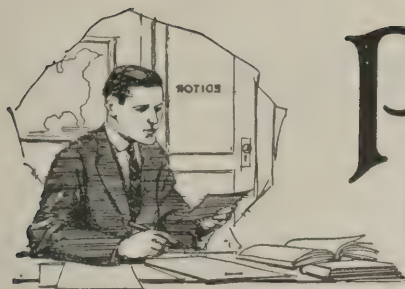
The armature is mounted between the centers of the special lathe, or on two horses if the hand-guided saws are used, so that it can be rotated readily. The small circular saws are revolved at approximately 2,000 r.p.m. and are drawn toward the operator, so that he can guide the cut. The cutting edge of the saw should revolve in a direction toward the operator while it is cutting the mica.

After slotting is completed, the face of the commutator should be thoroughly polished and cleaned of all particles of copper by means of emery cloth. The special lathe can be so equipped that this polishing is done without removing the armature from the lathe centers.

It is essential that all particles of mica be removed from between segments by this operation; thus it is advisable to use a saw about 0.005 in. larger than the thickness of the mica to be undercut. A small diameter saw must be used in order to cut the slot to the proper depth and at the same time not cut into the neck of the commutator. After the slots are sawed it sometimes is necessary to go over them with a small hand cutter, to remove all remaining particles of mica.

A clean undercut commutator prevents high mica, which reduces the burning of the commutator bars, increases the life of the carbon, and practically eliminates flashing. This results in greatly reduced maintenance cost.

An undercut commutator should operate from one heavy inspection period to another. If an armature is removed from the motor frame for any other repairs, however, the commutator should be carefully inspected, and if the mica is getting flush with the copper the commutator should be carefully trued up and then undercut and smoothed.



Problems of Operating Men

Edited by
James T. Beard



Facts Throwing New Light on the Wakesiah Explosion

Pumpman Killed by Coal Blown from Cars on Main Slope—Jack Hammer Drills Made Much Fine Dust—Air Laden with Gas and Dust Ignited on Lamp

I HAVE read with interest the letter of "Mining Engineer, No. 2," *Coal Age*, June 7, p. 940, relating to the Wakesiah mine explosion of Nov. 24, 1922, and asking for more detailed information in regard to the exact position of the pumpman who was killed by the blast, and the location of the motor driving the pump.

In answer to the first question, kindly permit me to say that the pumpman was found, after the explosion, lying on the main slope directly opposite and about eight feet from the pump. The pump was driven by compressed air. There was no electric motor, as the second question would seem to imply.

COAL BLOWN FROM CARS KILLS PUMPMAN

Standing on the main slope, about fifty feet below the pump where the pumpman was picked up, there was a trip of six loaded cars. Such was the force of the explosion that this was moved up the slope twenty feet, as shown by the amount of slack rope.

The pumpman was killed instantly by the flying coal that was blown from the top of the cars and scattered a long distance up the slope. My duties following the disaster were such as to enable me to see the actual conditions that existed in the mine and I am therefore speaking from personal knowledge and observation.

First, in respect to the lamps, as has already been stated by other writers, the men were all equipped with electric cap lamps, except the fireboss who carried the only flame safety lamp used in the mine.

TESTS SHOW LAMP WAS IN GOOD CONDITION

From my own knowledge, I can say that the lamp had been subjected to test in a highly explosive mixture and found to be in good shape after the accident, although the gauze showed signs of intense heat.

It is my firm belief that the point of ignition of the gas was at the place where the fireboss' lamp was found. Careful study of the situation and observation of the facts leaves no doubt whatever in my mind but that the gas ignited on this lamp. Whether or not the lamp was properly handled is another question and one that I will not assume to discuss further than to say a safety lamp ceases to be safe when improperly used.

The evidence obtainable on the fateful morning of the explosion, in respect to the point of ignition was very marked. There were the burnt cap and the blistered bag of the fireboss, showing plainly the immediate presence of flame. There were, besides, numerous signs of force emanating from that vicinity.

It is true the fireboss was not killed by the blast, but was overcome by the afterdamp when he had fled 100 ft. from where he dropped his lamp. It must be remembered that his position in the *cul de sac* protected him from the full force of the blast, which gained strength as it swept up the slope 250 ft. to where it felled the unfortunate pumpman.

JACK HAMMER DRILLS MAKE MUCH FINE DUST

One factor that I believe has not been mentioned in connection with this disaster is the presence on the walls, floor and timbers of much finely powdered coal dust. In this section the miners largely drilled their holes with a jack hammer drilling machine. Anyone familiar with this tool knows the quantity and extreme fineness of the dust produced.

Consider then what would be the result of starting to blow out from its lodgment a body of gas by the use of a blast of air under a pressure of 90 lb. per sq.in. When the fireboss turned on the air undoubtedly this fine dust was thrown into suspension in the air and formed a most dangerous atmosphere with the gas dislodged from the roof. It is pleasing to know that the Coal Mines Regulation Act has now been amended and forbids the use of these machines without some means being employed to prevent the suspension of the fine dust in the mine air. The act also forbids the use of compressed air for blowing out gas from where it is lodged in a mine.

PROBABLE MOVEMENTS OF THE FIREBOSS

Observing the position of the nozzle of the air hose, I noticed it was directed upward in a slanting direction in a manner that would force the gas down on the lamp, which was 21 ft. away from the nozzle. The nozzle I would say was about 4 ft. inside of the gas, leaving only 17 ft. from the gas to the lamp.

Presumably, after adjusting the position of the nozzle, the fireboss had gone down and turned on the air at the valve, 30 ft. below, and then walked back up the road to wait till the place was clear, so that he could so report, this being the last place on his round and the time being about up for making his examination of the mine.

Considering the velocity of the blast from the air hose and the fact that the fireboss was advancing up the slant against the air highly charged with gas and fine dust, one has no difficulty to imagine what happened.

In conclusion, allow me to remark that it behooves every man when using a safety lamp, for any purpose in a mine, to handle the lamp with the utmost of care and not to violate the principles on which it was designed. We are all of us too prone to omit many precautions that make the use of the lamp safe. The price of safety is eternal vigilance.

Nanaimo, B. C.

S. K. MOTTISHAW.

Moving a Body of Gas Dangerous Work

Use of compressed air in moving gas a dangerous practice that should be stopped—Move a large body of gas a little at a time—Give air current time to dilute gas—Watch lamps closely.

HAVING moved much gas in mines, I have been deeply interested in what has been written regarding the fatal Wakesiah explosion caused by a fireboss' attempt to blow out an accumulated body of gas with compressed air.

The letter of Glen Calder, which appeared in *Coal Age*, April 5, p. 568, particularly impressed me and I quite agree with him that the practice of removing gas, from a place where it has lodged in a mine, by the use of compressed air is extremely hazardous and should be stopped.

Anyone who undertakes to move a body of gas should remember that he is about to deal with a dangerous proposition. He should exercise every precaution, run no chances and take nothing for granted. First, study the situation carefully before taking any steps to disturb the gas.

SAFEST PLAN IN MOVING LARGE BODY OF GAS

When moving gas the safest plan is to first withdraw all men from the mine, unless one can feel that there is absolutely no danger to those remaining at work. The fireboss or man in charge should always take with him an experienced helper.

He should test carefully and know, as nearly as possible, about the volume of gas he must handle. This will make it possible for him to gage properly his air current, which must be strong enough to act efficiently on the body of gas and effect its removal.

It is of most importance to move a large body of gas a little at a time, which will give the air current time to dilute the gas and render it harmless as it passes out of the mine. In this manner there is no danger to be feared from the return current becoming highly explosive.

It is my experience that a person cannot be too careful in the handling of gas. A very slight mistake may mean the loss of one or more lives. Far better is it to lay the mine idle than to take any chance of accident that may prove fatal or destroy valuable property.

By directing a large air current against a considerable body of gas, it may be caused to descend onto the lamps, which must be closely watched and removed from the place on the first appearance of danger.

Loogootee, Ind.

JACOB RILEY.

Bituminous Mine Law (Pa.) on Ventilation

Insufficient ventilation of mine chief cause of explosions—Bituminous law not lacking in this respect—Strict compliance with what the law requires needed to avert disaster.

SINCE reading the good letter of C. W. Atkins, *Coal Age*, March 1, p. 378, naming different conditions in mines that invite explosions, it has been on my mind to offer a few comments bearing on the requirements of the mine law with respect to ventilation.

While I heartily agree with Mr. Atkins that an "insufficiency of ventilation" is a chief cause of many mine explosions, I fear he has overlooked certain references in the law when he says, "The volume of air in

circulation may be sufficient to comply with the requirements of the mining law and yet not enough to dilute and sweep away the gases generated in the workings of a mine."

As I understand the Bituminous Mine Law of our state it requires the ventilating current in a mine to be sufficient to "dilute, carry off and render harmless the smoke and the noxious and dangerous gases generated therein." If this is not done the circulation has not complied with the law's requirements.

LAW PROVIDES FOR EVERY POSSIBLE CONDITION

Perhaps, the statement first quoted above has reference to the specific requirement (Art. 9, Sec. 1) of "not less than 200 cu.ft. per min." for mines generating gas. But the law adds "and as much more . . . as one or more of the inspectors may deem requisite." This clause should certainly be broad enough to fully meet any and every condition that can reasonably be expected to arise in a mine.

What could be more full and explicit in respect to the ventilation of mine workings than the following paragraph of the same section of the law:

The ventilation shall be conducted through the main entries, cross entries and to the working faces of all working places in the mine in sufficient quantities to dilute, carry off, and render harmless the smoke and the noxious and dangerous gases generated therein, to such an extent that all working places and traveling roads shall be in a safe and healthy condition for the persons working and traveling therein.

The number of explosions that have occurred recently should incite every miner to use his utmost efforts to prevent their recurrence. We are led to wonder if the next disaster will come closer home. Are we, one and all, doing what lies in our power to avert these terrible calamities and make them history of the past?

It is my belief that if every official of a gaseous mine would insist on a strict compliance with every requirement of our state laws and take no chances there would be a large reduction in mine fatalities. This discussion in *Coal Age* should nerve every man to action.

JAMES THOMPSON.

Mayport, Pa.

Permissible Explosives vs. Black Powder

More enlightenment needed regarding use of permissible powders—Use of black powder not justifiable—Why permissibles often fail—Firing by electricity safest and most efficient method.

FOR some time past I have been watching and waiting for the question of the use of permissible explosives to be brought to the attention of *Coal Age* readers. It would seem that greater efforts should be made to enlighten mining men, both operators and miners on this important subject.

If this was done more persistently and systematically there is no doubt in my mind but that this class of explosives would come into more extensive use in coal mines than is true today.

CONTINUED USE OF BLACK POWDER UNREASONABLE

In the larger development of mines and the rapidly increasing production of coal, it is evident that the continued use of black powder for blasting down the coal is going to be a chief factor in maintaining a high accident rate in this country.

From the standpoint of safety and efficiency in mining, the use of black blasting powder in coal mining

cannot be justified. Arguments in its favor, however plausible, are without the sphere of reason. It is true that, owing to its slower action, larger coal is produced and a less proportion of fines and dust are the result.

On the other hand, the larger amount of flame projected into the mine air when a shot is fired must always be a menace to life and property, which no responsible operator or miner can ignore. This fact alone is enough to debar absolutely the use of black powder in any coal mine.

OPPOSITION TO USE OF PERMISSIBLE POWDER

It has always seemed strange to me that there should be so much of opposition manifested, on the part of many operators and miners, when an attempt is made to introduce permissible powder into a district or even a single mine. The danger in the use of black powder is well known and yet many prefer to take the chance because of the promise of producing larger coal.

It has been my lot to have worked, at different times, in mines where either of these explosives have been in use. I could not fail to observe what varying results were obtained, because of lack of care and judgment in choice of suitable grade of powder or proper weight of charge in shooting different coals.

When making my daily examination, in a mine using permissible powder, I would often notice what little work the powder had accomplished, in respect to the extent of face blasted in those places. The coal would generally be seriously pulverized and much dust produced, making the mine dangerous.

In other places, where the explosive was better suited to the coal in question, a good grade of marketable coal was invariably produced and there was not the same difficulty experienced in squaring up the face, which requires much extra labor on the part of the miner when this has to be done because the coal does not shoot right.

WHY PERMISSIBLES GAVE POOR RESULTS

My observations led me to conclude that, in most instances, the pulverizing of the coal and the need of extra work to square up the face was owing to excessive charges of powder or poor judgment of the miner in placing his shots. These results, however, whatever their cause and whatever the conditions of their occurrence, have naturally made working men regard permissibles with disfavor.

My opinion is that electric firing is not only far safer practice but is a more efficient method and gives better results in the use of permissible powders. The simultaneous firing of a number of shots in a place eliminates the danger of a miner returning too quickly to the face, which is often the case in firing single shots. There is also a saving in explosive for the same work performed.

Finally, permissible explosives are made up in cart-ridges of less diameter, requiring smaller holes and a lesser number of them for the same tonnage of coal mined. It is also easier to tamp a small hole than a large one. The drills are lighter, more easily handled and cost less than the drills used previously. In fact, a miner will often find that a common breast auger is all that is needed when using permissible powder in blasting his coal. The size of the hole is the important factor. Labor should appreciate the fact that it is far easier to drill a 1½-in. hole than a hole 3 in. in diameter.

Linton, Ind.

W. H. LUXTON.

Inquiries Of General Interest

Flooding Prevents Operation of Slope Mine

Mine Underlies Creek Bottom—Water Drowns Out Workings During Rainy Season—Lining Slope with Concrete Fails to Keep Water Out—Steel Door Proposed

WE ARE having much trouble of a very serious nature in endeavoring to keep water from drowning out the workings in our mine. The water comes from the surface drainage and at times of the heavy spring rains the inflow is so great as to threaten the life of the mine.

Our mine is opened by a slope that was started in a bed of quicksand 30 ft. deep and driven on an inclination or dip of 11½ deg. After being drowned out at two different times in a single year, I decided to concrete the mouth of the slope, starting from the entrance and continuing for a distance of 300 ft. to where the slope reached the coal.

This plan seemed to me full of promise of making the mine comparatively dry. The work was well done, the top and both ribs of the slope being covered with a layer of concrete 18 in. in thickness, at a cost of \$9,000 when the work was completed. Much to our disappointment and discomfiture, the result was a failure as the concrete lining did not prevent the water from finding its way into the mine and the next heavy rain again filled the mine and we were obliged to cease work. The water appeared to seep down behind the concrete ribs and come up through the floor of the slope. I should have stated that this mine underlies a creek bottom.

I propose now to build a steel door at the end of the concrete lining, at the foot of the slope. The coal here is five feet in thickness. The door is to be made water-tight and I want to ask the opinions of *Coal Age* and its practical readers if they think this door will keep the water from flooding the mine in time of freshet.

Hartshorn, Okla.

JOSEPH MAGDALENA.

Here is a proposition that should call forth many practical and helpful suggestions. The seasonal flooding of such mines is not uncommon in the practice of coal mining and the experiences of others in like situations will be of untold interest.

There is little doubt but that a heavy steel door could be built at the foot of the slope capable of sustaining the pressure that would be thrown on it in the event of the slope filling with water during a wet season. The question is, however, Could the structure be made water-tight and the water kept out of the mine, which is the object sought, till the danger is past and the water can be pumped or bailed from the slope by water cars.

Assuming an opening 6x10 ft. in section the total maximum pressure at the foot of the slope would be, $62.5 (6 \times 10 \times 300 \times 0.19937) \div 2,000 = 112\frac{1}{2}$ tons which is not excessive. The problem then would be to make the floor and surrounding strata impervious to water. Let us hear from our practical readers.

Examination Questions Answered

Penna. Bituminous Examinations, Foremen and Firebosses

(Selected Questions)

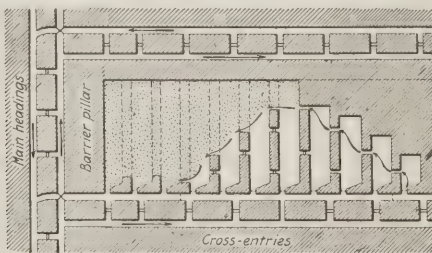
QUESTION—(a) *What are the principal causes of accidents in coal mines?* (b) *What precautions would you take to reduce such accidents to a minimum?*

ANSWER—(a) In the order named the most frequent causes of accidents in the mining of coal are the following: Falls of roof and coal; movement of cars and locomotives; gas and dust; electrical equipment of all kinds; use of explosives; shafts and steep slopes.

(b) Supervise carefully and closely all work at the face; enforce strictly all rules and regulations regarding timbering, blasting and haulage; instruct workmen in safe practices; install and maintain needed safety appliances; attend carefully to the efficient ventilation of all working places, roads and travelingways; and finally operate the mine in full compliance with law.

QUESTION—*Describe in detail how room pillars should be drawn with mining machines, to secure the greatest recovery of coal, with the highest degree of safety to the workmen and the greatest economy in the use of posts and other material.*

ANSWER—In drawing room pillars with machines, the main point is to develop the mine with the room pillars of such size that they will suffer no crushing effect in the first working. In machine work where roof conditions will permit, advantage is gained by driving double rooms with a 50- or 60-ft. breast for working the machine. In any case, however, when drawing the pillars the cut must be started on the side of the pillar farthest from the gob, in order to afford better protection for the men and the machine. In driving single rooms with track laid along the straight rib, this will



necessitate widening the rooms in the direction the work is advancing, in order to facilitate loading the coal on the track and keeping the machine on the side of the pillar away from the gob. The accompanying figure shows advancing room-and-pillar work where the rooms are widened inby and the track is then laid on the inby side of the straight rib.

QUESTION—*Assuming that you were in charge of a non-gaseous mine worked with open lights and explosive gas is discovered on certain pillar falls, what precautions would you take to safeguard the workmen; (a) before removing the gas; (b) while removing the gas; (c) after the gas has been removed?*

ANSWER—(a) Send reliable men to notify all workers in that district or section to extinguish their lights and conduct them by the safest route to the shaft or slope bottom or mine entrance. Also, station reliable men to guard all approaches to the affected district and the return air-course.

(b) Select competent helpers and equip them with good safety lamps. As far as practicable, increase the circulation of air in the district if that is needful. Approach the gas on the intake side, keeping a close watch of the lamps as you proceed. Erect what brattice or canvas may be needed to direct the air onto the gas. Proceed slowly, giving time for the air to dilute and move the gas. Make frequent tests with a lamp to observe progress of the work. This answer assumes holders of first-grade mine foremen's or fireboss' certificates. (c) When the gas has been removed, begin at the intake end of the district and examine each working place and all idle or abandoned places, roads and travelingways for gas and other dangers and enter a report of the examination in the report book. This must be done before permitting any men to return to work.

QUESTION—(a) *What are the general causes of mine fires in non-gaseous mines?* (b) *What precautions should be taken to prevent them?*

ANSWER—(a) Careless use of open lights in proximity to combustible material; use of flame torches in stables, pump and tool shanties, or in handling cars of hay and powder on the shaft bottom or haulways; spontaneous combustion of oily waste; ignition of dust or timber from short-circuited wires not properly installed; and failure to keep fine coal and dust from the waste in mines.

(b) Care in use of open lights; rigid enforcement of strict rules and regulations regarding the handling of combustible material, explosives, oily waste and other supplies; and regular close inspection of all waste and void places in the mine.

QUESTION—*What equipment should be installed with electrically driven pumps and what provision should be made to insure safety, the installation being of a permanent nature?*

ANSWER—The Bituminous Mine Law (Art. 11. Sec. 5) requires every stationary motor underground and its starting resistance to be protected by a fuse on each pole, or circuit-breaking device on at least one pole for d.c. and two poles for a.c. motors, and by switches to cut off the power; such devices to be in a convenient position near the motor. A motor of 100 b.hp. must be further equipped with a meter to indicate the load on the machine. Motors exposed to gas-charged air must have all live parts, starters, terminals and connections enclosed in an explosion-proof casing of incombustible material, which cannot be opened by any unauthorized person.

QUESTION—*What is the capacity of a double-acting pump 12 in. in diameter, running at a piston speed of 120 ft. per min., the efficiency of the pump being 85 per cent?*

ANSWER—The sectional area of the pump cylinder in this case is $0.7854 \times 12^2 = 113.1$ sq.in. Running at a piston speed of 120 ft. per min., the piston displacement is $120 (113.1 \div 144) = 94.25$ cu.ft. per min. Then, since 1 cu.ft. = 7.48 gal., and for a water-end efficiency of 85 per cent, the capacity of this pump is $0.85 (94.25 \times 7.48) = 599.25$ gal. per min.

Anthracite Miners and Operators Resume Wage Parley

Negotiations between the anthracite operators and miners were resumed at Atlantic City on Monday of this week, after more than three weeks' suspension. The U. S. Coal Commission is directly responsible for breaking the deadlock and bringing about the resumption of the conferences. It called the representatives of both sides to New York last week and, after reading notes from them for two days, wound up the proceedings by asking them to state in writing just why they could not get together to prevent a strike on Sept. 1.

The issue of the check-off—the refusal to grant it by the operators and the insistence of the miners that it must be granted before negotiations could proceed—was brushed aside by the miners when it came to the showdown before the Commission and the negotiations are resumed this week as if that issue had not for three weeks threatened to plunge the industry into a strike.

The most significant developments of the week were the operators' acceptance of the miners' offer to abandon the check-off for occupational and all other deductions from pay in exchange for the union dropping the check-off for union dues; the operators' offer to renew the present agreement until April 1, 1925, or to arbitrate wages as well as all other matters in dispute, pledging themselves in such an event not to ask for a reduction; the plain word from Washington that if the miners want to strike the country will have plenty of other fuel offered it, and the backdown of Lewis from his ultimatum of July 26 in the face of a promise by the Coal Commission to tell the country what's what if he wouldn't play ball.

LEWIS MAKES THREE PROPOSITIONS TO COMMISSION

When the hard-coal miners and operators gathered at the Pennsylvania Hotel in New York on the morning of Wednesday, Aug. 15, they found that they had not been called together by the Coal Commission but instead were being asked to report separately on why they had not continued their negotiations at Atlantic City. The Commission had two meeting rooms, and in one they first sat with the representatives of the miners. John L. Lewis wasted no time but at once filed with Mr. Hammond a statement setting forth just what the miners wanted as a precedent to getting back together with the operators. Negotiations had been broken off at Atlantic City on July 27 and Mr. Lewis had issued his ultimatum that the check-off and other features of demand No. 1 must be granted before a contract could be negotiated. His propositions to the Commission were three, one that private detectives in the pay of the operators in the mining region must be withdrawn, the second that the miners would agree to withdraw their demand for the check-off if the operators would agree to cease checking off, that is making deductions for items owed the company. His third was that if the operators would agree that they would give the check-off and agree in principle to a wage increase, they would start negotiations at once and promise to keep at work after Sept. 1, making any settlement retroactive to that date. This was transmitted to the operators late in the afternoon. The second proposal was stated as follows:

"That the United Mine Workers abandon its demand for a provision in the next contract providing for participating in the check-off arrangement; that in consideration of such abandonment the anthracite operators agree to a provision in the next contract whereby they will abandon their age-old practice of checking off from their employees payment for the long list of items herein incorporated, and such others as may exist.

"Upon this proposition the United Mine Workers desire a categorical reply from the anthracite operators through the United States Coal Commission. If the anthracite operators agree with this suggestion it will remove any obstacle which may now exist in prevention of an immediate resumption of joint wage negotiations. If the anthracite operators refuse this suggestion then the American people will understand the true selfishness of their position and the United States Coal Commission will be able to report to the President of the United States and properly place the re-

sponsibility for any suspension of anthracite production."

As an alternative it was offered by Mr. Lewis that the following should be accepted:

"The representatives of the United Mine Workers have full appreciation of the natural desire of the coal consuming public to avert a suspension of production after Sept. 1. The mine workers join in this desire, and in consideration of the emergency which exists in the premises propose the following arrangement, which will relieve public apprehension and be endorsed by every citizen:

"That the anthracite operators agree that all men now working nine hours or more shall be given an eight-hour day with commensurate compensation, effective as of Sept. 1; that the necessity of a wage increase be recognized; that the United Mine Workers be accorded the privilege and convenience of the check-off arrangement, effective the same date; that in consideration of such arrangement all other matters be immediately taken up in joint negotiations and the anthracite mines remain in operation pending such negotiations, with a proviso that agreement on all matters when reached shall be retroactive to Sept. 1, 1923.

"In making the foregoing constructive suggestion, the representatives of the United Mine Workers have in mind that the anthracite operators have announced that they agreed in principle with the demand of the mine workers that the eight-hour day apply to all classifications of labor. We also have in mind that in making the check-off arrangement effective Sept. 1, no cost is involved either to the anthracite operators or the consuming public."

Later the same day the anthracite operators gave out their acceptance of the proposal to abandon the checkoff of all items of debt incurred by their employees. Their letter addressed to the Coal Commission follows:

OPERATORS AGREE TO DISCONTINUE DEDUCTIONS

"The Anthracite Operators are gratified to note the willingness of the miners' representative to abandon their Demand No. 1, calling for the 'check-off,' on condition that the operators discontinue the practice of deducting from the wages of employees certain specified items.

"The operators accept this proposition. They are prepared to agree in so far as the law of Pennsylvania will permit, to incorporate in the wage agreement a clause discontinuing the present practice, and placing the business upon a cash basis.

"Heretofore, the operators have extended credit to the men for the purposes named, charging the men's accounts currently and deducting the charges when wages were paid. The operators had assumed that this practice met with the approval of the employees since heretofore such practice has never been presented as a grievance. Neither did the eleven demands presented by the miners at Atlantic City embody any request to abandon this practice.

"If now the employees desire a discontinuance of the present practice, the operators are entirely agreeable. The existing practice having been put into effect for the convenience of the men, some inconvenience to them may result from its discontinuance. The operators, however, will be pleased to co-operate with their employees in working out methods which will reduce such inconvenience to a minimum.

"In agreeing to the foregoing, the operators assume that in accordance with the miners' proposition to your Commission, negotiations will be promptly resumed and that no suspension will take place September first, it being understood that the wage agreement, when consummated, will be retroactive to that date."

No statement was forthcoming from the union headquarters on Wednesday night after the operators filed their acceptance. Early Thursday morning Mr. Lewis talked to the newspaper men and indicated that the union men were not pleased with the form of Mr. Warriner's letter and that they would take exception to everything in it. Late that day they filed a reply, again to the Commission, stating that in their opinion the operators had not met their proposal. The letter follows, in full:

"The mine workers' representatives have given careful



ANTHRACITE CONFERENCE AT PENNSYLVANIA HOTEL, NEW YORK

Seated, left to right—Thomas Kennedy, president of District 7, United Mine Workers; John L. Lewis, International president, United Mine Workers; John Hays Hammond, chairman of the Federal Coal Commission; Thomas R. Marshall, member of the Commission, and George Otis Smith, another member.
 Standing—E. E. Hunt, secretary of Commission; C. J. Golden, president District 9 United Mine Workers; Rinaldo Cappeleni, president District 1, United Mine Workers, and Dr. Charles P. Neill, Commissioner.

consideration to the letter filed with your Honorable Commission by Mr. Warriner. We do not believe that the communication constitutes a good faith acceptance of the proposal made by the mine workers yesterday for the abandonment of the present check-off system by the anthracite operators and the waiving of the check off demand by the United Mine Workers.

"The first paragraph of Mr. Warriner's letter expresses gratification that the mine workers have abandoned demand No. 1. The mine workers made no such offer, as their letter referred only to the check-off feature of demand No. 1. The operators' statement on this feature is therefore in error.

"The second paragraph of the operators' letter qualifies their acceptance by inferring that the laws of Pennsylvania will prohibit them discontinuing the practice. They have always heretofore insisted that the law prohibited them from instituting the practice. It is obvious and perfectly manifest to all that no written agreement could transcend the law of the Commonwealth or the Federal Government. The introduction of this qualification is therefore without warrant.

"The third paragraph of the operators' letter purposes to understand that the United Mine Workers desire that the anthracite operators desist from extending credit to their employees in commercial transactions. No such feature was incorporated in the mine workers' presentation, and neither do the mine workers propose to countenance such change. This matter is therefore extraneous and its introduction into a discussion of the check-off is not accepted by the mine workers' representatives.

"In the fourth paragraph of the operators' letter, Mr. Warriner proposes that the anthracite operators will deal with their employees individually in working out such matters. The miners in the anthracite region are members of the United Mine Workers and have given authority to certain officers of their organization to represent them upon all such matters. We therefore advise that the anthracite operators will not be able to deal with their employees upon an individual basis affecting this matter, and that the proposition in its entirety has nothing to do with the check-off proposal of the United Mine Workers.

"The closing paragraph of Mr. Warriner's letter states the operators' assumption that in agreeing to the abandonment of the operators' check-off system that no suspension will take place Sept. 1, in event a wage agreement is not

negotiated at that time. The anthracite operators are again strangely in error in this matter. Your Commission will recall that the representatives of the mine workers filed with your honorable body yesterday an alternative proposal calling for the operation of the anthracite mines after Sept. 1. This proposal has been ignored by the anthracite operators' representatives and we assume has been rejected by them. The matter of working after the first of September has no relation to the mine workers' proposal that the operators abandon their check-off system.

"The operators' letter is misleading and confusing in its every paragraph. The mine workers cannot accept it as an interpretation of their previous proposition. We made a fair proposal dealing exclusively with the check-off proposition and requested therein a categorical reply to the offer. Such reply has not been forthcoming. If a good faith assent is given to the mine workers' proposition, joint wage negotiations can be immediately reopened and there is no proper reason why an agreement cannot be negotiated prior to Sept. first and a suspension of anthracite production averted."

The operators promptly gave out a statement characterizing the miners refusal as an indication of their desire to avoid the issue. Mr. Warriner said that "The efforts of the operators to reach a peaceful adjustment by what they believe to be an acceptance of the miners' proposition of yesterday seem to have failed. The operators have earnestly sought to settle differences by peaceful negotiation or arbitration. They have offered and now offer either or both of these courses. The miners reject these peaceful courses and insist upon their demands under threat of a strike. They refuse arbitration and even insist upon the granting of a large part of their demands as the condition precedent to negotiation. The fundamental issue is whether or not force or reason is to be the accepted basis of adjusting disputes in this basic industry.

"Mr. Lewis' criticism of our acceptance of his proposal of yesterday is without a constructive or conciliatory note, and indicates a determination to avoid a settlement except upon his own terms. His proposal was obviously advanced to avoid a break over the issue of the closed shop with the 'check-off' but when the operators accepted it, he informs them, through the Commission, that the closed shop demand is not abandoned and that he did not intend by this proposal to give a pledge that there would be no strike.

"In view of the present situation, we propose to ask the Commission to state definitely to the public the issues involved in this controversy."

At about the same time, and after several hours conference behind closed doors with the operators, Mr. Hammond authorized a statement to the effect that the Commission was discouraged over the situation.

The air cleared the next day, for on Friday morning the Commission addressed a letter to both Mr. Warriner and to Mr. Lewis asking them to get together as the country needed the coal. Commissioner Smith had previously told the newspaper men that the two parties were writing letters that the other side could not understand and that the Commission could understand neither. The Commission's letter follows:

"The committees appointed respectively by the anthracite operators and mine workers to negotiate a new contract to replace the existing one which expires Sept. 1, have been in complete deadlock since July 27, and from that date until Aug. 14 not even a meeting was held in an effort to negotiate a new agreement.

"Now more than two days have been spent in a fruitless effort to find a basis upon which to bring about a resumption of negotiations, and in the exchange of notes between the parties thereto, through the medium of the commission, it has been found impossible to have the language of those notes construed to mean the same thing to both of the parties.

"There now remain only fourteen days before the present contract expires. The public mind, with a keen realization of the suffering of last winter because of an inadequate supply of anthracite is beginning to be seriously alarmed over the question of whether there is to be another suspension of anthracite mining on Sept. 1 of this year.

"It is imperative that this uncertainty be cleared up at once. We therefore urge that the representatives of the two sides enter into a conference to consider and report to us:

"(1) Whether you can reach an agreement over the matters now in dispute and negotiate a new agreement by Sept. 1.

"(2) Whether, in the event of your inability by Sept. 1 to reach agreement upon the matters in controversy, you can agree on a plan that will assure a continuance of mining after Sept. 1 and until you have reached an agreement.

"(3) Whether, in the event that you find yourselves unable to reach a complete agreement upon the matters in controversy, you can agree upon some plan for an orderly and peaceable settlement of the matters in controversy on which an agreement cannot be reached by contract negotiations, and thus prevent a suspension of mining as a result of the present controversy.

"The Commission asks that you go into joint session immediately and reply in writing by 8 o'clock to-night."

BOTH SIDES PROMPTLY AGREE TO RECONVENE

The response was prompt and to the point. Both sides held executive meetings and then they gathered together as a joint committee with James A. Gorman as their secretary, and shortly after lunch sent forth the word that they had agreed to take matters up in joint conference at Atlantic City on Monday, Aug. 20 just where they left off before Lewis issued his ultimatum on July 26. Their joint letter to the Commission, that sent them all scurrying for the ticket office and home, read as follows:

"The Joint Conference of Anthracite Miners and Operators has directed me to reply to your letter of even date requesting representation of the two sides to immediately enter into a conference, and submitting certain questions, as follows:

(1) In view of the Commission's request, and the public interest and apprehension, the miners and operators will, without prejudice, meet in joint conference Monday next, 11 a.m., at Atlantic City, and will earnestly endeavor to reach an agreement by Sept. 1.

(2) The operators urged that an understanding be reached providing that no suspension take place September 1, in case no agreement is reached by that date, and that the new agreement, when executed, be retroactive to that date. The miners asked that this be left to the joint conference.

(3) The operators urged that the parties agree to arbitrate any part of the eleven demands not otherwise disposed of. The mine workers stated that this subject was superseded by the joint action in agreeing to confer."

Condemn Effort to Unionize West Virginia; Commission Asked to Inspect Field

Operators of southern West Virginia are unwilling to contract with the organization of United Mine Workers of America, according to a voluminous brief filed Aug. 18 with the U. S. Coal Commission by Colonel Henry L. Stimson and Goldthwaite H. Dorr, counsel for the Bituminous Operators' Special Committee. "Wisely or unwisely, they object to placing their labor relations with their men under the absentee control of the International officers of the United Mine Workers' organization at Indianapolis. They point to strikes called by the central organization in districts in which there was no local dispute. They point to the fact that it was only through the existence of the fields which refused to contract with this organization that the public, as the President told Congress, was saved from being entirely at the mercy of that organization during the 1922 nation-wide strike.

"Wisely or unwisely, they are convinced that contracts with that organization are in the interest neither of the operator nor the miner but tend to stifle efficiency and individual initiative, and to create a relationship based not on mutual confidence and sense of responsibility but on mutual hostility. They point to a 20 per cent loss in productivity per worker in the Fairmont field when it contracted with the organization. They point to an 18 per cent increase in efficiency and 15 per cent increase in miners' earnings in the Kanawha field in the mines which have changed from union to non-union operation.

"They are convinced that to contract with that organization is to put the economic future of their fields which have no local markets at the mercy of wage agreements dictated by the International officers in Indianapolis who have a deep-rooted hostility to this field and whose primary interests are elsewhere. They point to the bitter complaints of the operators in the Kanawha field and the states of the Southwest to the effect that the central organization, through arbitrarily dictating wage scales inapplicable to local conditions, has in effect discriminated against those fields.

"They object to the principle of being compelled to employ only members of that organization and to being forced to collect, by the 'check-off,' for that organization such dues and assessments as it sees fit to impose on each worker in their mines."

Urging the members of the Commission to visit the West Virginia mining regions in person, counsel assert that they will find living conditions that compare favorably with any standard. Tables are adduced to show higher earnings by miners in the non-union fields than in bordering union territory. Nowhere in West Virginia, the brief states, will the commissioners discover any mitigation of the crimes presented in 15,375 pages of West Virginia court records growing out of violence alleged in many cases to have been directly instigated or even directed by responsible officials of the miners' union.

Reviewing the bloody attempt of the United Mine Workers to impose the check-off at Willis Branch, Colonel Stimson and Mr. Dorr declare that after the fighting "fire, dynamite and bullets had made the place practically uninhabitable and had made mining impossible." Hundreds of thousands of dollars in damages, they say, were paid out of court by the United Mine Workers of America rather than to have the resultant damage cases come to trial.

John L. Lewis, president of the miners' union, in reply to the brief made the following "square-toed proposition":

"We challenge the non-union operators of southern West Virginia to remove all restrictions and restraint and permit their employees to join the union if they so desire. The union will present its case to these men in a lawful, peaceable and orderly manner; and let the men themselves determine whether they wish to join.

"Of course, it will be necessary for these non-union

operators to agree in advance that they will eliminate all of their gunmen, hired thugs and armed guards during the time this test is in progress, and that they will not permit these brutal desperadoes to interfere in any manner with the men in the exercise of their discretion. Further, it will be necessary for these non-union operators to pledge their word that they will abandon their practice of discriminating against men who do join the union; that they will not discharge employees who become members of the United Mine Workers as they have done in the past and as they are doing today. Otherwise the test would not be a fair one.

"No member or representative of the United Mine Workers will violate any law or create any disturbance in connection with this test of the unorganized employees. If these non-union operators are game they will accept this challenge. If they are a set of welchers, they will refuse it. It will be interesting to see what they do about it."

Fireboss' Attempt to Relight Lamp Causes Explosion That Kills 99 at Kemmerer

Ninety-nine coal miners lost their lives and thirty-five survived in an explosion in Frontier Mine No. 1 of the Kemmerer Coal Co., one mile from Kemmerer, Wyo., at 8 o'clock in the morning of Aug. 14. The last sad rites were held over the bodies of the stricken miners Aug. 17.

About the same time the Coroner's jury returned a verdict finding that the blast was the result of an attempt by the fireboss in room 7, off the thirtieth entry, to relight his safety lamp. The lamp, carried by Thomas Roberts, fireboss, whose body was last taken from the mine, was produced at the inquest by Peter Boam, gas watchman. He declared he found the lamp 12 ft. from the face of room No. 7, close to the spot where the body of Roberts was found. The top and bottom were 2 ft. apart and a match apparently recently lighted, with evidences of being burned on the head only, was found a few inches from the bottom part of the lamp, he testified.

P. F. Patterson, state mine inspector, testified that on May 17 he had found the mine in good condition with adequate air.

Joe Nadi and Tony Davich were heroes of the disaster, having locked twenty-seven men within a slope barricade, until the death tunnel on the 1,700 ft. level was partly cleared from blackdamp. Twenty-two of this number were rescued alive. The explosion occurred between slopes 15 and 17, about a mile from the entrance of the mine. A cave-in on the 1,700 ft. level soon after the explosion and the bursting of a water main greatly hampered rescue work.

District Judge John R. Arnold, of Evanston, is at Kemmerer to begin payment of compensation to the survivors of the blast victims, in accordance with the Wyoming law relating to workmen's compensation. The fund will be depleted at least \$200,000 by the blast, he said.

P. J. Quealy, president of the company, is doing everything possible for the survivors and the victims' families. A relief organization has been formed.

Danger in Check-Off, Says Dr. Eliot

Declaring that the "check-off" demanded by the United Mine Workers of America is illegal and that it would be a violation of the Federal Anti-Trust Law, Dr. Charles W. Eliot, president emeritus of Harvard University, in a letter to the General Committee of Anthracite Operators, says the insistence of the United Mine Workers on the adoption by all coal operators of the "check-off" is "much more than a threat of 'no anthracite' for the American people. It is a declaration of purpose of the United Mine Workers to force the closed shop on all coal operators throughout the country, and through the establishment of the closed shop, control all American industries and the Government itself. Hence the necessity of submitting to the thinking public the operators' reasons for refusing the demand for the check-off."

Dr. Eliot says that the union boldly avows a policy of resorting to a general tie-up all over the country rather than accept arbitration, as the operators have done, in cases where collective bargaining fails to reach an agreement.

"If the operators," he says, "should agree to join the United Mine Workers in creating an ironclad and irresistible monopoly in mining coal, they would not only betray the interests of the entire consuming public but also make themselves violators of the law. They should not violate the law to save themselves from financial loss, and do not propose to do so."

"The closed shop throughout an entire industry has been declared illegal by every high court which has passed upon the matter. As late as June 30, 1923, a federal court said: 'Monopolies are especially intolerable where they concern the basic resource of individual existence, to wit, the capacity to labor. . . . This is an old and familiar doctrine in whose maintenance none have so deep a concern as the poor, the humble and those who live by the labor of their hands.' The Supreme Court of the United States has declared that 'There is no more sacred right of citizenship than the right to pursue unmolested a lawful employment in a lawful manner. It is nothing more nor less than the sacred right to labor.'

"Hence it follows that maintenance of the open shop in the chief American industries, especially those which deal with foods, fuels and transportation, should henceforth be a prime object with every lover of his country and democracy. How little has been accomplished toward the open shop since 1903, when the Roosevelt award forbade discrimination on account of membership or non-membership in a labor union!

"The closed shop also puts into the hands of the unions the power to reduce the volume of production by ordering every worker to 'go slow.' The 'slacking' is the most disastrous practice which has ever found place in the American industries, and presents the most serious danger for their future. It destroys the alertness, energy, self-reliance and sense of responsibility which formerly characterized all American labor, and is inconsistent with the maintenance of individual self-respect."

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of June*

(In Net Tons)

Ports	Railroads	1923			1922			1921		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo	Hocking Valley	2,314,486	69,256	2,383,742	1,492,230	36,331	1,528,561	2,349,553	61,521	2,411,074
	N. Y. C.-Ohio Central Lines	817,014	25,428	842,442				646,417	18,206	664,623
	Baltimore & Ohio	1,233,115	36,349	1,269,464	1,649,323	40,916	1,690,239	1,365,697	38,589	1,404,286
Sandusky	Pennsylvania	1,398,824	42,331	1,441,155	975,982	27,879	1,003,861	800,265	22,079	822,344
Huron	Wheeling & Lake Erie	718,221	26,586	744,807	7,612	334	7,946	1,020,112	26,182	1,046,294
Lorain	Baltimore & Ohio	1,511,966	86,094	1,598,060	17,820	16,069	33,889	1,594,796	58,398	1,653,194
Cleveland	Pennsylvania	906,827	83,495	990,322	44,805	22,543	67,348	1,312,504	44,878	1,357,382
	Erie	475,844	20,649	496,493				276,161	8,448	284,609
Fairport	Baltimore & Ohio	326,908	32,708	359,616						
Ashtabula	New York Central	1,854,363	121,693	1,976,056	31,083	15,391	46,474	817,040	33,595	850,635
	Pennsylvania	1,020,053	42,721	1,062,774	30,392	16,708	47,100	1,529,437	48,159	1,577,596
Conneaut	Bessemer & Lake Erie	1,394,998	98,505	1,493,503	58,139	1,207	59,346	592,120	7,443	599,563
Erie	Pennsylvania	311,596	39,842	351,438	28,607	31,148	59,755	711,560	35,659	747,219
Totals		14,284,215	725,657	15,009,872	4,335,993	208,526	4,544,519	13,015,662	403,157	13,418,819

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, Manager.

Coal Commission Optimistic on Wage Parley; to Fix Responsibility if Conferees Fail to Agree

Expressing optimism that resumption of negotiations between the anthracite operators and miners will result in an agreement, so that work in the hard-coal fields may continue without interruption, but asserting that should there be a failure to do so they will report the facts and fix responsibility and make "appropriate" recommendations to the President, members of the U. S. Coal Commission returned to Washington Saturday from their conferences in New York with operators and miners which brought about an agreement to resume negotiations Aug. 20.

While the atmosphere of official Washington is hopeful that the crisis in the anthracite situation has passed and that from the reopened negotiations will come, if not an immediate agreement on all points at issue, at least an arrangement by which work will continue without interruption, spokesmen for the administration have let it be known that plans have been perfected to forward heavy shipments of substitutes for hard coal—bituminous coal and coke—into the anthracite-consuming sections if there be a cessation of operations in the collieries Sept. 1, or at any date.

Although "a cessation of production of any essential commodity cannot be viewed as a pleasant prospect," to use the words of one high government official, and it is realized that to provide substitutes would entail longer railroad hauls in many cases, place a strain upon open-top car supply and create other problems, yet the plan, it is felt, will insure the people and the industries of the anthracite-consuming regions against suffering from cold or a shutdown of plants.

WADLEIGH TO DIRECT DISTRIBUTION OF SUBSTITUTES

F. R. Wadleigh, Federal Fuel Distributor, will be placed in charge of distribution of substitutes if production of anthracite ceases. The broad powers of the Interstate Commerce Commission will be employed to execute the plan. Mr. Wadleigh's office as Federal Fuel Distributor expires by limitation Sept. 22, but it is pointed out that he can be appointed an agent by the Interstate Commerce Commission, and this will be done if the necessity arises.

For several months Mr. Wadleigh has been making a special study of transportation of coal, and this, added to his broad experience in fuel matters, it is felt by officials, marks him as the logical authority to place the system of distributing anthracite substitutes in operation if that action becomes necessary.

The National Coal Association, through its president, J. C. Brydon, speaking for the bituminous operators, has offered a plan to the government to supply soft coal to the anthracite-consuming areas, with voluntary committees of operators to assist and with traffic experts to aid the distribution, at the same time agreeing in advance to submit to voluntary price-regulation or supervision by the government. The plan in view by the government will be a government plan, but it is highly probable that the offer of the bituminous operators will be accepted in part should occasion arise.

It is evident that in the event of another deadlock between the anthracite miners and operators at Atlantic City the Coal Commission will resort to an appeal to public opinion, through a statement which will attempt to fix in the public mind the responsibility for the condition. The Commission will receive daily reports of the proceedings at the Atlantic City conference.

Immediately after their return from New York, where they had summoned in conference committees representing the hard-coal producers and the workers in those fields, Chairman John Hays Hammond and Dr. George Otis Smith, of the Commission, conferred with President Coolidge, remaining with the chief executive half an hour. They submitted a written report and discussed the subject more intimately than was possible in this document.

Speaking to newspaper men after his conference with the President, Chairman Hammond said: "I don't think that

intelligent men can afford to commit suicide at this time. It would be suicidal for either party to be responsible for the suspension of industry. I have too high a regard for the operators and miners to think they would commit such an egregious error, and yet such things have been."

The text of the report submitted by the Coal Commission to the President follows:

"The U. S. Coal Commission, in the discharge of what is believed to be its function, having obtained knowledge that the conference between the operators and the miners in the anthracite region had come to a deadlock, and that negotiations had been discontinued on the 27th day of July, 1923, and that no steps had been taken by either party to reconvene the conference, requested the parties thereto to appear before the commission at the Pennsylvania Hotel, in the city of New York, upon Wednesday, the 15th day of August, 1923, at 3 o'clock p.m.

"At that date and hour the parties appeared and the commission took up with them in turn in executive session the conditions which caused the deadlock and questions in controversy.

"After two days of continuous examination the commission deemed it advisable to address the following letter to the parties in controversy: [The report here quoted the letters addressed by Chairman Hammond of the Coal Commission to John L. Lewis, representative of the mine workers, and Samuel D. Warriner, representative of the operators, under date of Aug. 17, calling upon them to enter into conference, and addressed by James A. Gorman, secretary of the joint conference, in reply to Mr. Hammond, announcing that the parties to the controversy had agreed to resume conferences at Atlantic City, Aug. 20.]

"The Commission does not believe it is in the public interest or helpful in the negotiations to be resumed at Atlantic City for it to report the details of the statements made by the several parties before it in conference.

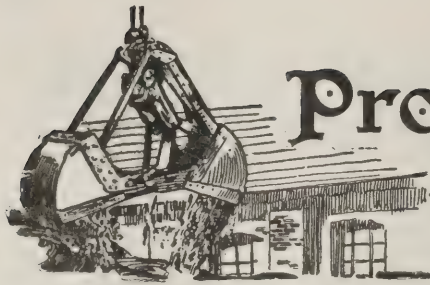
"The Commission will keep in constant touch with said negotiations, and has the promise of both parties that it shall be informed day by day by the secretary of the joint conference of the progress made, or attempted to be made, in reaching a solution of the question involved in keeping the mines open.

"The Commission ventures to express the hope that a prompt agreement at Atlantic City may render unnecessary any further report on this subject, but if there shall be a failure to negotiate a new contract at Atlantic City before the 31st day of August or a failure to agree upon some method of keeping the mines open until a new contract shall be agreed upon, the Commission will report the facts, fix what it believes to be the responsibility and make such recommendations to you as under the circumstances and the law it may deem appropriate.

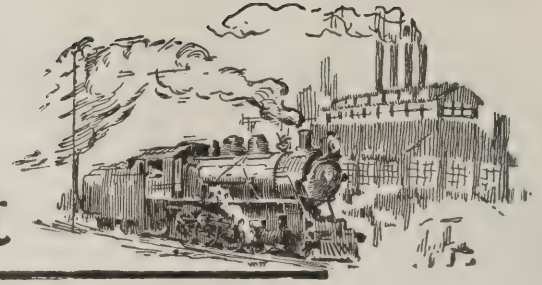
"In the meantime, if the reports received daily from Atlantic City shall lead the commission to the conclusion that an emergency report is necessary, the same will be promptly made."

Bids Received for Supplying U. S. Army Coal

Thirteen bids were received by the U. S. Shipping Board, New York City, Aug. 13 for furnishing and delivering, f.a.s. vessels of the United States Line, New York harbor, eight months supply of coal, with an alternative of one year's supply. Bidders were privileged to submit prices on Pennsylvania or West Virginia Pool 1 coals, or on coals on the United States Navy acceptable list. Three separate bids were received for furnishing and delivering Pocahontas or New River coals, the prices ranging from \$6.59 to \$7.93 f.o.b. mine. Prices submitted in the remaining ten bids ranged from \$6.29 to \$7.52 per gross ton, or on a basis of about \$3.16 to \$4 per net ton f.o.b. mine. Bidders can be required to supply 15,000 tons per month.



Production and the Market



Weekly Review

The market for both bituminous coal and anthracite is sensitive to a marked degree over the anthracite situation. Last Thursday morning it was announced that miners and operators had settled the check-off question and that the danger of the strike on Sept. 1 was averted. Immediately the top level of independent quotations on domestic anthracite dropped a dollar. The same night it was announced that settlement had been upset. The next morning these independent quotations went up 75c.

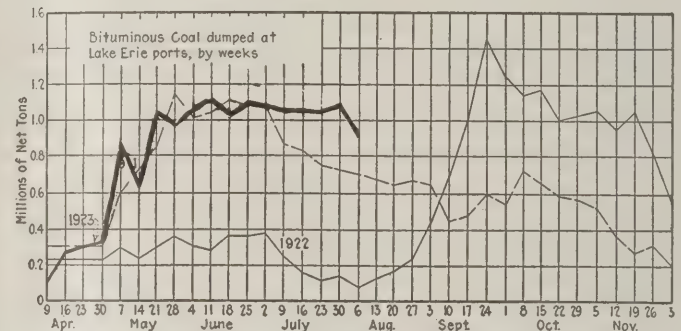
Production of bituminous coal is now nearly 11,000,000 tons per week. An increase of 10 or even 5 per cent in demand would change the situation over night from a buyers' to a sellers' market and inside of two weeks the soft-coal operators would be charging their lost operating time to "car shortage" instead of, as now, to "no market." A strike or the certainty of a strike in the anthracite region would soon throw an added load of from 10 to 20 per cent on the Eastern soft-coal fields that are in position to furnish substitutes for anthracite. Under such circumstances nothing but voluntary action, such as has been promised by the soft coal operators, would serve to keep down the price.

PRICE INDEX REGISTERS SLIGHT INCREASE

Coal Age Index of spot prices of bituminous coal at the mines gained one point last week and on Aug. 20 was 197, which corresponds to an average price of \$2.38. Throughout the East there has been some buying of soft coal to replace anthracite and a flood of inquiries have been received by the distributors of both coal and coke, particularly those in the Pittsburgh district. Industrial buying has been quiet but regular in the past six weeks and practically all large consumers in New England now have more than 90 days' supply on hand. The railroads on Aug. 1 had 14,000,000 tons of reserve of which more than 11,500,000 was in stockpiles. This exceeds railroad fuel stocks at the end of the war, which

were the highest recorded up to that time. The railroads put 3,500,000 tons of coal in storage in July.

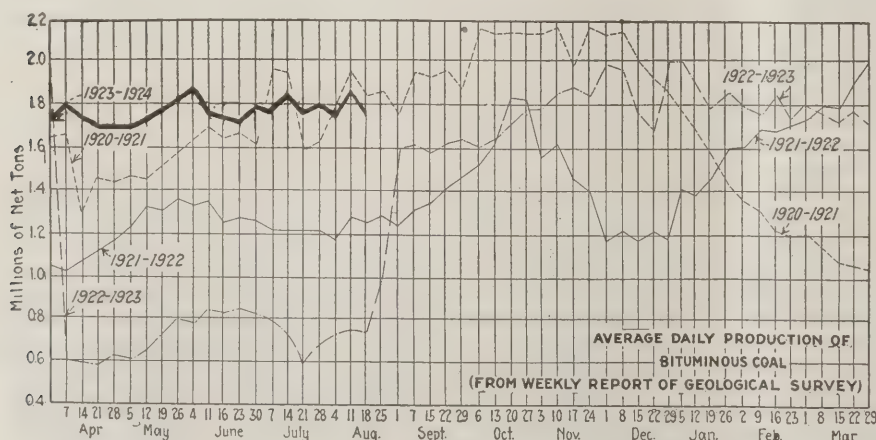
Nearly one-sixth of the total bituminous coal produced in July was used in the manufacture of coke, which goes for the most part to the iron and steel industry. The high production records now being set up in the iron and steel industry account for a large part of the heavy production and consumption of bituminous coal this summer. Because a great deal of coal thus used comes from mines, owned and occupied by the steel producers, the heavy demand from these sources has had no effect on the commercial market.



LAKE COAL DUMPED (Net Tons)

	Week Ended Aug. 20	Season to Aug. 20
Cargo	935,882	16,955,167
Fuel	54,022	859,828
Totals	989,904	17,814,995

All-rail shipments of bituminous coal and anthracite continue in heavy volume to New England, the anthracite movement in the first half of August exceeding 8,000 cars and the soft-coal movement exceeding 9,000 cars. In July more than 1,000,000 tons of soft coal was shipped to New England by water, mainly from southern West Virginia via Hampton Roads.



Estimates of Production

(Net tons)

BITUMINOUS

	1922	1923
July 28 (b)	3,952,000	10,817,000
Aug. 4 (b)	4,313,000	10,565,000
Aug. 11 (a)	4,606,000	9,978,000
Daily average	768,000	1,890,000
Calendar year	212,214,000	334,974,000
Daily av. cal. year	1,120,000	1,779,000

ANTHRACITE

July 28	27,000	2,080,000
Aug. 4	29,000	2,018,000
Aug. 11	40,000	1,735,000
Calendar year	23,504,000	62,569,000

COKE

Aug. 4	110,000	345,000
Aug. 11 (a)	112,000	327,000
Calendar year	3,849,000	12,192,000

(a) Subject to revision. (b) Revised from last report.

Movement of soft coal up the Lakes is at the rate of more than a million tons per week, the total to date being about 2,000,000 tons ahead of 1921, the best year in the last four. Anthracite shipments up the Lakes through the port of Buffalo were 1,747,520 tons for the season up to Aug. 14, as compared with more than 2,300,000 the same date in 1921, which figures refute the charges commonly made that all the anthracite is being sent west this summer.

Anthracite production continues at the high rate of around 2,000,000 net tons per week. The market for steam sizes of anthracite is better than for some time and the entire product, domestic and steam, is moving forward to the consumer as fast as produced.

The production of beehive coke is slowly but surely declining.

Chicago Hopes for General Improvement

Despite uncertainty due to the hard-coal negotiations conditions in Chicago last week were such as to stimulate

buying in certain quarters and warrant hopes for a general improvement. Prominent factors in the market are of the opinion that should a settlement of the hard-coal controversy be reached without a strike it would not materially affect the undercurrent betterment that is beginning to make itself felt in soft-coal circles.

Domestic sizes showed some improvement, although the general demand is still hesitant and buying by city dealers is not yet up to expectations. Country dealers were very active during the past week. The situation is due to a combination of increased demand, restricted car movement, and the piling up of low-volatile slack.

In southern Illinois screenings are better maintained at \$1.75 than they have been at any time in recent weeks, due to the depletion of surplus stocks which were a bar to an improvement earlier in the summer, and the slowing up of railroad buying. Domestic demand is light in the city, but is registering a steady improvement in the country. Lump in general is held at circular and the tendency toward a 50c. or more shading is less in evidence than it was a week ago.

In Central Illinois conditions are not of the best, although

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Aug. 21	Aug. 6	Aug. 13	Aug. 20	Midwest	Market Quoted	Aug. 21	Aug. 6	Aug. 13	Aug. 20
		1922	1923	1923	1923†			1922	1923	1923	1923†
Smokeless lump.....	Columbus....	\$6.10	\$5.85	\$5.85	\$5.75@ \$6.00	Franklin, Ill. lump.....	Chicago.....	\$3.65	\$3.90	\$3.50@ \$4.35	
Smokeless mine run.....	Columbus....	6.00	3.00	3.00	2.75@ 3.25	Franklin, Ill. mine run.....	Chicago.....	2.85	2.85	2.75@ 3.00	
Smokeless screenings.....	Columbus....	5.90	2.35	2.35	2.25@ 2.50	Franklin, Ill. screenings.....	Chicago.....	1.65	1.65	1.50@ 1.85	
Smokeless lump.....	Chicago.....	6.85	5.75	5.75	5.50@ 6.00	Central, Ill. lump.....	Chicago.....	2.60	2.60	2.50@ 2.75	
Smokeless mine run.....	Chicago.....	6.25	2.75	3.00	2.75@ 3.25	Central, Ill. mine run.....	Chicago.....	2.10	2.10	2.00@ 2.25	
Smokeless lump.....	Cincinnati.....	5.75	5.75	6.00	6.00@ 6.25	Central, Ill. screenings.....	Chicago.....	1.35	1.35	1.35@ 1.40	
Smokeless mine run.....	Cincinnati.....	5.50	3.25	2.75	2.75@ 3.25	Ind. 4th Vein lump.....	Chicago.....	3.35	3.35	3.25@ 3.50	
Smokeless screenings.....	Cincinnati.....	5.15	2.85	2.85	2.50@ 3.00	Ind. 4th Vein mine run.....	Chicago.....	2.60	2.60	2.50@ 2.75	
*Smokeless mine run.....	Boston.....	8.70	5.35	5.60	5.15@ 5.50	Ind. 4th Vein screenings.....	Chicago.....	1.60	1.60	1.40@ 1.75	
Clearfield mine run.....	Boston.....	7.60	2.35	2.35	2.00@ 2.75	Ind. 5th Vein lump.....	Chicago.....	2.85	2.85	2.50@ 3.00	
Cambria mine run.....	Boston.....	8.75	3.00	2.85	2.50@ 3.25	Ind. 5th Vein mine run.....	Chicago.....	2.10	2.10	2.00@ 2.25	
Somerset mine run.....	Boston.....	8.00	2.60	2.60	2.25@ 3.00	Ind. 5th Vein screenings.....	Chicago.....	1.45	1.45	1.30@ 1.50	
Pool I (Navy Standard).....	New York.....		3.25	3.25	2.90@ 3.25	Mt. Olive lump.....	St. Louis.....	3.00	3.00	2.75@ 3.25	
Pool I (Navy Standard).....	Philadelphia.....		3.40	3.45	3.20@ 3.65	Mt. Olive mine run.....	St. Louis.....	2.00	2.00	2.00	
Pool I (Navy Standard).....	Baltimore.....					Mt. Olive screenings.....	St. Louis.....	1.50	1.50	1.50	
Pool 9 (Super. Low Vol.).....	New York.....	8.00	2.55	2.45	2.35@ 2.75	Standard lump.....	St. Louis.....	2.30	2.40	2.30@ 2.50	
Pool 9 (Super. Low Vol.).....	Philadelphia.....	8.25	2.60	2.75	2.55@ 3.00	Standard mine run.....	St. Louis.....	1.85	1.85	1.85	
Pool 9 (Super. Low Vol.).....	Baltimore.....		2.45	2.50	2.50	Standard screenings.....	St. Louis.....	1.05	1.05	.95@ 1.05	
Pool 10 (H.Gr. Low Vol.).....	New York.....	7.50	2.25	2.25	2.00@ 2.40	West Ky. lump.....	Louisville.....	6.00	2.25	2.30	2.10@ 2.35
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	8.00	2.25	2.30	2.15@ 2.45	West Ky. mine run.....	Louisville.....	6.00	1.60	1.65	1.65@ 1.85
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	7.75	2.25	2.25	2.25	West Ky. screenings.....	Louisville.....	6.00	1.05	1.05	.80@ 1.00
Pool 11 (Low Vol.).....	New York.....	6.50	1.80	1.80	1.75@ 2.00	West Ky. lump.....	Chicago.....	6.00	2.10	2.10	2.00@ 2.25
Pool 11 (Low Vol.).....	Philadelphia.....	7.75	1.95	1.96	1.75@ 2.00	West Ky. mine run.....	Chicago.....	6.00	1.30	1.30	1.25@ 1.35
Pool 11 (Low Vol.).....	Baltimore.....	7.75	2.00	2.05	1.90						
High-Volatile, Eastern											
Pool 54-64 (Gas and St.).....	New York.....		1.80	1.75	1.60@ 1.90	Big Seam lump.....	Birmingham.....	4.25	3.50	3.50	3.40@ 3.65
Pool 54-64 (Gas and St.).....	Philadelphia.....	6.60	1.80	1.85	1.60@ 1.90	Big Seam mine run.....	Birmingham.....	4.25	2.00	2.00	1.75@ 2.15
Pool 54-64 (Gas and St.).....	Baltimore.....	7.50	1.70	1.75	1.85	Big Seam (washed).....	Birmingham.....	4.25	2.35	2.35	2.25@ 2.50
Pittsburgh sc'd gas.....	Pittsburgh.....		2.65	2.65	2.75@ 2.90	S. E. Ky. lump.....	Chicago.....	6.15	3.10	3.10	2.75@ 3.50
Pittsburgh mine run (St.).....	Pittsburgh.....		2.05	2.05	2.00@ 2.15	S. E. Ky. mine run.....	Chicago.....	6.00	1.85	1.80	1.60@ 2.00
Pittsburgh slack (Gas).....	Pittsburgh.....		1.55	1.55	1.50@ 1.60	S. E. Ky. lump.....	Louisville.....	5.90	2.85	2.85	2.75@ 3.00
Kanawha lump.....	Columbus.....	6.40	3.00	3.00	2.75@ 3.25	S. E. Ky. mine run.....	Louisville.....	5.75	1.75	1.75	1.50@ 2.25
Kanawha mine run.....	Columbus.....	6.25	1.85	1.85	1.75@ 2.00	S. E. Ky. screenings.....	Louisville.....	5.65	1.00	1.00	.75@ 1.25
Kanawha screenings.....	Columbus.....	6.00	1.05	1.05	1.00@ 1.15	S. E. Ky. lump.....	Cincinnati.....	5.90	3.10	3.10	3.00@ 3.50
W. Va. lump.....	Cincinnati.....	5.35	3.10	3.00	3.00@ 3.50	S. E. Ky. mine run.....	Cincinnati.....	5.75	1.55	1.60	1.50@ 1.75
W. Va. Gas mine run.....	Cincinnati.....	5.35	1.60	1.60	1.65@ 1.75	S. E. Ky. screenings.....	Cincinnati.....	5.10	.90	1.10	1.00@ 1.15
W. Va. Steam mine run.....	Cincinnati.....	5.50	1.60	1.60	1.65@ 1.75	Kansas lump.....	Kansas City.....	4.00	4.00	3.50@ 4.50	
W. Va. screenings.....	Cincinnati.....	5.10	1.05	1.05	1.00@ 1.15	Kansas mine run.....	Kansas City.....	3.25	3.25	3.00@ 3.50	
Hooking lump.....	Columbus.....	6.65	2.75	2.75	2.50@ 3.00	Kansas screenings.....	Kansas City.....	2.60	2.60	2.50@ 2.75	
Hooking mine run.....	Columbus.....	6.25	1.85	1.85	1.75@ 2.00						
Hooking screenings.....	Columbus.....	5.75	1.10	1.10	1.00@ 1.20						
Pitts. No. 8 lump.....	Cleveland.....	6.10	2.55	2.55	2.20@ 3.00						
Pitts. No. 8 mine run.....	Cleveland.....	6.10	1.90	2.05	2.00@ 2.10						
Pitts. No. 8 screenings.....	Cleveland.....	6.10	1.25	1.25	1.10@ 1.30						

* Gross tons, f.o.b. vessel, Hampton Roads.

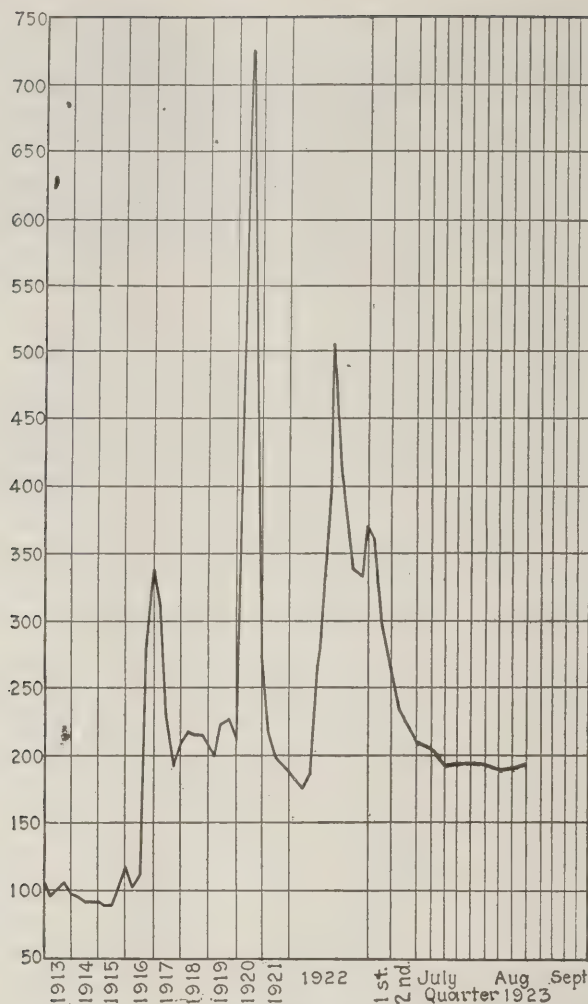
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Aug. 13, 1923		Aug. 20, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia.....	2.39		7.90@ 8.10		7.90@ 8.10		7.90@ 8.10
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	\$8.50@ 13.00	8.00@ 8.35	\$8.50@ 12.50	8.00@ 8.35
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago.....	5.06	12.50@ 13.00	7.20@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 13.25	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago.....	5.06	12.50@ 13.00	7.35@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35	8.50@ 12.50	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago.....	5.06	12.50@ 13.00	7.35@ 8.35	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York.....	2.34		8.25		8.30		8.30
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.50	6.00@ 6.30	6.75@ 8.50	6.00@ 6.30
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago.....	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	3.00@ 3.50	3.50@ 4.15	3.00@ 3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	3.50	3.50	3.50	3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	2.25@ 2.50	2.50	2.25@ 2.50	2.50
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	2.50	2.50	2.50	2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye.....	New York.....	2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



Index	1923				1922
	Aug. 20	Aug. 13	Aug. 6	Aug. 21	
Weighted average price	197	196	195	530	
	\$2.38	\$2.37	\$2.26	\$6.41	

This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

there is a disposition among distributors to respond to improvement in tone. Indiana reports a stronger demand for domestic sizes from the Fourth Vein with prices inclined to reach a higher level and rule a little firmer on the upper ranges.

A slight increase in orders for domestic coals is noted in the Carterville field, while steam sizes continue quiet. In the Standard district mines are operating $1\frac{1}{2}$ to $2\frac{1}{2}$ days a week while there is considerable difficulty being experienced in selling the steam sizes.

St. Louis Notes Increased Inquiries

A slight increase in the retail trade has been noted in St. Louis and additional inquiries from consumers indicate that more interest is being shown in their fuel supply. The increased inquiry comes for the high-grade southern Illinois domestic sizes. There is little demand for anthracite, smokeless or coke and since the dealers of St. Louis are known to have a larger supply of anthracite tonnage in proportion to the amount used than other cities, it is not likely to suffer in the event of a suspension of operations in the anthracite fields. There is little demand for anthracite from the country, as most points have been supplied by earlier shipments.

Things continue a trifle draggy with the western

Kentucky operators and prices on screenings have been a shade weaker, due to better demand and larger production of prepared coal, which is moving north, northwest, central and south. Operators believe that September will bring a better volume of business, and probably better prices. In fact business for September delivery isn't being accepted at present prices by many operators.

Movement Better in Louisville Market

Reports in the Louisville market show that movement of coal is better, and that more buyers are entering the field for prepared coal, as well as steam. Movement of prepared coal is now more general, with larger Southern buying, while steam coal demand is taking up screenings quite well at low prices.

Better inquiry is being received from the gas companies, with better utility buying and fair movement to steel and metal-working plants. Railroad buying is not heavy, but consumption on contracts is good. Fair movement to the Lakes has been reported, which is tending toward heavy production of screenings.

Retailers have been buying more freely, as they have about decided that prices are as low as they are likely to go this fall or for some months to come, unless an open winter and good car supply prevail.

No Anthracite Arrivals at Duluth

For the first time this year since the opening of navigation no anthracite arrived at the Head-of-the-Lakes during the past week, despite the fact that 50 cargoes of soft coal came in. In the thirty-four cargoes reported on the way from lower lake ports five are hard coal. Official figures of anthracite shipments show that 717,600 tons of hard coal had been received at the docks up to Aug. 1. It is assumed that at least 225,000 tons additional will be received at the docks during August.

One thing which is likely to curtail the use of hard coal at Duluth and also cut down the tonnage necessary is the evident determination of various consumers of hard coal to use substitutes this winter. Total bituminous receipts this year to Aug. 1 are 5,324,400 tons.

Anthracite is being shipped from Duluth to Winnipeg and even to points west of Winnipeg. The Port Arthur and Fort William dealers who usually supply the Winnipeg market complain of being unable to get any anthracite from lower lake ports.

The recent recommendation of the examiner in the I.C.C. hearing on the southern Illinois-Head-of-the-Lakes rate dispute has reassured dock men.

Prices are as follows: Youghiogheny and Hocking: lump, \$6.25@6.50; run of pile, \$5.25@5.50; screenings, \$3.75@4. Splint: lump, \$6.75; screenings, \$4@4.25. Pocahontas: lump, \$9@10; run of pile, \$6.50; screenings, \$6. Kentucky: lump, \$7.50; run of pile, \$6.75; screenings, \$4@4.25.

Active Anthracite Demand at Milwaukee

An active trade in anthracite is the dominant feature of the market at Milwaukee. The yards have plenty of room for hard coal, but soft-coal storage facilities are slowly being exhausted. Soft coal is being taken quite freely, but it is expected that there will be a marked check in receipts by the end of this month unless the outward movement increases. There is some agitation in the newspapers over the fact that the popular grades of anthracite are \$1.70 cheaper at Duluth than at Milwaukee and that ports nearer to Milwaukee also are retailing coal at from 25c. to 50c. per ton less than Milwaukee. Receipts of coal by lake during the first half of August aggregated 78,102 tons of anthracite and 133,036 tons of soft coal, making the cargo receipts since the opening of navigation 531,410 tons of anthracite and 1,681,782 tons of soft coal.

Demand for Kansas and Oklahoma coal, as well as for Arkansas semi-anthracite is beginning to pick up. Reports received by the Southwestern Interstate Coal Operators' Association indicate that the mines are now working an average of three days a week, while a week ago they averaged around two days.

Salt Lake City retail dealers have received many storage orders. Operators report a quiet market, but are optimistic.

Interest Awakens in Ohio Markets

The trade at Cincinnati is interested in the number of inquiries received last week, although they were not as productive of orders as they might have been. Prices showed more strength. The awakening of interest is attributed to the probability of trouble in the hard-coal fields. Demand for the low-volatile coals continues strong. West Virginia 2-in. lump is quoted at \$2.75, as compared with \$2.50@2.75 last week, and southeastern Kentucky 2-in. lump at \$2.75@3, as compared with last week's quotation of \$2.75.

A slight improvement in the demand for domestic coals at Columbus is reported. Due to better business from the consumer, retail dealers are showing a disposition to buy more, especially Pocahontas, New River and splint varieties. There is a fair demand for the steam coals. Railroads are not taking as large a tonnage as formerly, while public institutions and utilities are taking only a fair tonnage. No change in market conditions is reported from Cleveland. Little storing is being done, most consumers buying as they need the coal.

Domestic Coal Moving at Pittsburgh

There is no change in general conditions in the Pittsburgh district. Domestic coal is beginning to move with some freedom and the market for good grades is about \$3@3.25. It is estimated at Pittsburgh that about 1,000,000 tons of lake coal remains to be covered. A strengthening of the central Pennsylvania market was noticed at Altoona, more orders being received from Eastern consumers and at somewhat better figures than a week previous. The market at Buffalo remains quiet.

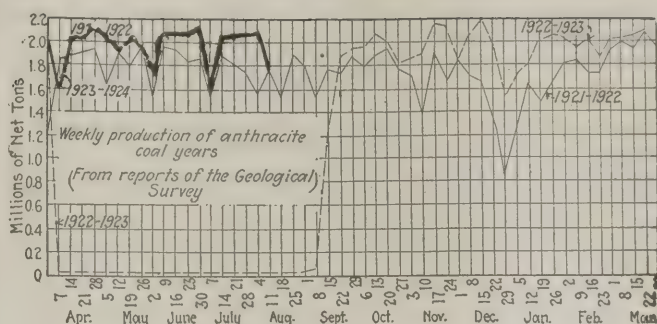
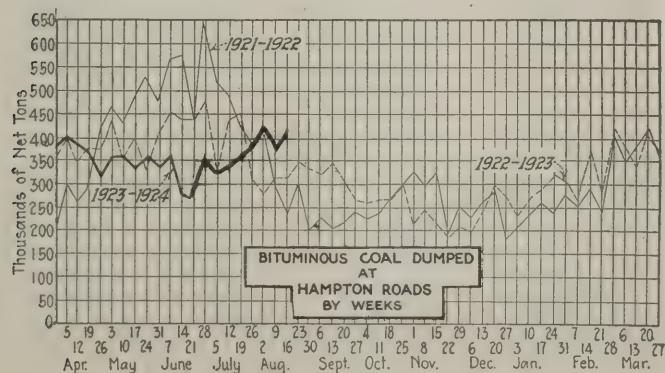
New England Market Still Apathetic

In New England the market shows no improvement. Buyers continue apathetic and there is so much coal offered that consumers have no idea of increasing their present large reserves. The textile mills in particular have used much less than anticipated, and there are almost no signs of better inquiry ahead.

Hampton Roads prices average lower than a week ago. Quotations still range around \$5.50 per gross ton f.o.b. vessel for No. 1 Navy standard, but a few actual sales have been made as low as \$5.10@5.25. There is practically no distress coal at this end, and for that reason prices on cars at Boston, Providence and Portland are a shade firmer. While Pocahontas and New River have sold at \$6.75 on cars Boston, the prevailing price is now nearer \$7 while certain factors are asking \$7.15.

Receipts all-rail from central Pennsylvania continue on a light basis. Shippers of even the most favorably known grades are actively canvassing for August and September business and prices are down to the cost of production. Prices on the medium and low grades show no change; in fact most of the low-grade operations are shut down until demand improves.

A fair volume is moving via New York and Philadelphia piers, although at New York there are beginning to be accumulations. The actual tonnage dumped this month at the Philadelphia terminals will not compare favorably with tonnage handled in July, but the amount of coal via this route holds up more consistently than coal from the same districts all-rail.



Buying on Increase in Seaboard Markets

Inquiries for soft coal increased in New York and Philadelphia during the week, and while not much new business developed shippers agreed that buying should increase from now on. There was some expectation among the New York trade that the drawn-out wage negotiations of the anthracite operators and miners would lead to a stronger market. Considerable interest was taken in the prices received by the U. S. Shipping Board on Aug. 13 for supplying coal to the vessels in New York harbor. Efforts made to introduce soft coal as a domestic fuel are not meeting with the success expected. The soft-coal market at Baltimore is quiet, due to a slump in the export trade. Mines in some of the Southern districts, which were damaged by severe wind and rain storms in the middle of August are beginning to recover. There is little demand for high-volatile coal for export. At Birmingham the market remains quiet, though there is a feeling that the trend is toward more activity. Production during the week ended Aug. 4 is reported at 343,000 tons.

The export market is dull. Inquiries have fallen and most of the business now moving is said to be on old orders. During the first twelve days of August four vessels left Baltimore for foreign countries carrying 18,469 tons of cargo and bunker coal.

Anthracite Market Reacts to Wage Parley

The anthracite market was more or less affected by the favorable impression gained early in the week that the wage negotiations were in a way to early settlement. Some shippers' quotations for independent quotations eased at once only to be partly regained within the next twenty-four hours when the union leaders further explained their offer to the operators. There has been no lessening in demand for domestic coals and steam coals are moving well. The coal fields continue to be thoroughly covered by buyers, who in some cases are bidding against each other. Stove coal continues to be the most desired size, with chestnut a close second. In the New York market egg coal demand is easier and some retail dealers are said to have small tonnages of it, as well as of pea coal, in their bins. Notwithstanding the heavy output retail dealers continue to receive orders, which with the orders already unfilled on their books absorb their receipts rapidly.

A steady demand for anthracite continues to make the hard-coal market at Toronto strong. Although retailers are experiencing no great difficulty in obtaining supplies, anthracite is none too plentiful.

Production of beehive coke continued to decline during the week ended Aug. 11, the Geological Survey reporting the total output to be estimated at 327,000 net tons, a decrease of 18,000 tons as compared with the previous week. The cumulative output of beehive coke during the present year to Aug. 11 stands at 12,192,000 net tons.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended Aug. 4, 1923	1,033,130	190,531		
Previous week	1,041,044	194,546		
Same week in 1922	842,663	78,965		
		All Cars	Coal Cars	
Aug. 8, 1923		74,168	6,546	10,149
Same date in 1922		174,927	131,267	
July 31, 1923		76,453	6,546	9,570
				4,897
				4,774

Foreign Market And Export News

Great Britain's Coal Output Increases; Operators Watching Anthracite Wage Conference

Output of coal continues to increase in Great Britain, 5,250,000 tons having been produced during the week ended Aug. 4, says a cable to *Coal Age*. The output for the previous week was 5,112,000 tons.

With the exception of a few of the better grades of large coals, supplies are sufficient to take care of the demand. Mine owners are watching developments in the wage negotiations between the anthracite mine owners and workers.

The Welsh steam coal trade has shown marked improvement. European and Canadian business increased, while the French and Italian railways have sent in bookings for about 400,000 tons of locomotive coals. Some of the best Admiralty mines are definitely out of the market until November. Prices generally are steadier. The anthracite market is good.

Newcastle improved slightly and inquiries increased. German business is slow; France, Italy and Belgium business is quiet and U. S. competition is being felt in the Mediterranean. Contracts reported include Zeebrugge, 12,000 tons best Durham coking; European gasworks, 6,000 tons Wear special gas. Other Continental gasworks are inquiring for quantities ranging from 5,000 tons to 40,000 tons of good gas coals.

French Coal Production for June Shows Large Increases

The coal market in France remains favorable, although prices for British and Belgium coals are still high. Supplies of industrial coals are fairly adequate to meet the requirements, while the recent decision of the Belgian Government for the re-establishment of export licenses for house-coals is believed to have caused a large cut in imports. The decision is believed to be due to the excessive prices charged by Belgian collieries. Owing to high prices the marketing of British coals in France has become almost impossible and has caused much uneasiness.

Shipments of coke from the Ruhr received by the S.C.O.F. during July

amounted to about 70,000 tons, as compared with 161,000 tons in June, the decline in the tonnage received being due in part to the bad loading facilities. In order to avoid as much as possible the exhaustion of stocks, the working of some of the coke-oven batteries in the Ruhr is being planned by the French authorities.

Contrary to the assertions made in the German press, the shipping of coal from the Ruhr to Italy has never been stopped, special regulations having lately been fixed by both French and German authorities.

Germany delivered to the Allies during 1922 9,076,000 tons of fuel, while the Commission for Reparations had previously fixed the amount to 11,536,700 tons. Of this amount, France has received 4,247,425 tons of coal, as against 5,308,400 tons fixed by the Commission for Reparations, and 4,340,154 tons of coke, instead of 5,333,300 tons.

The French mines output for June was 3,254,903 tons of coal and 70,813 tons of lignite, as compared with 3,060,061 tons of coal and 79,016 tons of lignite, in May. During the first six months of the year coal production amounted to 18,093,091 tons, as compared with 15,560,400 for the same period of time during 1922.

The total output of coal of the Nord and the Pas-de-Calais for the month of June was 1,785,765 tons, as compared with 1,648,445 in May.

The output in coke during June was 161,130 tons, as compared with 161,943 in May. In the devastated mines of the Nord and Pas-de-Calais, the production of coke in June was 108,149 tons, as compared with 104,740 in May.

There was produced during the first six months of 1923, 882,100 tons of coke, as compared with 464,300 tons for the same period in 1922.

Production of patent fuel during June amounted to 257,793 tons, as compared with 213,000 tons in May, while the devastated mines of the Nord and Pas-de-Calais produced 130,617 tons, as compared with 110,321 tons in May. For

the first six months of the year France produced 1,465,800 tons of patent fuel, as compared with 1,295,200 tons in the first six months of last year.

Production in the Sarre during June amounted to 1,025,716 tons of coal and 11,119 tons of coke.

Hampton Roads Market Quiet

Dumpings at Hampton Roads last week increased over those of the previous week, while prices declined slightly. There was some demand for Kanawha gas coals from Canada, but the tonnage was comparatively small. Inquiries from South America were quite numerous, it being stated that British coal agencies not being able to hold this tonnage, a large part of it had been diverted to this port. With the coming of cool weather a better market is looked for.

The large stocks on hand are not causing as much uneasiness among the shippers, as the light demand.

Export Clearances, Week Ended Aug. 18, 1923

FROM BALTIMORE

For Ecuador:	Tons
Br. SS. Almagro	1,657
For Germany:	
Ger. SS. Holstein	5,501

FROM HAMPTON ROADS

For Brazil:	
Ital. SS. Recca, for Rio de Janeiro....	7,411
For Holland:	
Dut. SS. Burgerdyk, for Rotterdam....	3,833
Ital. SS. Concordia, for Rotterdam....	9,520
For West Indies:	
Am. Schr. Theoline, for Hamilton....	878
Dan. SS. Stal, for Kingston.....	2,165

FROM PHILADELPHIA

For Cuba:	
Nor. SS. Lisbeth, for Havana.....	...

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	Aug. 9	Aug. 16
Cars on hand.....	1,692	1,443
Tons on hand.....	93,730	83,024
Tons dumped for week.....	160,964	177,636
Tons waiting.....		1,000

Virginian Ry. Piers, Sewalls Pt.:

Cars on hand.....	1,679	2,140
Tons on hand.....	95,691	122,560
Tons dumped for week.....	83,816	75,820
Tons waiting.....	23,805	...

C. & O. Piers, Newport News:

Cars on hand.....	2,607	1,815
Tons on hand.....	141,285	94,125
Tons dumped for week.....	109,839	110,437
Tons waiting.....	2,115	9,410

Pier and Bunker Prices, Gross Tons

PIERS

	Aug. 11	Aug. 18†
Pool 9, New York.....	\$5.35@ \$5.65	\$5.35@ \$5.75
Pool 10, New York.....	4.90@ 5.25	5.00@ 5.25
Pool 11, New York.....	4.65@ 4.85	4.65@ 4.85
Pool 9, Philadelphia.....	5.30@ 5.75	5.30@ 5.75
Pool 10, Philadelphia.....	4.60@ 5.35	4.65@ 5.30
Pool 11, Philadelphia.....	4.15@ 4.70	4.15@ 4.75
Pool 1, Hamp. Roads....	5.10	5.15
Pools 5-6-7, Hamp. Rds.	4.80	4.90
Pool 2, Hamp. Roads....	4.90	5.10

BUNKERS

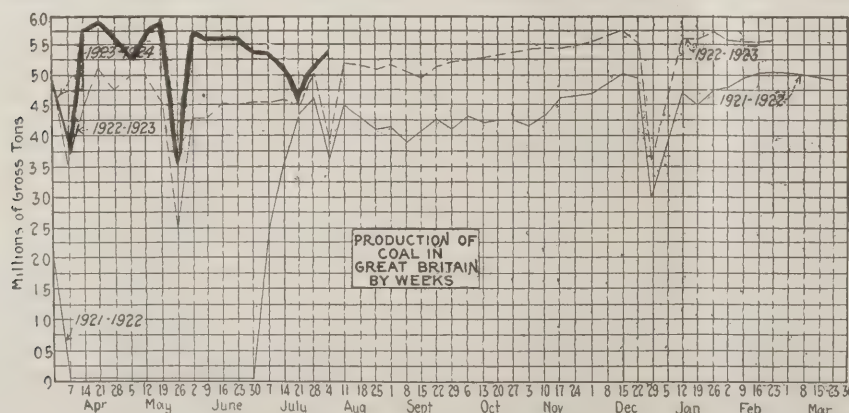
Pool 9, New York.....	5.65@ 5.95	5.65@ 6.05
Pool 10, New York.....	5.20@ 5.55	5.30@ 5.55
Pool 11, New York.....	4.95@ 5.15	4.95@ 5.15
Pool 9, Philadelphia.....	5.70@ 6.00	5.65@ 6.00
Pool 10, Philadelphia.....	4.90@ 5.70	4.90@ 5.65
Pool 11, Philadelphia.....	4.35@ 5.00	4.35@ 5.00
Pool 1, Hamp. Roads....	5.10	5.25
Pool 2, Hamp. Roads....	4.90	5.10

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Aug. 11	Aug. 18†
Admiralty, large.....	30s. @ 31s.	30s. @ 31s.
Steam smalls.....	21s.	19s. @ 20s.
Newcastle:		
Best steams.....	24s. @ 25s.	22s. 6d. @ 26s.
Best gas.....	27s.	24s. @ 25s.
Best bunkers.....	23s.	23s. @ 24s.

† Advances over previous week shown in heavy type, decline in italics.



News Items From Field and Trade

ALABAMA

The Federal American Engineering societies have appointed Erskine Ramsay, vice-president of the Pratt Consolidated Coal Co. as chairman of the committee that will make a study of the coal storage problem in Alabama. Other members of the committee are F. B. Keiser, Robert Hamilton, S. L. Morrow, E. Stauverman, E. H. Pierce and T. H. Aldrich. Questionnaires will be sent out to consumers and producers and an effort will be made to compile the data necessary for an early report.

William Lacey, superintendent of mines for the Woodward Iron Co. has tendered his resignation and accepted an appointment in like capacity with the DeBardeleben Coal Corporation. Mr. Lacey for the past two years has been in charge of both the coal and ore mines of the Woodward Company. W. M. Johnson will succeed Mr. Lacey.

The largest class in the history of the mining industry in Alabama took the recent mid-year examination before the state board of examiners. There were 119 applicants for certificates of competency as mine foremen and fire bosses, out of which a total of eighty were successful in passing the examination. Sixty-four received certificates as first class mine foremen, seven as second class, and nine were successful in obtaining certificates as fire boss.

The Riley & Kincaid Coal Co., with capital stock of \$5,000, and the Morrison Coal Company, with \$2,000 capital, were incorporated recently in Jefferson county.

COLORADO

The American Continuous Retort Co. of Denver has bought a quarter-section of coal land from U. H. Clark of Thompsons located near that place. The price was \$15,000. The Colorado concern will use the output for its own use. The mine has been operated for several years and the coal disposed of in Grand County.

Papers have been drawn for a lease of 6,100 acres of Colorado coal lands to the Pacific Steel Co. of Los Angeles. State house officials reported that the lease would be signed shortly, thereby giving a clear road for extensive exploitation of what is known as the Fort Lewis mesa in La Plata County near Durango where coal lands are located.

A representative of the company has appeared before the state land board and also the state board of agriculture. The latter has control of the mesa. He told the board that 1,000 tons of coal daily could be taken from the field. The Pacific Steel company says it is prepared to spend \$2,000,000 in the development of the new coal fields. The plan is to build a railroad into the mesa country—possibly a branch of the Santa Fe.

ILLINOIS

The Cosgrove-Meehan Coal Co. of Illinois, at Marion, has increased its capital from \$1,500,000 to \$1,800,000.

The McLean County Coal Company, Bloomington, has resumed operations, work being done on the second vein. The third vein was abandoned several years ago. The company will operate the mine after September 1 at full capacity.

A new 1,000-foot switch is being constructed at the Benton mine of the Franklin County Mining Co. to connect that mine with the Chicago & Eastern Illinois railroad thus giving the mine a second rail outlet. James Seymour is general manager.

Mine No. 5 of the Southern Gem Coal Corporation located at Pinckneyville, will be reopened at once. The shaft was closed sometime ago when the men called a strike over the hoisting engineer, whose discharge the miners demanded. The company refused. The company operates two mines at Pinckneyville, Nos. 5 and 6.

The Kolb Coal Company, one of the leading companies in the Fifth & Ninth Districts of Illinois has just been acquired by Louis C. Emmons, of Philadelphia, who is also President of the Emmons Coal Mining Company, operating mines in Pennsylvania and West Virginia. Mr. Emmons becomes President succeeding C. C. Field. H. B.

Wessel has been promoted from Sales Manager to the office of Vice President, in charge of both the St. Louis office and the company's five mines.

The East Side Coal Co., of Freeburg, a new concern, announces that it is about ready to open its new mine at that place. The following are members of the new concern; Erwin and Edwin Koesterer, Jake and Edward Martin and Leo Funk. The shaft has been completed at a depth of 160 feet and development work is under way. The coal is of excellent quality and averages 6 feet, 8 inches in thickness.

INDIANA

The Joy Machine Co., a Delaware corporation, has qualified to do business in Indiana with a capital of \$9,000. They will manufacture coal digging and loading machines. Van Nolan, of Evansville, is their agent.

The Keystone Coal Mining Co. has been incorporated with a capital of \$50,000. They will mine coal, clay and minerals with offices at Linton, Ind. W. T. Suthard, Squire Walters, Andrew Humphreys, C. H. Gregory and J. C. Fritz are directors of the company.

John T. Reed, receiver for the Calcora Coal Co., Terre Haute, has received permission from the court to sell or lease the property of the company clear of all encumbrance. The petition showed that the property of the company is of no value so long as it is encumbered and further alleged that all creditors of the company are willing that the property should be sold in this way. The property is said to be worth in the neighborhood of \$40,000. The receiver's report shows a total disbursement of \$6,781.08.

A survey of the amount of coal in storage in Indianapolis is being made by a committee composed of T. A. Wynne, of the Indianapolis Light and Heat Co.; Carl Fletcher, of the Knox Coal Mining Co.; M. K. Foxworthy, of the Merchants' Heat and Light Co.; Earl Carter, of the Public Service Commission, and R. H. Bennett, of the Industrial Sales Co., on behalf of the Federated American Engineering Societies. Every industry that consumes coal is included in the survey, the committee ascertaining how much coal is in storage now and how much the concern can store against emergencies.

KENTUCKY

Rainbow Coal Co. has been incorporated in Louisville, with a capital stock of \$25,000, by C. D. Salyers, F. S. Salyers and others.

The Kentucky gubernatorial election this fall can't hurt the coal trade of the state materially, as candidates nominated by both parties are favorable to the coal trade. Alvin W. Barkley, Democratic nominee, from Paducah, Ky., who was arguing for a coal tonnage tax, higher mine property tax, lease tax, etc., was defeated on Aug. 4, by J. C. Cantrill, of Georgetown, a man favorable to the coal and racing interests of the state. Charles I. Dawson, of Barbourville, Republican candidate, comes from the coal country, and is favorable to the coal interests. Nominations have been largely argued as if coal and racing were the two big issues. Regardless of which party receives the election, the feeling in the coal trade is that the next Governor will not be a man who is gunning the coal trade.

MASSACHUSETTS

The committee of Western Massachusetts engineers appointed to study the coal situation as a part of a national investigation of coal storage, which the Federated American Engineering societies have undertaken, in co-operation with the United States Coal commission and the United States department of commerce, will be headed by Robert E. Newcomb of Worthington Pump & Machinery Company, Holyoke. Other members are A. B. Reynders, Westinghouse Electric and Manufacturing Company, Springfield; Herbert A. Moody, Turners Falls Power and Electric Company, Turner Falls; John M. Newton,

Roland T. Oakes Company, Holyoke; Harley W. Morrill, Ludlow Manufacturing Associates, Ludlow; Lorenzo J. Scott, United Electric Light Company, Springfield.

MINNESOTA

W. H. Hoyt, chief engineer of the D. M. & H. Ry., has been chosen to head the Duluth committee by the Federated American Engineering Societies to study the coal situation. Other members of the committee are W. H. Hawley, G. W. Andrews, W. H. Cargo, C. A. Graves, C. J. Enger, John A. Jess, C. D. Christie and Thomas D. Hodge.

MISSOURI

A 38-in. vein of coal has been struck on the J. W. Barton farm, at Amoret, seventy miles south of Kansas City on the Kansas City Southern Ry., at a depth of 102 feet.

Bids for the St. Louis city contract for approximately 80,000 tons of Standard screenings, which last year was held by the Egyptian Coal & Mining Co., of St. Louis, were recently opened. The Meteor Coal Co., of St. Louis, was low at \$1.30. The West Virginia Coal Co. came next with a price of \$1.37.

The Kolb Coal Co. of St. Louis, sold under the hammer recently and bought in by the First National Bank of St. Louis representing Philadelphia capitalists who were the bondholders, has been reorganized with Louis C. Emmons, president, of Philadelphia, who is also connected with the E. C. Emmons Coal Co., H. B. Wessels of St. Louis, vice-president and general manager, and Charles Morris, secretary and treasurer.

The property of the Morton Coal Co., operators of Mine No. 24, near Novinger, was sold recently by Sheriff Waddill, of Adair County. The leases were obtained by J. J. McGraw.

MONTANA

It is estimated that the new Rosebud coal field to be opened by the Northern Pacific Ry. in Rosebud County bears a vein 28 ft. thick and contains an estimated total of 11,550,000,000 tons. The road told the I. C. C. before the commission granted permission for 31 miles of railroad to tap the region, that about 1,400,000 tons will be mined annually for the road's use, saving possibly \$1,000,000 a year over coal of admittedly better quality which the line has been buying for its lines between Mandan, N. D., and Missoula, Mont. No commercial development in the field is planned yet, but the railroad believes that some revenue coal eventually will be produced.

NEW YORK

It has been announced that Frederick McCann, President of McCann-Camp Company of New York, with offices at Scranton, Pa., DuBois, Pa., and Morgantown, W. Va., has disposed of his interest in Producers Coal & Coke Company of Johnstown, Pa., and is now concentrating his efforts entirely to McCann-Camp Company.

The Board of Directors of the Coal & Iron National Bank, New York City, appointed Harold C. Knapp of the Irving National Bank Trust Officer. Mr. Knapp will take up his new duties Sept. 1st, succeeding Arthur A. G. Luders who has resigned. At the same time John R. Voorhis, Jr., was appointed Assistant Cashier, the appointment to take effect immediately.

Pattison & Bowns, of New York City, announce that they have negotiated a contract for the purchase for a period of years of the entire tonnage of the famous Pittston coal of the Pennsylvania Coal Company, The Hillside Coal & Iron Company and associated companies, to be sold commercially in Canada and the territory east of the western boundary of Pennsylvania, to take effect as of April 1, 1924. They are negotiating with Williams & Peters to take over their sales contract which expires as of April 1, 1924, and upon the completion of these negotiations, an announcement will be made of a definite date when this arrangement will be effective.

OHIO

H. C. Cain, purchasing agent for Columbus, has awarded the contract for 22,650 tons of nut, pea and slack coal for various city departments at an average cost at the mines of \$1.30 per ton. The Jay Miller Coal Co. will furnish 12,500 tons for the municipal light plant at \$1.40; the Williams S. Harmon Coal Co. will furnish 6,800 tons at the water works pumping station at \$1.24, and the Hisylvania Coal Co. will furnish 3,350 tons for the garbage reduction plant at \$1.25.

The Clear Creek Coal Company has been placed in voluntary bankruptcy. Its assets are in the neighborhood of \$2,500 and liabilities about \$6,000.

The H. Tahl Co., has been chartered with a capital of \$5,000 to deal in coal, among other things. Incorporators are: Rebecca Tahl, Hyman Tahl, S. Tahl, E. R. Shawman and R. E. Marrs.

Development of about 700 acres of coal land in Pultney and Pease townships, Belmont county, Ohio, is contemplated by Fether Hamilton, following the acquisition of the acreage. Coal in this acreage is in the Pittsburg No. 8-A vein. The 700 acres acquired involved a consideration of about \$25,000, it is stated.

The Swaywood Coal Company has been incorporated under the Ohio laws with offices in Cincinnati. Those back of the venture are: G. W. Swain and Miss G. R. Wood, who were employees of the Main Island Creek Coal Company when that branch office was directed by E. J. Frechtling.

Deeds have been recorded at St. Clairsville transferring 800 acres of Pittsburg or No. 8-A coal in Pultney township, Belmont Co. to David Hamilton of Greensburg, Pa. Although the price is given in the deed as \$10 for the entire tract, the revenue stamps on the document indicate the price was \$60,000 or an average of \$75 an acre. This is believed to be the largest price ever paid in the Eastern Ohio field for the thinner vein.

Southern Ohio Coal Exchange reports that during the week ended July 28 there were 153,717 tons produced in the district out of a full time capacity of 722,915 tons from 443 mines reporting. Of the shortage of 569,198 tons, car shortage caused a loss of 9,860 tons; labor shortage a loss of 10,408 tons; strikes, 14,145 tons; mine disability, 6,378 tons, and no market, 528,407 tons. During the same week the eastern Ohio field loaded 11,182 cars out of a total of 15,792 cars ordered.

The Raven Coal Mining Co., of Steubenville, has been incorporated with a capital stock of \$300,000 by Lee Van Tilburg, John H. Peterson, R. D. Stone, E. M. Morrow and M. H. Francis.

The Willard Coal Co., of Cleveland, has sold to the Brocalisa Chemical Co. a tract of coal land containing 1,000 acres near Racine which will be developed soon by the opening of several mines. The deal involved about \$1,000,000.

The Big Mountain Coal Co., of Columbus, has been made exclusive sales agents for the Vulcan Coal Co., with headquarters in Steubenville and three mines at Pomeroy. The company operates a large mine with a capacity of 1,200 tons daily, where prepared sizes are made, and two smaller mines with a daily capacity of 600 tons where mine-run is produced.

PENNSYLVANIA

The Amend Coal Co., of Greensburg, has contracted with the Roberts & Schaefer Co., Chicago, for a Marcus screen to be installed in its tipple at Newcomer.

The strike in the Somerset county coal fields, which has been in effect since April, 1922, was called off Aug. 14, when John Brophy, president of district No. 2, United Mine Workers, announced that an agreement had been reached between mine officials and local union representatives, in session at Johnstown for two days. Approximately 2,500 miners were involved in the strike.

A state charter has been granted to the South Cambria Coal Company, Johnstown, with a capital of \$5,000. Incorporators: K. C. Ryan and William Ryan, Johnstown, and George S. Vickrey, Salix. A charter was also issued to the Breck Fuel Company, Pittsburgh, with a capital of \$25,000; incorporators: George D. Breck, Jr., Pittsburgh; Greer McIlvain and Frank G. Thompson, of Dermont.

Graham Bright, general engineer in charge of coal and metal mining department of the Westinghouse Electric & Manufacturing Co., has joined the firm of Howard N. Eavenson & Associates, mining engineers, Pittsburgh, Pa. Mr. Bright will give special attention to power house systems, power plant appraisals, transportation and transmission systems for coal and metal mines and general industrial power applications.

The Bureau of Workmen's Compensation of the State Department of Labor and Industry reports that of the total of 221 fatal accidents that occurred in the industries of Pennsylvania during July, 107 occurred in the mines. Of the other fatalities seventy-three are listed as industrial and forty-one as public service. Fifty-seven of the mine deaths occurred at the anthracite opera-

tions and fifty at the bituminous mines. Luzerne led with the greatest number of any of the coal counties, having nineteen, while Lackawanna and Schuylkill each reported thirteen deaths.

There will be offered at public sale on September 25 in Pottsville by the Lehigh Coal and Navigation Co., all its rights, title and interest in 582 acres of coal, with 104 acres of overlying surface, located partly in and eastwardly from Pottsville. The property will be sold to the highest bidder whose bid exceeds the sum of \$1,200 an acre for the entire acreage.

Since the inception of the Workmen's Compensation act, Jan. 1, 1916, there have been 19,553 fatal accident reports received by the Bureau of Workmen's Compensation; 3,850 cases of permanent disability; 1,377,303 cases of temporary disability; 15,248 agreements approved in fatal cases; 8,878 approved in permanent disability cases, and 473,480 approved in temporary disability. The total compensation paid during this period, to Aug. 1, this year, amounted to \$45,980,264. The compensation awarded for fatal accidents amounted to \$40,826,405, and of this amount \$13,776,106 has been paid, while in addition \$32,204,158 has been paid in disability compensation.

Shipments of anthracite for the month of July, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,260,053 gross tons as compared with 6,634,787 tons during the preceding month of June, a decrease of 374,734 tons, or 5.6 per cent. The decrease was due to Independence Day celebrations, and the fact that there were five Sundays in July, reducing the working days to twenty-five against twenty-six in June. July shipments show an increase over the same month in 1921, when 5,462,760 tons were shipped, of 797,293 tons, or 14.6 per cent. The July shipments this year were about 535,000 tons above the average shipments for that month in recent normal years. Shipments by originating carriers were as follows:

	July, 1923	June, 1923
Philadelphia & Reading	1,155,701	1,165,468
Lehigh Valley	1,124,400	1,188,497
Central Railroad of N. J.	494,254	563,304
Del., Lack., & Western	965,446	1,009,505
Delaware & Hudson ..	879,772	961,703
Pennsylvania	520,423	556,291
Erie	661,120	690,172
N. Y., Ont. & Western ..	152,543	162,353
Lehigh & New England	306,394	337,494
	6,260,053	6,634,787

The Workmen's Compensation Board has sustained the appeal of the Philadelphia & Reading Coal and Iron Co. in the case of Mrs. Anna Smith, Mt. Carmel. The woman had been granted compensation by the referee for the death of her husband, William E. Smith, but the Board in an opinion writ-

ten by Paul W. Houck, Commissioner, and concurred in by Chairman Walnut and Commissioner Morrison, reaches the conclusion that the referee's findings in the case are not supported by competent proof and that his award cannot be sustained. The referee found that Smith died Aug. 24, 1921, from acute myocarditis, superinduced by a strain sustained while in the course of his employment with the defendant company, Aug. 20, 1921. No person saw the accident and the only proof offered at the hearing was hearsay. The medical testimony showed that the death may have been due to numerous causes and that a sudden heavy strain might have caused it.

The referee in the case of Thomas Gowles, Wilkes-Barre, against the Hudson Coal Co., was also reversed by the Board. This case involved an appeal by the defendant from an order of the referee, granting a petition for termination of a compensation agreement. The claimant was injured, a compensation agreement was executed, and after payments had been made, the company petitioned the Board to terminate the agreement, alleging that the claimant had recovered and was able to resume his regular work on April 17, 1922. The referee found that the claimant's total disability ceased Jan. 24, 1922, but that he is still partially disabled. There was no evidence produced by either side to show the extent of the partial disability. The referee in his order directed that payments of compensation for total disability cease and that a supplemental agreement be executed providing for the payment of partial disability compensation. The company's appeal was based on the ground that the order is impossible of performance because the claimant did not show the extent of his partial disability and the referee did not find it. This, it was claimed, would prevent the fixing of terms of any supplemental agreement. Moreover, the defendant company contended that the claimant has fully recovered.

The fourth annual first-aid meet of the Bertha-Consumers Company, Pittsburgh, which was held Aug. 11, was won for the third consecutive time by the team representing the Johnetta mine at Johnetta. The Johnetta score was 94.66%, closely followed by the Jean Mine of Dinsmore, with a score of 93.50%. As a result of its victory, the Johnetta team will represent the Bertha-Consumers Company at the International First-Aid and Mine Rescue Contest which will be held August 27th to 29th at Salt Lake City, Utah. The Johnetta team in 1921 won the Pennsylvania State championship and tied for fourth place in a field of 68 entries at the International meet held in St. Louis that year. The Bertha-Consumers Company has at its twenty mines in Pennsylvania, Ohio, West Virginia and Kentucky 287 men trained in first-aid and 106 men in mine rescue. Teams composed of picked members from nine of the twenty mines competed in this first aid meet which was staged in co-operation with the U. S.



CHIEF JUDGES AT THE BERTHA-CONSUMERS MEET
Left to Right—D. J. Parker, Dr. A. F. Knoefel, J. A. Cartel

Bureau of Mines. The members of the winning team are: T. L. Holsing, Captain; Robert Bainbridge, Patient, Edward Fitzmaurice, M. J. Fitzmaurice, David McKelvey and Charles Peterson. R. L. Barnaby is superintendent of Johnetta Mine.

TENNESSEE

Southland Coal Co. has been incorporated in Memphis, with a capital of \$30,000, by J. M. Green, T. D. Hunt and Geo. Coatway.

Alvin Owens, mine foreman of the Highland Coal & Lumber Co., has been elected president of Chapter No. 60 of the Joseph A. Holmes Safety Association, just organized at Davidson. W. C. Reeves is secretary.

The suit entered by the Government against the Nashville Industrial Corporation in the Federal Court of the Middle District of Tennessee asking that the contract held by that corporation with the Government covering the sale of the Old Hickory Plant be rescinded, will in no way interfere with the plans of industrialization of Old Hickory, as it is the desire of both the Government, as expressed by First Assistant Attorney General A. T. Seymour, and the Nashville Industrial Corporation that an industrial city be made of this war expenditure. As charges have been made that there was fraud in the sale of the property, it was felt by both litigants that the question should be definitely settled in order that industrialization might proceed with absolute safety to industries intending to locate at this point.

TEXAS

Saline Coal Co. has been incorporated in Grand Saline, with a capital of \$90,000, by J. S. Brown, J. F. Bailey and J. F. O'Neill. The latter is president and general manager. The company will develop 303 acres and operations will start within ninety days.

UTAH

The United States land office at Salt Lake City has been directed by the Secretary of the Interior to offer for lease a tract of coal land in Utah containing 760 acres. The land is in Emery county, occupying the plateau rim on the West side of Huntington Canon and is in greater part underlain by the coal measures of the Mesa Verde formation.

C. H. Hotchkiss, Utah Fuel Co., has been chosen chairman of the coal committee of the new shippers board, formed at the state capitol with Thomas E. McKay, president of the Public Utilities Commission, as president. The board will study production, markets, distribution and trade channels of the commodities local to each district, with a view to effecting improvements in trade practices when related to transportation, and promoting a more even distribution of commodities where practicable. It is hoped that the board will ensure proper car service and that Utah will get her pro rata share of empties.

WEST VIRGINIA

Probably the first coal company in the country to be named for the new president is the Coolidge Coal Co., launched by Fairmont people including Ernest Hutton and W. Nelson Beale of the Hutton-Beale Coal company, Benjamin Franklin Evans, W. D. Evans and A. J. Colborn. The company is capitalized at \$50,000.

The Shenandoah Coal company has been organized with a view to operating in the Logan county field, with a capital stock of \$75,000. Offices of the company are to be at Logan, W. Va. Those interested in the new concern include Paul Barrett, William Frank, Rex Jones, Fred Haislip and R. S. Burton, all of Logan.

The Goodman Manufacturing Co., of Chicago, manufacturers of "Goodman" coal mining machines and electric mine locomotives, have opened a repair and supply department at Huntington, occupying a building designed and erected expressly for their use.

As a result of a survey made by E. & O. Ry. officials of the number of cars to which mines on its various divisions in West Virginia and other coal producing sections are entitled, mine ratings for the various mines have been revised. In many instances the revision has resulted in a reduction of the allotment for mines on some divisions. The new allotment became effective July 16.

A. Spates Brady, president of the Brady and other coal companies of Elkins, escaped

with light injuries in an automobile collision on the Connellsville road, near Uniontown on Aug. 3, when another car in attempting to regain the road, rammed Mr. Brady's car, drove it against a telephone pole and ripped off both the rear wheels.

F. R. Lyon, vice-president of the Consolidation Coal Co., returned on Aug. 1 from a trip abroad.

R. E. Salvati, recently appointed superintendent of mines 15, 16, 17, 18 and 19 of the Island Creek Coal Co., at Holden, was less than a year ago a laborer for the company, having this advantage, however, that he was a graduate of the West Virginia University. He is only 24 years old. Salvati was promoted from laborer, made assistant mine foreman, later appointed assistant superintendent and finally made superintendent of the group of mines already mentioned.

The Dwyer Coal Co., with operations near Coalburg, is opening a new mine near Chapmansville, where it recently acquired about 1,000 acres of coal of excellent quality. The company is building a modern colliery and also attractive quarters for its employees. John G. Dwyer will have charge of the mines.

A new mine is being opened by the Deep Run Co., of Cumberland, Md., in the Elk Garden district of West Virginia, at a cost of approximately \$300,000. Three mines are already in operation. The new mine at the beginning of operations will have an output of about 500 cars a day and that output will be increased as the mine is further developed. The company produces about 300 tons a day at its other mines. All the plants of the company are operated on an open shop basis. C. H. Lantz, of Piedmont, W. Va., is president, and W. R. Nethken, of Cumberland, Md., vice-president of the company.

The law enacted at the last session of the West Virginia legislature, in April, creating the West Virginia School of Mines is now in effect. The new school when established is to contain departments of mining engineering, mining extension, mining geology and chemical engineering, as well as the mining experiment station already authorized by the mining laws of West Virginia. It is to be organized with a suitable staff of instructors and shall have the same rank and standing as the colleges of engineering, law, agriculture, medicine and arts and sciences. The cost of establishing and maintaining the West Virginia School of Mines shall be paid out of an appropriation hereafter to be made by the legislature for such purpose. The governor has been authorized to appoint a committee of five to ascertain where the school may best serve the mining interests of the state and avoid unnecessary duplication of work. The commission is to be composed of one member of the Senate, one member of the House of Delegates and three prominent coal mining men, who shall serve without pay, and is to report whether in its opinion the school shall be carried on as an independent institution or in connection with one or more of the present existing educational institutions of the state. At the time the bill was introduced a movement was launched in Fayette county to have the new school of mines established at Montgomery. It is probable that it will either be established there or in connection with the State University at Morgantown.

Coal Tonnage handled by the Chesapeake & Ohio during July was heavier than at any time in the history of the road, no less than 3,517,000 tons of coal being handled in that period. The nearest approach to that figure was reached in June, 1922, when a total of 3,300,000 tons of coal were transported. Record-breaking loading in July was made possible by an excellent car supply. Increased loading has also been made possible owing to the steps taken to increase transportation facilities in general for coal.

Of 15 teams competing for first honors in the annual first aid and mine rescue contests at Huntington, Aug. 11, two teams representing the Davis Coal & Coke Company carried off first honors. Team No. 6, representing the Davis operation of the company won first place, and team No. 2 representing the Thomas operation, won second honors. Team No. 8 representing the New River Coal Company, of Beckley, took third place. The Davis team won the cash prize of \$150, the State Department of Mines Loving Cup, six Wolf aluminum safety lamps suitably engraved, and will represent West Virginia at the national first aid meet to be held at St. Louis in September. To the Thomas team was awarded a cash prize of \$90 and six Wolf aluminum safety lamps. The contest was conducted by the West Virginia Department of Mines in co-operation with the

Huntington Chamber of Commerce and under the inspection of the United States Bureau of Mines.

WASHINGTON

The Morton Coal & Coke Co. has purchased the J. H. Bell farm near Morton and has begun shipments of coal over the new suspension bridge and the C. M. & St. P. Ry. to Seattle and the Coast.

WASHINGTON, D. C.

The Government Relations Committee of the National Coal Association for the coming year is as follows: Walter Barnum, treasurer, Pacific Coast Co., New York; J. G. Bradley, president, Elk River Coal & Lumber Co., Dundon, W. Va.; W. H. Cunningham (chairman), president, Cunningham, Miller & Enslow, Huntington, W. Va.; E. L. Douglass, vice-president, First Creek Mining Co., Cincinnati; Michael Gallagher, general manager, M. A. Hanna Co., Cleveland; W. H. Huff, president, Victor-American Fuel Co., Denver; S. Pemberton Hutchinson, president, Westmoreland Coal Co., Philadelphia; Sidney J. Jennings, president, U. S. Smelting, Refining & Mining Co., New York; A. J. Maloney, vice-president, Chicago, Wilmington & Franklin Coal Co., Chicago; Isaac T. Mann, president, Pocahontas Fuel Co., Washington, D. C.; W. F. Megeath, president, Roundup Coal Mining Co., Omaha, Neb.; A. M. Ogle, president, Vandalia Coal Co., Terre Haute; J. G. Puterbaugh, president, McAlester Fuel Co., McAlester, Okla.; P. J. Quealy, president, Gunn-Quealy Coal Co., Kemmerer, Wyo.; Frank D. Rash, president, St. Bernard Mining Co., Earlington, Ky.; H. B. Sajkeld, vice-president, Carnegie Coal Co., Pittsburgh; H. N. Taylor, president, U. S. Distributing Corporation, New York; George T. Watson, Consolidation Coal Co., Fairmont, W. Va., and S. L. Yerkes, vice-president, Grider Coal Sales Agency, Birmingham, Ala.

CANADA

The Hunt Coal Co., Ltd., of London, Ont., has been incorporated with \$100,000 capital by Charles R. Hunt, John I. A. Hunt, James D. Hunt and others.

Quinle Coal & Towage, Ltd., of Toronto, has been incorporated with \$50,000 capital by Frank W. Richardson, Lancing B. Campbell, Wm. C. H. Swinburne and others.

J. A. Ellis vice-chairman of the Ontario Municipal and Ry. Board, is being retained by the new Ferguson Government in Ontario in his capacity as Fuel Controller. He states that a reasonable supply of anthracite is coming into Ontario but not enough to meet the demand and urges consumers to buy liberally this summer.

A Pennsylvania syndicate which has been exploring for coal near Skidegate, Queen Charlotte Islands for more than a year, has traced a three-foot seam for more than two miles. It is now proposed to sink two shafts on the seam, which is almost vertical. The syndicate is building a wharf at Kagan Bay, on which to land the necessary equipment for sinking and later it will be used for shipping coal. The coal is said to be a good grade of semi-anthracite.

The British Empire Steel Corporation reports that its coal production for July amounted to 136,894 tons, as compared with 423,493 tons for July, 1922, the reduction in output being due to the strike. The production of coal for the seven months ending July 31st amounted to 2,959,426 tons, as compared with 2,185,816 tons for the corresponding months of 1922.

It has been suggested to the Canadian coal trade, that Welsh anthracite coal be shipped to Canada in exchange for pit props. Ships carrying the coal to Canada could load pit props for the return journey thus cutting down carrying charges. Wales produces various grades of anthracite and Canada received some low quality last year but shippers of Welsh coal understand now that only the best quality must be shipped to Canada.

Premier Charles A. Dunning, of Saskatchewan, is advocating protection of the Western Canada coal industry against competition from the United States in the same way as the manufacturing industries of Canada are protected.

Unexpected progress is being made in the campaign for the use of coke as a substitute fuel in Canada, according to the statement issued by Charles Camsell, Deputy Minister of Mines following a meeting of the Dominion Fuel Board, at Ottawa. The board has been endeavoring to prevail upon the larger cities such as Toronto, Montreal and Quebec to establish plants for the manufacture of coke from soft coal and the utilization of by-products.

Association Activities

COLUMBUS COAL BUREAU

The organization of the **Columbus Coal Bureau**, Columbus, Ohio, composed of producers and distributors, was completed Aug. 6, when the following officers were elected: President, John M. Taylor; vice-president, Jay W. Miller, and secretary-treasurer Thomas C. Collins. It is the purpose to have the prominent men in the coal industry address the members of the Bureau on industrial and economic conditions.

Obituary

C. R. Wilson, president of the International Fuel and Iron Co. of Pittsburgh, died July 27. He was 39 years old, and was a son of the late J. T. Wilson, who at the time of his death, was president of the National Fuel Co.

John Hoyes McGowan, president of the John H. McGowan Co., pump manufacturers of Cincinnati, Ohio, died Aug. 6. He was 93 years old, and had been president of the McGowan company since 1852.

Willis F. McCook, president of the Pittsburgh Steel Co., died on Aug. 5, aged 73 years. He was senior member of the law firm of McCook & Jarrett. Early in his career Mr. McCook was the legal representative of Henry C. Frick and T. M. Carnegie.

David Pursglove, assistant general manager of the Cleveland-Morgantown Coal Company, at Scott's Run died Aug. 11. Mr. Pursglove's death was due to apoplexy, a stroke of which he suffered while engaged in writing a letter to his nephew, Joseph Pursglove of Cleveland, president of the Pursglove Coal Mining Company, as he sat at his desk in the office of the company on Scott's Run. Mr. Pursglove was 68 years of age. He was a native of Ripley, England where at an early age he acquired a knowledge of mining and of English coal mines.

Publications Received

Grates, Stokers, Steam Blowers—McClave-Brooks Co., Scranton, Pa. Catalogue 8 x 11, describing the McClave mechanical stokers for all grades of bituminous and lignite fuels. Illustrated.

The Motor Gasoline Surveys of 1920 and 1921. (Sequel to Bull. 191) by N. A. C. Smith, Bureau of Mines, Washington, D. C. Technical paper 328. Pp. 41; 6 x 9 in.; tables. Includes complete details of analyses of each sample of gasoline collected in four surveys made in 1920 and 1921, with tables and charts showing comparative results and a brief discussion of the variations in quality developed by the surveys.

Mine Rescue Standards (A. Tentative Study). Prepared by a committee appointed at the International Mine Rescue Standardization Conference, Sept., 1921. Bureau of Mines, Washington, D. C. Technical paper 334. Pp. 43; 6 x 9 in.

Comparative Tests of By-Product Coke and Other Fuels for House-Heating Boilers, by Henry Kreisinger, John Blizzard, H. W. Jarrett and J. J. McKitterick, Bureau of Mines, Washington, D. C. Technical paper 315. Pp. 21; 6 x 9 in.; illustrated. Results of tests made to compare by-product coke, bituminous coal and anthracite as fuels for small boilers are given.

Trade Literature

Short Cuts to Power Transmission. Flexible Steel Lacing Co., Chicago, Ill. Pp. 72; 4 x 5 in.; illustrated. This handy little book should prove useful to belt users.

New Reinforced Concrete Coaling Plants. Roberts & Schaefer Co., Chicago, Ill. Bulletin No. 52. Pp. 10; 8 x 11 in.; illustrated. Shows views of coaling plants erected for different railroads, also patented "calibrated" measuring feeder, Simplex loader, by the use of which the 4-column bucket tower is eliminated and undercut lever type coaling gates with swivel aprons.

Chain-Drive Data. Diamond Chain & Mfg. Co., Indianapolis, Ind. Pp. 14; 4 x 7 in.; illustrated. This loose-leaf booklet contains charts and information on the design and application of roller-chain drives.

A description of the new standard sprocket tooth form approved by the A. S. M. E. is included, as is also a chart which will prove useful in selecting correct chains and sprockets for transmission purposes.

The Lilly Hoist Controller, Models C and D. Duro Metal Products Co., Chicago, Ill. Pp. 18; 8 x 11 in.; illustrated. Contains instructions for installing and adjusting on steam, air and electric hoists.

The Lilly Hoist Controller, Models C and D (Gravity-Electric). Duro Metal Products Co., Chicago, Ill. Pp. 22; 8 x 11 in.; illustrated. Auxiliary equipment for steam, air and electric mine hoists are described. The book also contains a treatise on causes of accidents.

Stow Mfg. Co. of Binghamton, N. Y., has just issued a four-page folder describing and illustrating its motor-driven grinders, buffers, drill and die-sinking tools.

Erie Upkeep Cost Record Book Erie Steam Shovel Co., Erie, Pa. Pp. 71; 5 x 8 in.; illustrated. Contains maintenance costs covering actual repairs and consumed parts of steam shovels, gathered from an upkeep cost contest.

The Cox Stoker. Combustion Engineering Corporation, New York City, N. Y. Bulletin CB2. Pp. 7; 8 x 11 in.; illustrated. The burning of small-sized anthracite coals and coke breeze by the Cox stoker is described, and evaporative tests of the stoker over a wide range of capacities are included.

International Painting Equipment. International Engineering Corporation, Malden, Mass. Pp. 15; 8 x 11 in.; illustrated. Among the apparatus described are aerograph sprayers, aerograph control, exhaust hoods, exhaust fans, turntables, electric heaters, reflectors, portable compressors and automatic painting machines.

Traffic News

The railroads set a new record during the last half of July in repairing and turning out 22,200 locomotives. On August 1 there were 11,555 engines in need of repairs, but the carriers had 52,385 serviceable locomotives and 2,550 locomotives in good repair and in storage, awaiting the heavy fall movement of traffic.

The Coal and Coke Committee, Trunk Line Territory, announce a hearing at 143 Liberty Street, New York, on Aug. 23, relative to an advance in rates on anthracite coal, buckwheat No. 1 and smaller sizes, from mines on Delaware and Hudson Rys. to stations on New York, Ontario and Western Ry., Rockdale, N. Y., to Edmeston, N. Y., incl. The reason for the proposal is to make rates same as for one line haul.

During the first fifteen days of July the railroads placed in service 8,217 new freight cars which brought the total number of new freight cars installed since January 1, up to 87,457. They also installed from July 1 to July 15, 102 new locomotives, making a total of 2,100 that have been placed in service since January 1. Of the new freight cars placed in service, box cars numbered 35,833; coal cars, 36,048, and refrigerator cars, 10,224, which includes 6,149 placed in service by railroad-owned private refrigerator companies. Railroads on July 15 had on order 94,202 freight cars, of which 41,726 were box cars, 37,135 were coal cars and 10,703 were refrigerator cars. They also had on order on the same day 1,848 new locomotives. Deliveries of new freight cars and locomotives are being made daily.

W. J. Smith, of Omaha, Neb., has been appointed district manager of the Car Service Division of the American Railway Association at Omaha, effective August 15. He has been general agent in Omaha for the Chicago and Northwestern Railroad. The territory making up the Omaha district includes the terminals at Council Bluffs and Sioux City, Iowa; the entire states of Nebraska, Wyoming, Colorado and Utah and the state of Idaho exclusive of the Panhandle.

In recognition of his service to the road, the management of the Chesapeake & Ohio has promoted **J. W. Davin**, chairman of the car allotment commission of the Chesapeake & Ohio Ry. for the last two years, to be assistant superintendent of transportation. The appointment, made by A. T. Lowmaster, superintendent of transportation, was with the approval of General Manager J. B. Parrish. Mr. Davin will have his headquarters at Huntington. Announcement has also been made of the appointment of **Ira F. Davis** as chairman of the allotment commission to succeed Mr. Davin. Mr. Davis has been the general manager of the Chesapeake & Ohio fuel mine operation. **H. B. Husband** has been

appointed as general manager of fuel mine operations, succeeding Mr. Davis.

During the last half of July, 9,493 new freight cars were delivered to the railroads and placed in service, which brought the total number of new freight cars placed in service from Jan. 1 to Aug. 1 up to 96,950, according to the Car Service Division of the American Railway Association. Of the new freight cars placed in service during the last half of July, box cars numbered 3,595; coal cars, 3,133; refrigerator cars, including those delivered to railroad-owned private refrigerator companies, 1,846, and stock cars, 226. The railroads had on Aug. 1, this year, 86,716 new freight cars on order with deliveries being made constantly. Of the total number on order, box cars numbered 38,689; coal cars, 34,457; refrigerator cars, 9,299, and stock cars, 2,214. They also had on order on Aug. 1 a total of 1,772 new locomotives.

Class 1 railroads of the United States, in June earned an annual rate of return of 5.47 per cent on their tentative valuation as fixed by the Interstate Commerce Commission for rate making purposes, including additions and betterments up to Jan. 1, 1923. This rate represented a net operating income for the month of \$87,742,000. In the Eastern district the rate earned was 6.39 per cent; the Southern district, 5.78 per cent, and the Western district 4.20 per cent. The same carriers in June last year earned a net operating income of \$76,271,000 which was at the annual rate of return of 4.86 per cent. In May this year the rate was 6.33 per cent. Thirty one Class 1 railroads in June operated at a loss, of which nine were in the Eastern, two in the Southern and twenty in the Western district. Operating revenues of the carriers in June totaled \$541,163,000 an increase of \$69,129,000 or 14.6 per cent over the same month last year, while their operating expenses amounted to \$416,908,000, an increase of \$43,629,267 or 11.7 per cent over June one year ago.

For the first six months this year the net operating income of the Class 1 railroads represented an annual rate of return of 5.64 per cent on their tentative valuation, amounting to \$443,912,000, compared with \$349,069,000 or 4.53 per cent for the same period in 1922 or an increase of \$94,842,000 over the first half of last year. In the Eastern district for the six months period it was 6.59 per cent or \$240,731,000; Southern district, 6.64 per cent or \$69,916,000; and the Western district, 4.20 per cent, or \$133,265,000. The Interstate Commerce Commission has not tabulated the tentative valuation of the carriers according to the various subdistricts but compilations show the annual rate of return for the first six months this year based on their property investment accounts to have been 4.94 per cent. From Sept. 1, 1920 to July 1, 1923, during which period of thirty-four months the railroads have been operating without any guarantee whatever, the average annual rate of return of the carriers on their tentative valuation has been only 3.94 per cent. For the Eastern district it was 4.02 per cent; for the Southern district, 4.05 per cent, and for the Western district 3.82 per cent.

Coming Meetings

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casev. McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, AUGUST 30, 1923

Number 9

Practical Moves

GOVERNOR PINCHOT stated the case of the public well in his address to the hard-coal miners and operators and the public at Harrisburg on Monday. The millions of people dependent on anthracite to keep warm next winter do not want a strike; they want and have a right to expect the contending parties to get together, even at this eleventh hour, to avert the concerted withdrawal of the mine workers next Saturday. To accomplish this he is proceeding in the right way. No published notes, just confidential conferences, sensible negotiations through a third party. If anything will save the day it is this method. Hope, seemingly scant, lies in this direction.

And while Governor Pinchot is undertaking this thankless task, co-operating we are told with the administration at Washington, the Federal Fuel Distributor is carrying out the policy of Washington of getting the country ready for a winter without more hard coal than we already have. This is practical procedure. It is common sense for the government to accept the soft-coal operators' assistance in distributing their product as a substitute and it is practical business to enlist the consumers' aid through their state officials.

The Third Line of Defense

PREVENTION is better than cure. Nevertheless it is well to cure an evil if it cannot be prevented and it is well to escape from an evil if it cannot either be prevented or cured. Thus in the matter of mine explosions; the best way is to prevent them, the next best way is to extinguish them when they occur and the third line of defense is to make a way of escape for those who, not being killed by the blast, are exposed to the noxious atmospheres it creates and so have their lives jeopardized. The last way is not a counsel of perfection, but if it were provided it would save a large percentage of the men who are caught in a mine where an explosion has occurred.

Rescue chambers have been proposed and provided. Even metal mines have them. They need to be quite airtight, for they must be used till the area in which they are placed has been explored. That may be days after the accident has occurred, and during all those hours the air is getting fouler from leakage from without and from breathing, if not combustion, within. In metal mines the use of compressed air pumped from the surface provides that the pressure will be always outward. In fact the problem is to protect the chamber from the building up of such a pressure within, as it might suddenly rupture its walls.

Many a man has found help from a handkerchief thoroughly soaked in the liquid of the container in his dinner pail. It keeps out the hydro-carbons and so may

save his life, but if, as usually happens, carbon monoxide is present, the wetted handkerchief is powerless against it. Something should be provided that will not only give the worker safety but will not interfere with his mobility. He should be able to provide for his own escape to the surface, or should exit be cut off by reason of rockfalls he should be empowered in some way to travel to some place of shelter where the air is free from contamination. We have means now of absorbing carbon monoxide and all the deadly gases that the chemistry of war and of industry have devised, and surely it should be an easy matter to make a mask which will carry a man through any mine atmosphere, however badly poisoned by deadly gases, so long as enough oxygen is present to support respiration.

Negotiation and Arbitration Rejected

THERE may or there may not be a strike in the anthracite mines next month. But if there is the basic cause will be plain. The country is fast coming to a realization that the "rule or ruin" policy of the United Mine Workers is again in force. It ruled in 1922 and it may rule again. The ruin that it can accomplish in this instance is all the more apparent as the consumers' anger rises and threatens the boycott of anthracite. To say that the union is indifferent since it covers both hard- and soft-coal fields and the loss of one would be the gain of the other is to overlook the fact that it will be the non-union fields that will furnish the bulk of the substitutes if they are needed.

The workers in the hard-coal mines are not up in arms demanding the check-off or a 20- to 30-per cent increase in wages. Nor are they keen about a strike again so soon after the last one. Some of the debts are not paid up and, furthermore, winter is coming. So finds the impartial and keen observer William Hard. Yet he finds that if a strike is called the men will loyally go out and uncomplainingly support it.

If the workers are not downtrodden, desperate and insistent on some eleven demands, why this perseverance of the union officials? Perhaps the answer in part at least is that Mr. Hard did not get the whole story. There are in sections of the anthracite region groups of malcontents. Cappellini won his way back to a job with the union by teaching and preaching discontent. He is now one of the leaders and sits in the councils of the union, a member of the scale committee which meets off and on with the operators at Atlantic City. District President Golden is by no means a conservative.

The strike of 1922 netted the hard-coal workers nothing but the satisfaction of having helped the soft-coal workers win their strike. The local union leaders from the anthracite region have told their constituents that they will not come back from Atlantic City with empty hands. It is to make good on their jobs as union offi-

cials that the country is threatened with a strike and may have one.

There is a significant sentence in the Anthracite Report of the Coal Commission. It reads: "*The union must justify itself.*" It is not headed in that direction when it refuses to negotiate with the operators and likewise refuses to submit to arbitration. It is now the same wearisome story of 1919 and of 1922. It is collective threatening and not collective bargaining. It was the ultimatum on the check-off in July; this month it is the ultimatum on the 20-30 per cent wage increase. There are those who hold that John L. Lewis is not in sympathy with these tactics this year, and that he is letting the hotheads have rope. It may be that this situation does not appeal to him, but if it is not to his liking he conceals it very well. His bellicose threat to give the operators the "trouncing" of their lives savors of that "swashbuckling" mentioned in one of the Coal Commission reports. He is leading with his customary vigor.

No, the union is not intent on justifying itself. The union leaders are intent on bringing home the bacon—justifying their jobs. What they take back must be showy—something that they have wrung from a reluctant opposition. Things like the elimination of the 12-hour day, the continuing umpire, adjustments in working conditions, minor matters corrected that would make for less friction and satisfied workmen, increases in wages that affect the individual here and there—matters that can be had by straight negotiations—are not for them.

Anthracite Production Costs

TIME alone will show how generally useful such a complete and comprehensive statement of the cost of production of anthracite as has been published by the Coal Commission will be in educating the coal-consuming public to the facts. Even though Mr. Wing and his associates have stripped the maximum of technical and professional lingo from their report to the Commission, it is quite certain that were the complete details to be put in the hands of every hard-coal consumer, 95 out of every 100 would either refuse to exert the mental effort to read and understand it or would fail to take in the significance of its findings. It was so with the report of the Federal Trade Commission in 1919 covering the same subject and prepared by the same authors.

Too many will hasten to garner from this report facts to support stands previously taken. The honest student, however, can find therein a simple and clear statement of the facts. In the first place it is clear that this Commission, like its predecessors, the Fuel Administration and the Federal Trade Commission, had no difficulty in getting the facts. There is no mention that they were unable to learn all they wanted. No "secrets" are withheld from duly constituted authorities. Big companies and little companies furnished their figures—the high-cost and the low-cost, the "rail-road" and independent producers are all included.

Nor does the Coal Commission fear that any of the figures were not correct. It has satisfied itself on that score. No revision was made of figures given in sworn reports, the experience of the Federal Trade Commission indicating that "any effect on the total figures of a few false statements was negligible so far as affecting any general results."

In its treatment of "margin," that much-abused figure that does not represent profit but which so often is taken for it, the report is fortunate. It points out that the margin between sales realization and f.o.b. mine cost is net operating income before deduction of interest and federal taxes. "It is not a good measure for arriving at the relative profits of different operations." One operator, for instance, may have a heavy investment in mining machinery per ton of output and thus show a relatively low labor cost, while another may have a higher labor cost because he has no investment in labor-saving machinery; for this reason it says, "In the case of the first operator the margin must be larger in order to give an equal rate of remuneration to the larger amount of invested capital per ton of product." In the past ten years, and notably in the past three or four, the anthracite industry has been investing heavily in new equipment in its program of electrification.

Labor costs of production are shown to have increased 145 per cent from 1913 to the first quarter of this year, and it is stated that this is not all to be accounted for by increases in wage scales, but in part by the greater amount of labor necessary, in the later years, to produce a ton of coal, due to changes in the physical conditions in the mines, such as the mining of seams which formerly were considered too poor to work, etc." It is quite true that the coal now mined is deeper and thinner than ten years ago and that the cost in man power has increased thereby. According to the figures of the Geological Survey that increase has been slight, in fact the average output per man per day has risen from 2.02 net tons in 1913 to 2.09 tons in 1921. The weighted average increase in wage scales appears to have been not less than 125 per cent, according to data previously published by the Commission. It is evident therefore that the industry must be given some credit for having improved its practices and for having very nearly maintained the efficiency in output per man per day despite the added burden imposed by more difficult mining conditions. The greater part of the increase in labor cost must therefore be attributed to the gain in rates of wages.

It is the profits of the producers, however, that interest the consumer. The Commission has not yet issued its conclusions on this matter, having yet to report on the investment on which profit is to be calculated. It is stated, however, that whereas the "margin" of the producers averaged nearly 38c. per ton of total output in the three years 1913-1915, in the six months ended last March it was, on a comparable basis, \$1.20 per ton of total output. That is, there was an increase in the ten years of some 316 per cent in the margin between mine cost and selling price.

If the dollar of today is worth in buying power but 67c. compared with that of 1913, the anthracite mine worker is getting 50 per cent more wages, on the average, in actual worth—or real wages, as the economist puts it—than he was in 1913. The producer is getting, by the same method of calculation, 112 per cent more, out of which he must pay his federal taxes. The margin of today, \$1.20, is worth 80c. in buying power, as against a margin of 38c. before the war. What is paid in federal taxes is not as yet stated, but if it is half the margin, as was estimated for 1918, then the real money left for distribution as profits is but little greater than before the war. The intervening years, 1914-1922, made a much poorer showing.



Big Franklin Refining Plant and Coke Ovens

Franklin Byproduct Plant Makes Ammonia, Motor and Pure Benzol, Toluol, Xylol and Solvent Naphtha

A Description of Those Features in the Franklin Plant Which Differ from Those Delineated in the Article on the Rosedale Refinery—Methods of Fractionating the Light Oil for Commerce

BY G. A. RICHARDSON*
Philadelphia, Pa.

AT THE Franklin plant the processes of refinement in regard to light oil go much further than at Rosedale. In fact the light oil obtained at the latter plant is sent to the Franklin plant for further treatment. In this article it will be my endeavor to pass lightly over those parts of the processes at Franklin that are similar to those at Rosedale and dwell on those having to do with the fractionating of the light oil and the making of ammonia liquor, referring briefly, however, to the more careful drying which the sulphate of ammonia receives at this plant to suit such markets as demand that the water content shall be below 0.15 per cent.

The Franklin plant is a combination of old and new construction. About 1916 the old byproduct equipment (where only a partial recovery of byproducts was effected) was torn out and a new byproduct plant constructed. The coke ovens at this place include one of the first blocks built in this country. This block was erected in 1895.

No change was made in the ovens, of which there are eleven batteries of various types, namely: Five Otto-Hoffman, two Koppers, three Cambria and one Belgian type, making a total of 492 ovens with a combined capacity of 4,500 gross tons per day. The capacity varies but is smaller than that of newer types of ovens. The coking time averages 24 hours. As at Rosedale the coal from mines located at the plant

is washed on tables of Campbell type and mixed with gas coal.

The present plant is a complete installation for the recovery of byproducts. It takes care of the entire gas output of the plant and consists of hydraulic-main circulating systems, gas washers and condensing equipment for the separation of tar and light oil from the gas, for the manufacture of sulphate of ammonia and for the obtaining of pure benzol, toluol, xylol and solvent naphtha, a boiler house and all auxiliary equipment, including ample storage capacity. This equipment is listed in detail in Table I.

The construction difficulties encountered at Rosedale



PANORAMA OF PLANT TAKEN FROM SPRAY POND

In foreground is a 40,000-cuft. gas holder. The tall towers on the left and beyond the concrete road are the scrubbers where the benzol is collected, and to the right of them are the low secondary coolers. The primary coolers are to the right of these, and still further to the right is the office and laboratory. In the rear may be seen the steel works and two blast furnaces, half hidden by the smoke from the ovens.

NOTE—This is the sixth and last of a series of articles on the mines, ovens and byproduct refineries of the Cambria Steel Co. Earlier articles appeared Aug. 31 and Sept. 7, 1922; Feb. 15, July 19 and Aug. 9, 1923.

*Midvale Steel & Ordnance Co. and Cambria Steel Co. Since this article was received these two companies have merged with the Bethlehem Steel Co.

TABLE I—BYPRODUCT AND BENZOL EQUIPMENT AT FRANKLIN PLANT

Byproduct Equipment		
Primary coolers	Ammonia stills	Decanters
Exhausters	Final coolers	Collector tanks
Gas boosters	Absorbers	Banks of cooling coils
Tar extractors	Gas holder	(2 sets)
Acid separators	Light-oil stills	Dehydrators
Saturators	Ammonia condenser	
Benzol Equipment, etc.		
Absorbers	Acid washers	Spray pond
Wash-oil cooler coils	Acid storage tanks	Spray-pond collector tank
Wash-oil collector tanks	Acid monte-jus	Light-oil storage tanks
Decanters	Acid receiver	Washed light-oil tanks
Preheaters	Acid feed tank	Residue tank
Light-oil stills	Caustic dissolvers	Benzol test tank
Vent scrubbers	Caustic feed tank	Toluol test tank
Pure-benzol condensers	Caustic receiver	Refined light-oil tanks
Pure-benzol receivers	Caustic monte-jus	Benzol free-oil tank
Pure-toluol still	Sludge disposal tank	Toluol free-oil tank
Pure-toluol condenser	Refined light-oil stills	First-runnings tank
Pure-toluol receivers	Refined light-oil condensers	Pure-benzol tanks
Solvent-naphtha still	Refined light-oil separators	Refined 90-per cent benzol tank
Solvent-naphtha condenser	Refined light-oil receivers	Motor-benzol tanks
Light-oil condensers	Pure-benzol stills	Pure-toluol tank
Light-oil separators	Solvent-naphtha separator	Solvent naphtha tanks
Light-oil receivers	Solvent naphtha receivers	

were absent at Franklin, the only problems arising being those that might be expected to occur when endeavoring to modify existing equipment in a plant which is being kept steadily in operation.

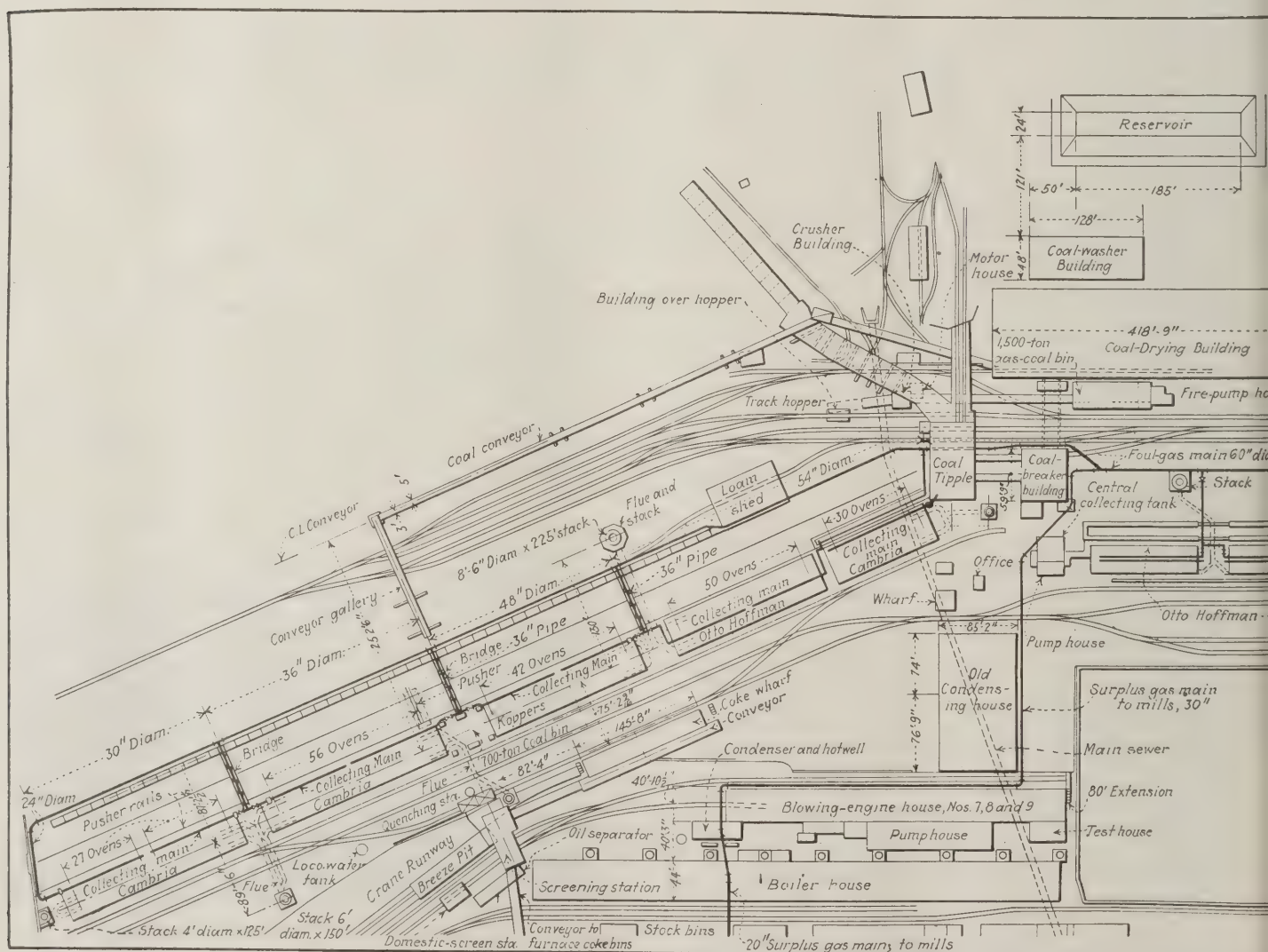
The gas from the ovens is taken off through two foul-gas mains which unite to form one 60-in. main at the three primary coolers. These coolers are somewhat

larger than those at Rosedale, but of the same type. Each cooler is 16 ft. in diameter, 45 ft. high, and has a capacity of 60,000,000 cu.ft. of gas per day. The cooling liquor is circulated through 160 banks of cooling coils, each 30 pipes high.

From the primary coolers the gas goes into the byproduct building, a steel and brick structure 360 ft. long by 83 ft. wide. Here are four turbo-exhausters, each having a capacity of 14,000 cu.ft. of gas per minute. From these the gas proceeds through (1) P. & A. tar extractors, of which there are five, and (2) Semet-Solvay saturators, of which there are an equal number. These latter take the ammonia from the gas by passing the latter through sulphuric acid, thus manufacturing sulphate of ammonia.

COOLERS AND ABSORBERS ARRANGED IN SERIES

The final coolers, which remove the naphthalene, and the absorbers or scrubbers, the function of which is to remove the light oil, are each arranged in two sets of three in series. The water from the final coolers is pumped to a spray pond for cooling and is circulated again. A small quantity of naphthalene is washed out at the final coolers, but owing to the efficient operation of the plant the yield is too small to warrant recovering it and it is wasted. The coolers are all 13 ft. in



The coal tippie shown near the center of the illustration is that of the Franklin mine. This slope has been operated for many years, and the plant for preparing the coal for use in the ovens also is by no means

new. The coal-drying building and the washer are quite similar in detail to like buildings at Rosedale; Bradford breakers, Campbell washers and large drainage pit with excavators being in use at both places.

Some of the buildings in the right foreground are parts of the steel mill, namely the blowing-engine house and the boiler house, neither of these having any part in the coke ovens or refinery. In like man-

PLAN OF THE FRANKLIN BYPRODUCT OVENS AND

diameter and 45 ft. high. The scrubbers, or absorbers, are of the same diameter as the final coolers but their height is 90 ft.

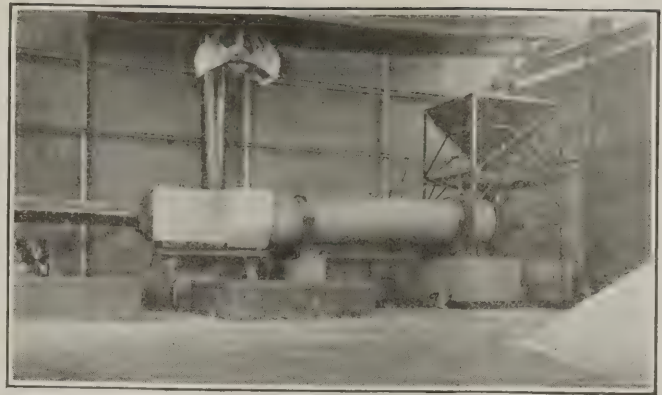
On leaving the scrubbers the fuel gas passes through a 42-in. main to the boilers to take care of Sunday gas requirements and a 30-in. main delivers the surplus to two turbine boosters and thence to the steel plant.

The ovens at Franklin are not of the regenerative type, and as a result the gas yield is smaller than at Rosedale. At full operation about 28,000,000 cu.ft. of surplus gas is released, which will replace approximately 570 tons of coal or 120,000 gal. of fuel oil or 15,000,000 cu.ft. of natural gas or 120,000,000 cu.ft. of producer gas. From these figures and those given for the Rosedale plant it will be seen that the savings in fuel consumption alone by installations of this character are a considerable item.

TABLE II—RECENT AVERAGE YIELD PER NET TON OF COAL CHARGED

Coke.....	70 per cent	Concentrated liquor...	1 gallon
Gas.....	10,500 cu.ft.	Ammonia sulphate.....	24 lb.
Weak liquor.....	30 gallons	Light oil.....	3 gallons
Tar.....	7 gallons	Motor benzol.....	2.4 gallons

These figures will vary, of course, with the mixtures charged in the ovens. The Semet-Solvay Co. estimates that the byproducts when the Franklin plant is running at full capacity are as follows: Tar, 40,000 gal.; sul-

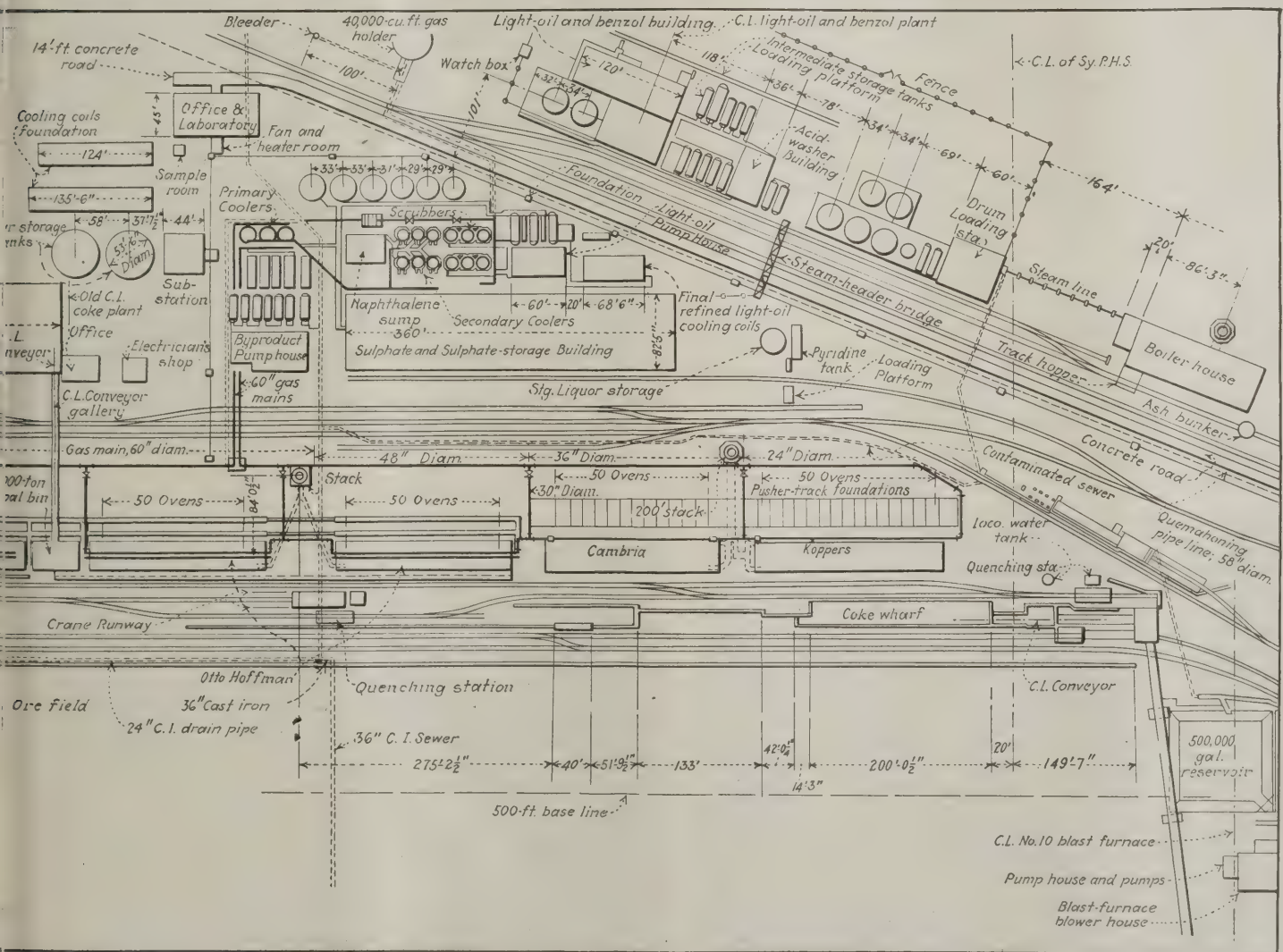


DRYING AMMONIUM SULPHATE IN ROTARY KILN

This kiln is air heated. Some industries require their sulphate of ammonia very dry, and this kiln brings the moisture below 0.15 per cent, which is the specified limit.

phate of ammonia, 126,000 lb.; light oil, 15,000 gallons.

As a rule ammonia is recovered at Franklin as ammonia sulphate. The salt precipitated in the saturators is taken to the centrifugal driers, of which there are ten. After drying it is delivered by a belt conveyor into the storage room, which will hold 5,000 tons and which measures 83x160 ft. A rotary air-heated drying kiln also is provided. Some consumers demand a very dry sulphate in which the moisture content is reduced

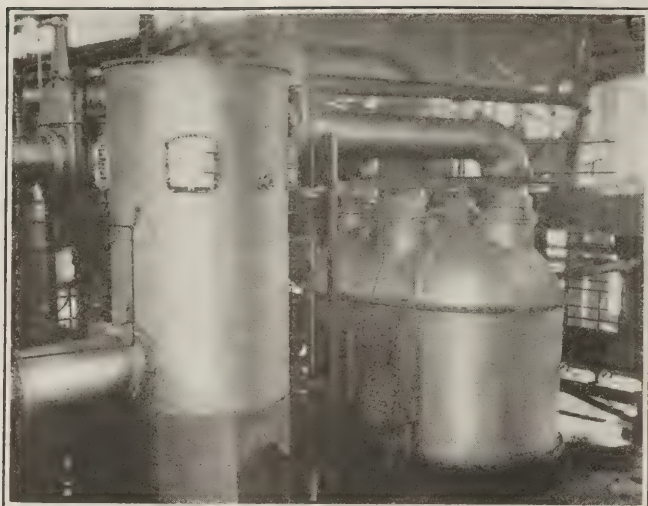


REFINING PLANT, CAMBRIA STEEL CO., JOHNSTOWN, PA.

ner the large ore field on the right marks the edge of the steel plant and the beginning of the plant which deals with the coal and its byproducts. This plant as it existed in June, 1912, was described in *Coal*

Age by R. Dawson Hall in the issue of July 20 of that year, pages 72-77. At that time nothing but Otto-Hoffman ovens were to be found at the plant. At the far side of the concrete road can be seen the light-

oil refining plant which purifies the light oil to motor benzol or goes further and breaks it up to form benzol, toluol, xylol and solvent naphtha. The latter benzol is the pure product.



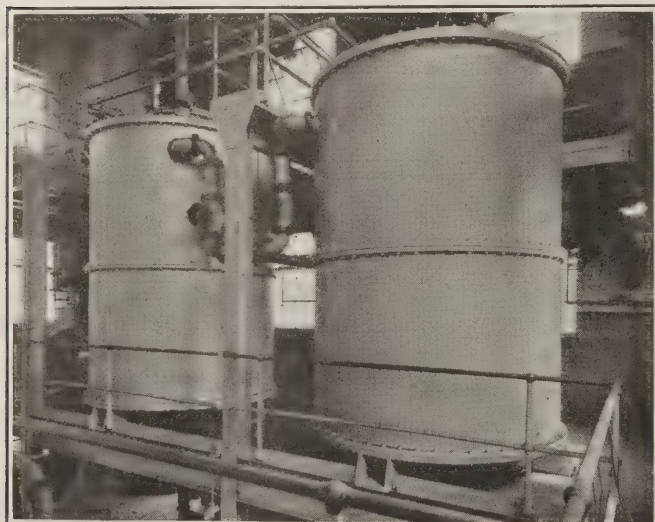
TAR SEPARATOR AND SATURATOR AT FRANKLIN

The gas, in which the ammonia is contained, passes through a screen and impinges on flat surfaces in the tar extractor or separator. Thus the tar is mechanically taken from the gas and falls to the bottom, where it is piped to the tar decanters. The gas, purified of tar, goes to the saturator, where it bubbles through a 5-per cent solution of sulphuric acid, forming ammonium sulphate.

to less than 0.15 per cent and the acid content to an equally low figure. In order to meet this requirement the drier is provided. As at Rosedale, the sulphate is either shipped in bulk or bagged.

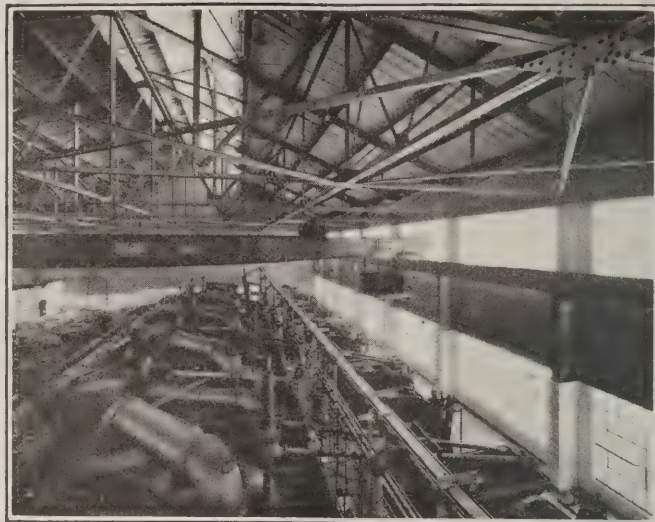
If desired the two ammonia stills provided to free the fixed ammonia and return it to the gas for absorption as sulphate can be used to make crude concentrated ammonia liquor, a condenser having been provided for that purpose.

Flexibility of operation is claimed by the manufacturers for the ammonia-recovery system. When sulphate is in demand, only a minimum quantity of ammonia liquor requiring distillation is produced. If, on the other hand, concentrated liquor is needed, the circulation systems easily can be reversed and, by adding small quantities of water, a large proportion of the total ammonia in the gas, whether free or fixed, can be recovered in the form of liquor. The quantity recoverable in this way will vary from 15 per cent to 85 per cent of the total, according to the coal used. The main essential in making this possible is that the stills have ample capacity, and the manufacturer asserts



TANKS IN WHICH SULPHURIC ACID IS STORED

Sulphuric acid is used for the manufacture of sulphate and for the purification of the light oil in the manufacture of benzol and its homologues.



INTERIOR OF SULPHATE BUILDING

The tar extractors are on the left and the saturators are under the eels where the big take-off pipes bend down. On the gallery floor are a line of centrifugals by which the sulphate is dried. If specially dry sulphate is desired an additional drying in a rotary kiln follows.

that the particular stills installed have a capacity four times greater than that of any other type of the same size.

Stripping stills, similar to those at Rosedale, are provided for the recovery of the light oil, together with the usual preheaters, heat exchangers, decanters, etc. From the stills the crude light oil goes into storage tanks. All storage tanks are vented into columns in front of the stills.

The first stage in the treatment of the crude light oil consists in washing it with sulphuric acid. The oil comes in at the top of the washer and is agitated by paddles which are driven by vertical steam engines. The acid also flows in at the top from a gravity feed tank, being forced up to that tank from storage by air pressure in an apparatus known as an acid monte-jus. For this washing 66 deg. sulphuric acid is used, and the quantity is determined by a color test on the oil after treatment. The general practice is to gage the work by No. 6 Barrett color. This acid wash takes out the olefines, and the sludge resulting, which is of no commercial value, is drained and sent to the slag dump.



BUILDING IN WHICH SULPHATE OF AMMONIA IS STORED

About 25 lb. of ammonium sulphate is made per ton of coal, or 1.25 per cent of the coal weight.

After the removal of the sludge, the oil is neutralized with caustic soda, which is blown over from the caustic tanks with the aid of a caustic-soda monte-jus. In preparing the caustic, holes are cut in the ends of the drums, which are then dropped into the water in the caustic tank. The sludge resulting from the neutralization of the oil is drained off into a tank and from that point goes to the quencher sewer.

The oil is agitated continuously while the acid is being introduced and is then still further agitated for a period of one hour. After this it is allowed to settle for one hour before draining the sludge and treating with caustic.

The neutral oil is run into the washed light-oil storage tank, and it is pumped thence into the refined light-oil still kettle. Steam injected at the bottom through fractionating coils vaporizes the oil. The vapors then go to the refined light-oil column, where they are still further refined, and lastly they are condensed in the refined light-oil condenser. Some of the water which also condenses in the process is separated out, and the refined light oil is pumped to the refined light-oil receiver. If no further refining is done the liquid is collected in the motor-benzol storage tank and sold as motor benzol.



ONE OF THE PUMP INSTALLATIONS AT FRANKLIN

Every part of the plant is as fireproof as tile, concrete, steel and glass can make it, as easy to keep clean as ingenuity can devise, well lighted and orderly.

When a product of greater purity is required further fractionation is necessary. Oil from the refined light-oil tank is pumped to the pure-benzol still kettle. Closed steam is injected to raise the temperature of the light oil to 80.2 deg. C., which is the true boiling point of pure benzol. The benzol vaporizes, and the toluol, xylol and solvent naphtha are run off from the bottom of the kettle and collected in the benzol-free-oil tank. This is further refined into toluol, etc.

The vapors from the pure-benzol still kettle are sent to the pure-benzol fractionating column and any toluol and naphtha that may be carried mechanically forward in the vapor are condensed and flow back into pure-benzol still kettle. The vapor passes out of the fractionating column through a dephlegmator which is in the form of a multi-tubular vessel.

The vapor circulates through the tubes while water passes around the outside of them. By regulating the flow of the water a partial condensation of the vapors is effected and only the most volatile compounds pass



BATTERY OF WATER-TUBE BOILERS

The Franklin coke ovens and refinery have their own boiler plant, containing five 768-hp. water-tube boilers, each equipped with chain-grate stokers burning coke breeze from the ovens.

off. These are condensed in the pure-benzol condenser, from which the resulting liquid flows to the pure-benzol receiver, where it is analyzed to determine its purity.

The "first runnings" of the benzol are collected in the "first-runnings" tank and are isolated in order to reduce the proportion of carbon disulphide in the "blown-over" benzol. These are then returned to the washed light-oil tank. The temperature of the still is allowed to rise, and the product that comes off contains a large proportion of benzene. This goes to the benzol test tank. Tests are made on this as a check on the analysis made at the receiver, and if it meets the specifications it is either sent to the pure-benzol storage or to the refined 90-percent benzol storage tank, depending on whether chemically pure (C.P.) or 90-per-cent benzol is being made.

Toluol is the product of a second distillation at a higher temperature. The contents of the benzol-free-oil still are pumped to the pure-toluol still kettle, where closed steam is used to raise the temperature to about 110 deg. C., at which point the toluol vaporizes. Any xylol and naphthas settle to the bottom of the kettle and are taken to the toluol-free-oil tank. The toluol vapors pass into the pure-toluol fractionating column. Here any xylol or naphthas carried forward are condensed and flow back into the kettle. The remainder of the vapor



LIGHT-OIL PUMPROOM

This installation is adjacent to the scrubbers. It pumps the light oil across the railroad tracks to the light-oil refinery, where it is subjected to the final refinement. Note how carefully all dangerous machinery is guarded.



CONTROL EQUIPMENT, LIGHT-OIL PUMPROOM

The transformers and controls are fully inclosed and placed in a brick room which forms part of the light-oil pump building but is separated by an unbroken brick wall, entrance being obtained from the outside of the building.

passes as through a dephlegmator of the same type as that used with the benzol, and then into the pure-toluol condenser, where it is cooled and condensed with water. Thence it goes to the pure-toluol receiver, where a test is taken for chemical analysis. Then it drains by gravity into the toluol test tank, where another test is made as a check on the first. If it meets the specifications it is pumped to the pure-toluol storage tank.

The product in the toluol-free-oil tank requires a little more handling than the products previously obtained. It is pumped into the solvent-naphtha-still kettle, where the naphtha fraction is driven off. The temperature of the closed steam is not high enough, and open steam is admitted to assist in the expulsion of the naphthas by mechanical means. The vapors are condensed in the solvent-naphtha condenser and then go to the solvent-naphtha separator by gravity. Any water present is separated and then the naphtha goes to the solvent-naphtha receiver. After a chemical analysis has been made and it is found that the naphtha meets the requirements it is admitted to the solvent-naphtha storage tank.

If xylol is desired, the liquid which comes from the toluol-free-oil tank is subjected to a much more careful refining process.

This briefly outlines the uses of the equipment which has already been listed. It is intended as a general and not as a detailed technical description. Its purpose is to give those not familiar with byproduct-plant operation some idea of the equipment and what actually takes place in it.

The auxiliary equipment of the Franklin plant embraces some interesting features. Foremost among these, perhaps, is the pneumatic-tube system which has been installed to expedite the sending of samples to the laboratory.

As at Rosedale, the plant has its own power house,



POWER HOUSE FROM BLAST FURNACES

In the foreground is a reservoir holding 500,000 gallons of water and on the left the conveyor which delivers the metallurgical coke, made in six of the blocks of ovens, to the stock bins for use in certain of the blast furnaces.

which is equipped in the most modern manner. It is, however, considerably larger than the Rosedale plant. It contains five 768-hp. water-tube boilers, each equipped with chain-grate stokers for burning breeze. The boiler efficiency obtained with breeze compares very favorably with that obtained with coal.

Motor-generator equipment and three 500-kva. transformers housed in an independent transformer building



VIEW OF THE VALLEY TAKEN FROM THE HILL ABOVE THE LIGHT-OIL REFINERY

On the extreme left is the boiler house. To the right of this is the acid washer building and the big gas holder. Back of the latter are the scrubbers and the large sulphate storage and sulphate building. To the right of the scrubbers are the secondary coolers. To the right of the tall stack are the primary coolers and in the right foreground the office and laboratory, which at the time when the photograph was taken for this cut was still under construction.

take care of all current requirements. The pumps are located in two separate pumphouses.

One feature that strikes the visitor is the neat appearance of all the buildings both at Rosedale and Franklin. Scrupulous cleanliness is a necessity, and a liberal use of white tiling on the side walls aids in brightening the surroundings and in enhancing the neat appearance.

The electrical equipment is of the latest type and some of the installations are models of their kind. Particular attention is called to the illustration showing the transformer and control installation at the light-oil pumping station. Everything is fully inclosed and located in a brick room which forms part of, but is separated by a wall from, the pumphouse, the only entrance being through a door from the outside.

All in all the Rosedale and Franklin byproduct plants form two installations which not only are of the most modern type to be found in this country but are among the finest. A high degree of efficiency in operation is being obtained and it is interesting to note that original estimates as to production are being exceeded.

Combustion and Mechanical Engineers Study Pulverized Fuel for Boilers

THE interest taken by a gathering of 175 combustion and mechanical engineers, in Pittsburgh on June 5, in a paper on "Pulverized Fuel for Boilers," which was delivered before a joint meeting of the mechanical section of the Engineers' Society of Western Pennsylvania and the Pittsburgh section of the American Society of Mechanical Engineers, attests the importance that engineers of this country attach to this new problem.

The discussion which followed the reading of the paper would lead one to believe that pulverization offers possibilities as a means of obtaining higher combustion efficiencies of coal, but that pulverized combustion adds difficulties to the problems of designing furnaces to withstand the higher temperatures that accompany the increased efficiency. It was generally agreed by those who participated in the discussion that the belief so firmly established as recently as five years ago that the furnace wall should be as thoroughly insulated as possible to retain the heat in the furnace no longer exists. Though pulverization does not insure complete combustion of coal it gives greater combustion efficiency than stoker feeding and simplifies control.

By way of introduction to the paper, which was prepared by J. C. Hobbs and L. W. Heller, it was pointed out that the Middle West has been most active in investigating and adopting pulverized coal for steam-producing purposes. The enormous tonnage of steam coal burned yearly justifies investigation of this problem on a large scale as a means to reduce the cost of producing energy.

Facts upon which the paper was based were obtained in a test conducted by the Duquesne Light Co. in its Colfax station. In the burning of nearly 10,000 tons of pulverized coal in an 850-hp. Stirling boiler an over-all efficiency of 84 per cent was obtained, while the heat derived amounted to 30,000 B.t.u. per cubic ft. of furnace space per hour. The coal was ground so that 65 per cent of it passed through a 200-mesh screen.

Little was said about the obstacles encountered in the test. It was asserted that the cost of good refractories to withstand high temperatures is prohibitive. The dis-

cussion marked this statement as unsound by reason of the need of better furnace design to check the rise of temperature in the furnace walls above the temperature of failure of the refractories used. This, it was pointed out, can be accomplished by passing air to the combustion chamber through hollow furnace walls or by water tubes in the wall or a screen in the furnace, the latter method being preferred.

Dr. Kreisinger, formerly combustion engineer for the U. S. Bureau of Mines, opened the discussion by stating that powdered coal gives higher efficiencies and permits higher capacities than coal in any other form. High efficiencies can be maintained under conditions of variable load and losses through banking are small, which is not the case with the stoker-fed fire. Only a few minutes are required to bring the boiler up to rating. The success in the use of pulverized coal, he affirmed, is due to almost complete combustion with little excess air. In other methods combustion losses may be 5 to 10 per cent, while with powdered coal they seldom exceed 1 to 2 per cent, and little excess air means smaller stack losses. In the burning of pulverized coal the excess air consistently may be held at 10 to 25 per cent as against 100 per cent or more when lump coal is burned.

The endurance of furnace linings, which is important to insure continuous operation, can be obtained by proper design as well as by the use of high-grade refractories. If this factor is overlooked the lining may be burned away in a short time. Molten ash usually runs to the bottom if it is not frozen by means of a screen of water tubes placed close to the walls; otherwise the furnace must be cooled and the slag punched out periodically.

Dr. Kreisinger was not in accord with a statement made in the paper that air-cooled walls should be inclined away from the furnace. His belief is that they should be vertical and that they will stand if of sufficient strength. To give the necessary strength and to hold the fire bricks in place recourse may be had to a steel casing on the outside, which should be utilized solely to retain the heat in the furnace and to resist abrasion by molten ash.

Mr. Crolis deplored the practice of charging the cost of furnace repairs and maintenance as an "experimental" item. Some of these at least should be charged to the generation of steam. He further added that the problem is one of economy as well as efficiency, and among other things, that it is not a practice in economy to crush the bulk of the coal to 200 mesh when 100 mesh will give equal efficiency. He said that nobody yet has designed a furnace which will long withstand the high temperatures of present-day practice.

It was suggested by Mr. Romb that the amount of air admitted with the coal can be increased by reducing the rate of feeding the coal.

That the results obtained with the use of pulverized coal have caused the manufacturers of stokers to develop the super stoker was intimated by J. B. Gregg. The capacity of the furnace per foot of width is now about three times that formerly obtained.

The burning of pulverized coal is increasing, according to Mr. Breslove, consulting combustion engineer of Pittsburgh, Pa. Ease of operation is one of the salient features which recommends it. He told of a small installation in Pittsburgh where a higher efficiency is being obtained in a 500-hp. boiler than is general where stokers are intelligently operated. The boiler is attended by a man who is no expert.

New Equipment

Traction Wheel Mounting for Railroad Type Steam Shovels Saves Time and Expense

TRACTION wheel mountings for heavy railroad type steam shovels, recently built, have successfully withstood tests on a machine of this type having a capacity of 6 cu.yd. Heretofore such machines have been mounted only upon standard railroad trucks, but on account of the necessity for laying track for moving the shovels much time was consumed in getting from one point to another. This size shovel is much used in large rock quarries and open mines and when blasting operations were in progress it usually was necessary to lay track and move



RAILWAY TYPE SHOVEL MOUNTED ON LARGE TRACTION WHEELS

The flexibility and ease of locomotion are important factors in the arrangement of this shovel. Limiting the location of a shovel to places where there are rails frequently results in great losses of time and money.

the shovel back from the face of the excavation and then up again after the explosives had been set off. These operations were not only costly in time and labor consumed in making the changes, but also in decreased output through time lost, and steps were taken to overcome the difficulty.

Traction wheels measuring 6 ft. in diameter and with a face of 36 in. on the front or drive wheels and 30 in. on the rear wheels were designed. The front wheels are used as drivers and power is delivered through a series of gears from the powerful hoisting engines on the shovel. Steering is accomplished by turning the rear wheels by means of a screw shaft and traveling nut. The nut, to which is attached the axle tongue, moves along the screw shaft, slewing the rear axle and wheels in the direction desired. The screw shaft is operated by a separate reversible steering engine mounted above deck alongside the boiler—out of the way yet readily accessible. Reversing the engine causes the traveling nut to move in the opposite direction. The engine is controlled and steering accomplished by means of a single lever from the engineer's position in the forward end of the cab.

Briefly summarized, the advantage of traction wheels over railroad trucks for large railroad type steam shovels are as follows: Greater mobility of machine, elimination of pit crew, easier accessibility to face of excavation, elimination of tracks and reduction of side strains and racking to the machine in general. Traction

wheels also have a marked advantage over any other type of mounting in that the traction wheels are much less complicated, simpler to operate and have a much lower upkeep cost.

The shovel has an over-all length of slightly more than 85 ft. and the over-all width is 20 ft. with a maximum height over the cab of 15 ft., while the boom extends to a height of 32 ft.

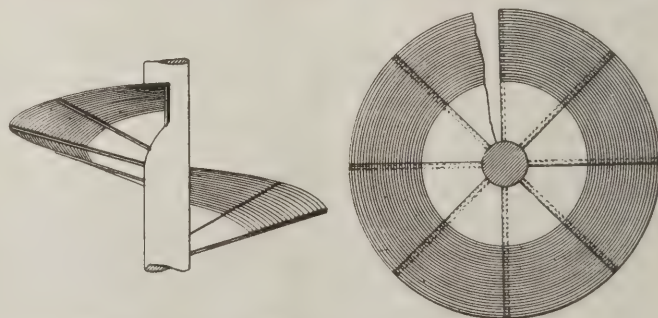
An interesting feat accomplished by one shovel recently was in a pit about 80 ft. deep and reached by a steep incline. To get the new machine into the pit ordinarily would be quite a problem, but when equipped with traction wheels the problem was much simplified. With boom up and dipper and handle in place the shovel was backed down the steep declivity under its own power without difficulty.

Soon after this shovel had been placed in operation a train of loaded dump cars was derailed when some distance from the shovel and on the way to the incline hoist. The shovel was thrown into gear, run down to the cars, a chain hooked over the dipper teeth and around the cars. In a few minutes the train was re-railed and on its way to the hoist while the shovel went back to the face ready for work. Under the old conditions it would have been necessary to unload the cars to rerail them by hand, and then reload them. While this was being done the shovel and other cars would have been standing idle if the ready mobility of the shovel had not saved the day. The shovel also has been used for handling boilers and other heavy machinery that would require the services of a locomotive crane.

Traction mountings on the 1½-cu.yd. shovel have been standard equipment for some time and their successful use led to experiments which have developed the traction wheels for all sizes of railroad type steam shovels. The traction mountings and shovel are manufactured by the Osgood Co., Marion, Ohio.

Roughening the Thread of the Coal Spiral

"IT IS KNOWN to those skilled in the art of coal cleaning," says Frank Pardee, of Hazleton, Pa., in applying for a patent on a new spiral separator, "that coal from one bed often requires different treatment from that given to coal from other beds, and it is apparent that by utilizing one or a combination of several types of corrugated jackets I can readily adapt the separator for handling materials of widely differing natural characteristics." The corrugation may be made over the whole thread or only a part, it may



MODIFYING SPIRAL SURFACE TO SUIT COAL

Here the spiral corrugations are concentric but it is not certain that this will be the best kind of roughness to adopt.

be directed in any one of several directions, may be curved or straight to suit the peculiar needs of any particular kind of coal. By testing the various spirals, that particular one may be chosen which has the right pitch and the correct type of roughness.

How Revolving Field Is Produced in Induction Motor

Explanation of the Varying Current in a Single-Phase Circuit—Combining of Phases—Grouping of Phases to Produce Magnetic Field—Visualizing the Rotating Field

BY O. E. KENWORTHY

Electrical Engineer with Lehigh Valley Coal Co., Wilkes-Barre, Pa.

THE revolving field of a polyphase alternating-current motor always has been considered more or less of a mystery. As a matter of fact it can readily be understood by one having only a slight knowledge of the fundamentals of alternating-current and motor-winding diagrams.

One of these fundamental concepts is that in a single-phase alternating-current 60-cycle circuit the current will flow in one direction through a given conductor, starting from a zero value, building up to a maximum, dying down to zero again; then completely reverse itself in direction and build up to maximum and die down to zero. This operation completes a cycle of which there are sixty in one second. This variation of the current value and direction in the conductor may be visualized by means of what is known as a sine curve, shown in Fig. 1.

The line A, always designating the vertical distance from the zero line to the curve as it moves from left to right, represents the different values of the current in the circuit at any instant during a cycle. A three-phase circuit is made up of three single phases with the instantaneous current values timed so that the currents in each phase reaches its maximum value in a given direction one-third of a cycle apart from one another. Fig. 2 will show this. Phase A is maximum at the instant of time marked X-X' while phases B and C are one-half their maximum value at the same instant. At the point marked 120 deg. phase B is maximum and A and C are one-half their maximum value. At the point marked 240 deg. phase C is maximum while A and B are one-half maximum value.

Looking at Fig. 2 again it can be seen that a full cycle has been completed for all three phases when phase A has progressed from the point marked zero to the point marked 360 deg. This may show that a cycle can be divided into 360 deg. and that in a three-phase circuit the phases are 120 deg. apart.

Again the three phases of a three-phase circuit may be interconnected in several different ways within a motor. Two of the most important connections are called the delta connection, and the wye connection. Fig. 3 is called a delta because of its resemblance to the Greek letter D or Δ . Fig. 4 is called a wye connection because of its resemblance to the letter Y.

In order to visualize the revolving field of a three-phase motor we will consider a stator winding diagram of a three-phase motor (see Fig. 5). This particular winding diagram applies to a motor having 120 slots and 120 coils. The diagram is for a ten-pole motor so

that there are twelve coils per pole, or four coils per phase per pole. Or again there are four coils per group, three groups per pole and thirty groups in all. The coils are made up of one turn each and the four coils in each group are connected in series. One can now easily see that there are ten groups connected in series for each phase. The winding is termed a "series delta."

In order to simplify the winding and make it easier to follow we will draw in the line X, Fig. 5, and considering that part of the winding above X we can construct Fig. 6 by combining the coil groups. This is a method used by a prominent manufacturing company to represent windings. Now we can see each group and its relation to all the other groups of the complete winding.

If we consider that each group can set up a magnetic flux by itself in a given direction at a given instant there will be a series of alternate north and south poles around the stator. For instance, refer to Fig. 7 and Fig. 2; Fig. 7 represents the groups, 2, 1, 30, 29, 28, 27 taken from Fig. 6. At the instant marked zero on Fig. 2, phase A is maximum, groups 1 and 28 are in phase A; phase B is one-half maximum, groups 2 and 29 are in phase B; phase C is one-half maximum and groups 30 and 27 are in phase C. Curve 1 of Fig. 7 shows the magnetic field thus set up by these groups; for convenience it is shown as a sine curve. It is easily seen that groups 2, 1 and 30 and groups 29, 28 and 27 make up two poles as shown on Fig. 6. Considering again curve 1, Fig. 7, we can assume that groups 2, 1 and 30 form a south pole while groups 29, 28 and 27 make a north pole, the maximum strength of the south pole being centered under group 28. If the reader will now follow around the winding he will see that a sine curve can be traversed around the winding showing five south poles and five north poles. (See curve 1 of Fig. 6.)

So far we have shown that at a given instant marked zero on Fig. 2 the winding produces a series of alternate north and south poles, different polarities appearing on the opposite sides of the zero line. Now if we refer again to Figs. 2 and 7 and consider the point on Fig. 2

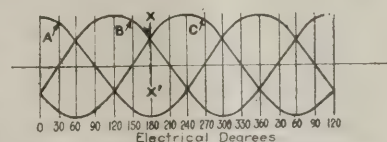


FIG. 2—THREE-PHASE CURRENTS

In the combination of single-phase currents to produce a three-phase system each phase must be 120 electrical degrees apart. Each current wave must start a definite interval after that preceding.

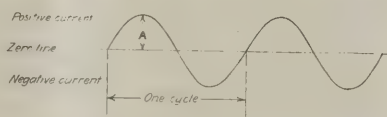


FIG. 1—ALTERNATING-CURRENT VALUES

The amount and direction of the current at any given instant is the vertical distance, as A, measured between the zero line and the current line.

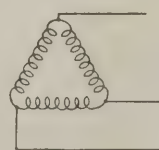


Fig. 3

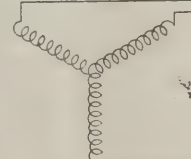


Fig. 4

FIGS. 3 AND 4—DELTA AND WYE CONNECTIONS

These are the two common methods of combining windings for a three-phase circuit.

marked 30 deg. and curve 2 of Fig. 7 we see that the current in phase A, or groups 1 and 28, has dropped 0.866 of its maximum value, that the current in phase B, or groups 2 and 29, has dropped to zero and that current in phase C, or groups 30 and 27, has increased to 0.866 of its maximum value. Curve 2 of Fig. 7 is drawn to show this. From this curve we see that the

south pole, which was formed with its maximum strength directly under group 1 at the instant zero Fig. 2, has moved to a position where its maximum strength is directly under a point midway between groups 1 and 30, and that the north pole, which was formed with its maximum strength directly under group 28, at the instant marked zero has moved to a point midway between groups 28 and 27. Similarly taking the point 60 deg., Fig. 2, we get curve 3, Fig. 7, showing that the south pole has moved so that its maximum strength is directly under group 30 and that the north pole has moved so that its maximum strength is directly under 27. Considering the rest of the points in Fig. 2 and the corresponding curves of Fig. 7 we can see that the magnetic field set up by the winding is actually revolving around the stator.

The speed of the revolving field, of course, is entirely dependent upon the number of poles for which the motor is wound. Referring to curve 7, Fig. 7, and point 180, Fig. 2, the pole set up under group 1 has changed completely from a maximum south pole to a maximum north pole. Fig. 2 shows that this change has occurred during one-half of a cycle. We can say

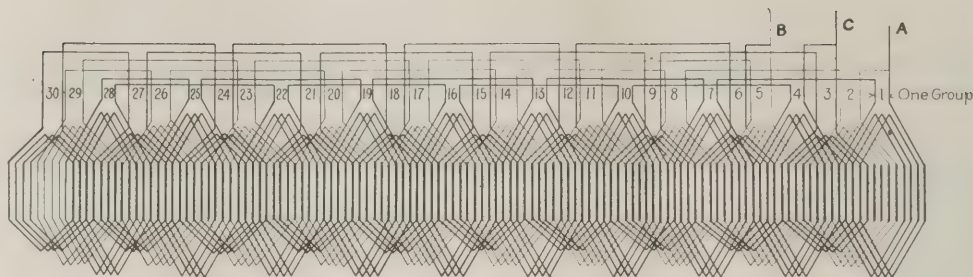


FIG. 5—COMPLETE WINDING DIAGRAM

This development drawing shows the three-phase circuits very distinctly throughout the whole winding. The complete circuit may be easily traced from one line wire to the other.

then that the field has revolved the distance of one pole pitch; that is, the distance from the center of one pole face to the center of the next pole face, in one-half cycle and twice the pole pitch in one cycle. Then for 60 cycles per second the field has revolved past 60×2 , or 120 poles, and in one minute the field has revolved past 7,200 poles. If the machine is wound then as per diagram Fig. 5, the speed of the winding is $7,200 \div 10$, or 720 r.p.m. This brings out a simple method of figuring the speed of the revolving field for any 60-cycle three-phase motor, which is 7,200

divided by the number of poles. This speed is called the "synchronous speed," the full-load speed of an induction motor being about 95 per cent of the synchronous speed. An induction motor always runs at less than synchronous speed. The rotor must run slower than synchronous speed in order to operate.

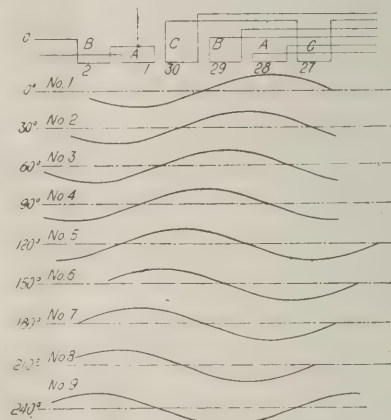


FIG. 7—SHIFTING OF THE POLES

As the electrical degrees indicated in Fig. 2 are passed the field poles progress as shown by the curves. Each field pole has a definite position, depending upon the amount and direction of the current in the stator winding.

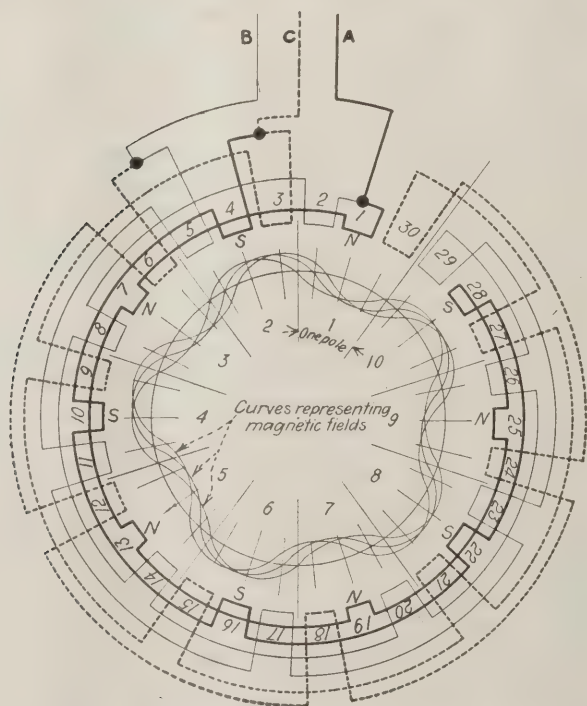


FIG. 6—STATOR WINDING AND FIELD POLES

The curves on the inside of the diagram are used to indicate the location and quality of the poles created by the current in the winding. That part of the curve wave which is on the outside of the circle is considered as being a south pole while that part of the curve on the inside of the circle represents a north pole. The three curve positions considered as existing in three successive instants of time visualize the shifting of the poles in a clockwise rotary motion.

Germany Imports Less Coal During May

Imports of bituminous coal into Germany in May, according to German official statistics, were as follows in metric tons:

Sarre.....	50
Great Britain.....	1,667,099
Czechoslovakia.....	84,867
Polish Upper Silesia.....	583,831
Other Countries.....	59,803
Total.....	2,395,650

How the importation of coal has grown since the commencement of the Ruhr occupation is shown in the following monthly tabulation as compared with the last three months of 1922, in metric tons:

	October	November	December	January
Bituminous coal.....	2,146,226	1,799,965	1,471,559	1,870,127
Brown coal.....	127,972	54,685	81,045	86,829
Coke.....	43,650	48,019	18,987	27,107
Briquets { bituminous coal.....	5,942	11,973	7,098	2,871
brown coal.....	95	135	665	945

	February	March	April	May
Bituminous coal.....	1,421,832	3,397,658	2,695,152	2,395,649
Brown coal.....	121,115	247,345	233,997	83,031
Coke.....	16,565	71,954	132,379	95,699
Briquets { bituminous coal.....	6,996	13,413	22,258	23,678
brown coal.....	7,099	12,800	3,240	1,784

Machine Bookkeeping Speeds Accounts at the Mine

Here Is a System of Sales Accounting Which Puts Correct Bills Out on Time and With so Little Labor That Two Clerks Can Serve a 4,000-Ton Coal Operation

By JOHN C. MCNEIL

Certified Public Accountant, Louisville, Ky.

IT MIGHT safely be assumed that every coal operator in the country is interested in reducing the cost and increasing the accuracy and speed of his sales accounting at the mine. It is the purpose of this article to offer a plan by which any operator can do that very thing. Lessening lost time, getting bills into the mail always exactly at the end of the month, making disbursements well within the discount period, keeping accounts up to the minute, all have their cash value to a mining company, which can be realized through this improved bookkeeping method.

The usual method of accounting for coal sales at the mine is first of all to render to the railroad a bill of lading covering the coal shipped. After this is returned from the coal-billing station, an entry usually is made in the shipping book, charging the coal to the customer, the entry showing to whom the coal was shipped and what was the weight of the shipment. Extensions are then made, and a record is entered in the shipping book from these data. From this the invoice is prepared. Some concerns reverse the order, making the invoice first and then writing the data in the shipping or sales record. The sales ledger is then posted, either from the shipping book or from the duplicate invoice.

The postings to the sales ledgers are then proved and at the end of the month the sales ledger is balanced with the controlling account in the general ledger, statements are taken off, added and compared with the sales ledger. Coal often is shipped to some railroad station where there is no agent, necessitating the prepaying of freight charges on the shipment. In this event it is necessary to make a debit charge against the customer, to journalize this charge, post it to the ledger and then enter it in the controlling account in the general ledger.

USUAL PLAN, THOUGH SLOW, WILL SERVE

Allowances often have to be made to the customers on account of faulty preparation, which allowance has to be posted or journalized, the proper account being credited in the sales ledger, the same item being posted to the controlling account in the general ledger. All these items, of course, have to receive consideration in preparing the statement against the customer. When the customer pays on his account, the check is taken, compared with the account in the sales ledger, written up in the cash book of the sales ledger account, and is posted to the credit of the customer in the sales ledger, postings being proved, so as to show that no credits have failed to receive consideration.

That method of handling the sales account will produce the desired results, provided it is carefully and accurately done, but the repeated copying of figures is likely to introduce errors and the time involved in doing the work in this way and the strain which comes at the beginning of every month greatly delays statements, for the clerical force has at that time to do a lot of balancing of accounts in order to be sure that every-

thing ties in properly. Delays in getting statements to the customer mean delays in getting returns; thus capital is tied up unnecessarily, and a larger investment is needed than would be necessary with a better accounting system.

The efficiency exhibited in the management of production is lost if that efficiency is not carried through all departments. Whenever the work is done by the usual methods and done with due accuracy too long a time passes between the day when the amount the customer owes is on record and the day when the cash is deposited in the bank. Of course the work must be done accurately or it is practically useless. The purpose of this article is to reduce the cost of transporting these accounts through the office by reducing the number of men employed and by making use of mechanical equipment—precisely the same result we expect to derive from introducing mechanical haulage at our mines. Combining as many operations as possible into one will effect this result.

We will now take up the work by the new methods, commencing with the bill of lading as it stands after the railroad weights have been inserted. On the memorandum or office-file copy we ascertain the tonnage, multiply this by the price per ton and pencil in the name of the customer. After we have made these calculations on all of the memorandum bills of lading for the day, we go to the adding machine and total the tonnage of the shipments and their value, saving this tape as a showing of the total tonnage shipped and its aggregate selling price.

We are now ready for handling this information in our bookkeeping machine. The superintendent long ago replaced the old hand picks by undercutting machines. Just as he has demonstrated to us the efficiency of machine methods in mining, we are going to demonstrate to him the superiority of machine over pen methods in bookkeeping.

FOUR FORMS AND THREE CARBONS IN MACHINE

We put Form A-1, our "daily audit sheet of coal sales," in our machine and let it stay there. This is placed under a carbon sheet in roll form in the machine, and, as we want to charge our customer, we put in also at the same time the accounts receivable ledger sheet, Form A-2. As we want to mail our customer a monthly statement of his account at the end of the month, we put in a third sheet, Form A-3, "statement of account" under which is a carbon roll. We also put the invoice in the machine over a carbon sheet. So now we have four forms and three carbons in the machine.

We then collate our memorandum bills of lading according to customers, and, assuming that we have not had any account with the customers, we take each bill of lading and write the data on the invoice, showing first the date, the order or invoice number, the car initial and number and then the grade. Moving over into the

weight columns, we insert the weight in pounds and then in tons. We next insert the price which he is to be charged. Then in the amounts column we place the amounts or extension on each car.

When we have entered all the bills of lading for this customer on the little adding machine we have over the amounts column the totals of these items of the invoice, and we move over into the charge column and write this total. As we have no more charges for this customer, we move over on the statement, and, in the balance-due column we write the amount which our machine has automatically accumulated for us as the balance.

After making each entry of each bill of lading, we distribute the sizes by tonnages and amounts, writing these entries on the part of our sales sheet that extends beyond the other forms. This we do by moving over and making entries in the appropriate columns. Assuming now that we have some more charges to this customer, we put in a new invoice and over in the extreme left of the invoice, in "old balance" we write the amount shown at the right of the statement sheet "balance due" and proceed as before.

Suppose that now we have paid the freight on a car for a customer to a prepaid station. We leave the coal-sales sheet in the machine, removing the others, take the ledger sheet and the statement sheet and put them in the machine. We take the debit memorandum, Form A-5, and after writing the balance in the "old-balance" column, we fill in the date, number of the charge ticket, the data in the data column and the amount in the charge column, after showing such items as are necessary in the items column. After writing this in the charge column we move over to the "sundry" column of our sales sheet and write the credit to our prepaid freight account.

WE ARE NOW READY TO CHECK OUR FIGURES

After we have written up all the bills of lading for that date, we write in the totals at the bottom of the following columns: Pounds, tons, debit sales ledger, old balance, new balance, repeat old balance, tons and amounts under "block," "egg," "R.O.M.," "slack" and "sundries." If we have done our work correctly the total tons will agree with our adding-machine tape of tonnages and the total debit to sales ledger will agree with our total amounts, plus any freight charges we have made. The total debit to sales ledger will agree with the total credits in the sales-distribution columns.

The distribution of the different tonnages will agree with the total tonnages shipped. To these totals we will add the accumulation for the previous dates, and the last sheet at the end of the month will show us the total tonnages shipped, the total debits to our sale ledger and the corresponding credits, giving us one entry for posting to our general ledger at the end of the month. As we have the total tonnages for the month by grades and the total amounts by sizes it is an easy calculation for us to determine the selling price averages by sizes, and also the general average for the month.

We have now completed our sales sheets and are ready to enter remittances. We put first into the machine Form B-1, "daily audit sheet of credits to accounts receivable." Let us suppose now that we have a check from the Ohio Valley Coal Co. paying on account; so we get their ledger sheet, Form A-2, and their statement of account, Form A-3, putting the necessary carbons between them.

We write in the "old balance" column the balance as

shown by the statement, the date and sufficient data to identify the check or remittance received and put the amount in our credit column. Our machine has told us the balance left after this payment, so we write the balance in the balance-due column. We then write the name of the customer on our credit sheet and as we are running three bank accounts and are making daily deposits, we charge in the proper column the bank in which we are going to place the check.

HOW TO ENTER ALLOWANCES AND COMMISSIONS

Now, possibly, we have a contract with the Ohio Valley Co., whereby we allow them a commission on their sales, or it may be that we wish to make them an allowance because of faulty preparation, excess freight or some other allowance which always confronts the coal man. We take our ledger and statement sheet and put them in the machine. We then take a "credit memorandum," Form B-2, and put it in the machine, write in the data and put the total of the items credited in the "amount credited" column, writing on the statement the automatically calculated new balance due, at the same time making an appropriate charge on the daily credit sheet. When we have finished our total credits for the day, the total credits to our sales ledger will agree with the total debits to banks and sundry items and by bringing these items forward from day to day we have totals for posting to our general ledger.

After entry of the last day's business, which at the average mine will be around the first or second of the following month, depending upon the rapidity with which we receive our weights, we are ready to mail out our statements. These statements to the customers are itemized in every respect and proved with the ledger accounts to the penny.

Because we are able to get our statements in the mail so promptly at the end of the month we are going to be able to collect on the 10th, as sales agencies will not be able to put up the usual excuse of delayed statements.

The basis for the disbursements entry is the vendors' invoice. The vendors' invoices for each day are assembled in alphabetical order, and an adding-machine run is made of them for the predetermined total. The distribution of the charges is indicated on each invoice. A voucher, Form C-1, is prepared in duplicate for each vendor. At the time the entry is made on this it is copied through by carbon process on the purchase-record sheet. The first items for each vendor are written in order according to the invoices, entry being made in the detail column and the daily total moved over into the next or credit column. The balance is calculated by the machine and written in the "new-balance" column.

UNNEEDED ENTRIES TORN OFF AT PERFORATION

It is well to call attention here to the reversal of the usual order of debits and credits so as to use the same machine for handling receivables and payables. If there is already a balance in favor of the vendor this balance is written in the old-balance column and the machine automatically calculates the balances.

After entry is made in the voucher, corresponding charges to the various subsidiary expenses in the general ledger sheet are made on the purchase record, Form C-2. It will be observed that Form C-1 is perforated just to the right of the "old-balance" column, so that the check and remittance slip will go to the vendor without the old-balance pick-ups being shown.

At the end of the month or whenever the vendor's or

Form A-1

General Coal Company Daily Audit Sheet of Coal Sales For 192.....

Old Balance	Date	No.	Car Initial & Number	Grade	Railroad Weights Pounds Tons	Price Per Ton	Items	Debit Sales Ledger	Credits	New Balance	Customer	Repeat Old Balance	Cr. Block Sales Tons Amount	Cr. Egg Sales Tons Amount	Cr. R. o. M. Sales Tons Amount	Cr. Slack Sales Tons Amount	Sundry Credits Item Amount

Form A-3'

Statement

Mineral City, Ky., 192.....

In Account With
General Coal Company

Old Balance	Date	Order No.	Car Initial & Number	Grade	Railroad Weights Pounds Tons	Price Per Ton	Amount Items	Debits	Credits	Balance Due

Form B-2

Mineral City, Ky., 192.....

General Coal Company

Credit No.

We Credit You As Follows:

Old Balance	Date	No.	Credit Data	Items	Amount Credited

Form C-1

Voucher Check Mineral City, Ky., 192.....

General Coal Company

Pay
to
the
order

Old Balance Date Check No.

Discount Bal. Due

The Sum of
In full for statement attached
ToGeneral Coal Company
By
Counter Signed

Old Balance	Date	Inv. No.	For the Following Items	Detail	Credits	Debits	New Balance

Form A-2

Accounts Receivable Ledger

Dr.

Old Balance	Date	No.	Car Initial & Number	Grade	Railroad Weights Pounds Tons	Price Per Ton	Items	Debits	Credits	New Balance

Form B-1

General Coal Company

Daily Audit Sheet—Credits To Accounts Receivable For 192.....

Old Balance	Date	No.	Credit Data	Items	Debits	Credits Sales Ledg.	New Balance	Customer	Repeat Old Balance	Bank Debits First Nat'l State Bank Third Nat'l	Sundry Debits Name Amount

Form C-2

General Coal Company Purchase Record For 192.....

Old Balance	Date	No.	Items	Detail	Credits	Debits	New Balance	Vendor	Repeat Old Balance	Debit Accounts Mine General Sales Expense Expense Expense	Commissary Purchases	Commissary Expense	Other Debits Name Amount

Form C-3

General Coal Company Check Register For 192.....

Dr. Accounts Payable	Date	No.	Payable to the order of	Discount Taken	Amount of Check	Amount of Old Balance	Credit Banks First Nat'l State Bank Third Nat'l	Miscellaneous Debits Pay Rolls Salaries	General Ledger Debits Name Amount

Form A-5

Debit Memo

Mineral City, Ky., 192.....

General Coal Company

No.

We Debit You As Follows:

Old Balance	Date	Memo. No.	Charge Data	Items	Total Charge

Form A-4

Invoice

Mineral City, Ky., 192.....

General Coal Company

Sold To.....

Inv. No.

Railroad Weights Govern All Settlements

Old Balance	Date	Order No.	Car Initial & Number	Grade	Railroad Weights Pounds Tons	Price Per Ton	Amounts	Charge

creditor's amount is due, there is nothing to do but draw the check. The usual custom with coal companies is to deduct a fixed percentage, say 2 per cent, of the total month's charges for payment between the first and fifth of the succeeding month. Check record, Form C-3, is placed in the machine and the vouchers (original and duplicate) are arranged for vouchering. The last amount in the balance column is written in the "old-balance" block, at the left of the check and the name and address of the payee written in. At the same time the date and check number are put in.

The amount of the discount to be deducted is written after the name of the payee, and the machine automatically calculates the balance due. The duplicate voucher can then be filed in alphabetical order, to which is attached all of the invoices covered by the voucher. It will be observed from this that Form C-3, being in the machine, will automatically get at the extreme left the debit to accounts payable, the credit to purchase discounts and the net amount of the check. As we have provided in the receipts side of the cash book for three banks, similar columns are provided on the check register and the bank on which the check is drawn should be credited by entry in the proper column.

A few checks necessarily will have to be written for payrolls, and other items not affecting accounts payable, and for that reason debit columns have been provided. In writing a check for this kind of a transaction the entries are not accumulated in the "old-balance" column or in the discount column.

LEAVE AS LITTLE AS POSSIBLE TO MONTH'S END

The advantages of this system over ordinary pen-and-ink methods are that balances are automatically accumulated after each transaction. There is no lost time at the end of the month in preparing statements for debtors and proving them with the ledgers. Remittance advices and vouchers are ready for mailing to creditors after the last invoice is entered.

The totals of each column of the proof sheets are written in from adding registers at the close of each day, the amounts for the previous day to date written next and the last line will show the totals down to date. After making the entries for the last day of the month, totals are ready for posting to the general ledger without having to recapitulate a large number of sheets.

Proofs of accuracy of the work are obtained from the daily audit sheets in the following manner:

A-1, Coal Sales Sheet—

Old Balance agrees with Repeat Old Balance.

Pounds in "Railroad Weights" will be two thousand times amount in tons.

Total Tons in "Railroad Weights" will agree with total tons by grades.

Debit to Sales Ledger will agree with Distribution Credits.

B-1, Credits to Accounts Receivable.

Old Balance agrees with Repeat Old Balance.

Credit Sales Ledger agrees with Debit Distributions.

Both Forms

Total of "Old Balances" and "Debits" agrees with "Credits" and "New Balances."

C-2, Purchase Record

Old Balance agrees with Repeat Old Balance.

Credits agrees with detail distribution of debits.

Old Balances and Credits agrees with Debits and New Balances.

C-3, Check Register

Old Balance agrees with Repeat Old Balance.

Totals of three bank columns and discounts agrees with totals of All Debit Columns.

If the company produces 100 cars of coal per day and handles 300 payable invoices daily, the bookkeeper can handle this system in less than four hours per day, provided the tonnage calculations and bills of lading are priced for him. Two people can handle the accounts receivable and payable for a 4,000-ton operation with this system, an impossibility with pen-written books, to say nothing of the advantages of rendering accounts promptly at the close of each month.

June Explosives Sales Show Increase

Sales of explosives in June 1923 for use in the United States according to the U. S. Bureau of Mines amounted to 529,697 kegs of black powder, 4,442,175 pounds of permissible explosives, and 18,174,435 pounds of explosives other than permissibles. Each of these figures represents a large increase over sales in June last year. The figures are based upon reports of manufacturers whose yearly sales represent 85 per cent of all black powder used in the United States, 88 per cent of all permissibles, and 81 per cent of all other high explosives. The sales in May amounted to 502,747 kegs of black powder, 4,894,200 pounds of permissibles, and 21,546,905 pounds of high explosives other than permissibles.

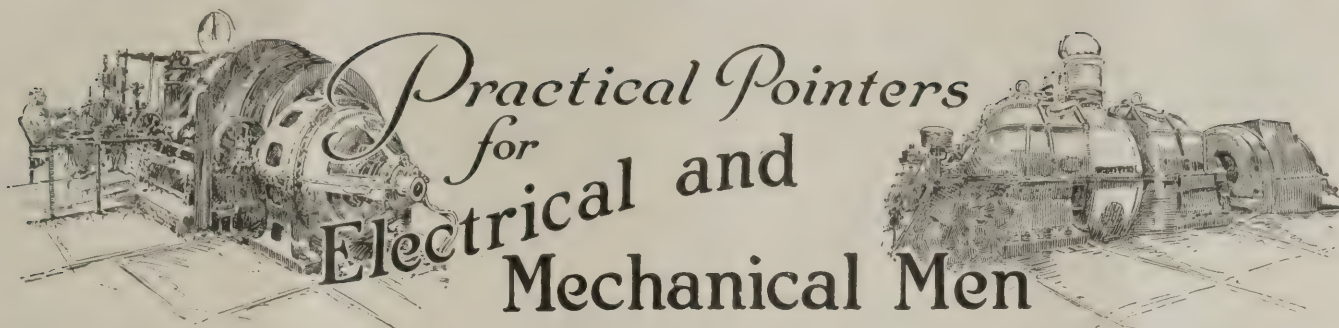
The June sales of black powder were considerably in excess of the amount sold in June 1922 and 1921. Since the beginning of the present calendar year, sales of black powder aggregating 3,643,093 kegs have been reported to the bureau, representing an increase of 63.2 per cent over the amount reported for the first half of 1922, and 49.5 per cent over the 1921 six-months period. Of the total amount sold to date in 1923, coal mining required 87.1 per cent, other mining 2.1 per cent, railway and other construction work 4.8 per cent, and miscellaneous purposes 6.1 per cent. The number of kegs of black powder used by coal miners to date is 3,173,933 kegs, equivalent to 79,348,325 pounds, an amount representing 245 pounds for every thousand tons of coal produced in this country since January 1.

The quantity of permissibles sold in June was much larger than the amount sold in the corresponding month of one and two years ago. The total sales for the first half of 1923 were 29,127,152 pounds, exceeding the record of the first half of 1922 by 93.4 per cent and of the first six months of 1921 by 64.4 per cent. Of the total sales during 1923 to date, 93.7 per cent was for coal mining, 1.3 per cent for other mining, 0.6 per cent for railway and other construction work, and 4.4 per cent for miscellaneous purposes. For each thousand tons of coal produced since January 1, the consumption of permissibles has averaged 84 pounds.

Sales of high explosives in June other than permissibles were greatly in excess of those for June 1922 and 1921. For the first six months of 1923, sales of 115,155,946 pounds were reported, an amount 44.4 per cent in excess of that for the corresponding period last year and 51.4 per cent above the sales during the first half of 1921. Of the total 1923 sales, 16.0 per cent was for coal mining, 40.9 per cent for other mining, 10.0 per cent for railway and other construction work, and 33.1 per cent for miscellaneous purposes.

Cement Shipments and Stocks Decline

Production of portland cement during July, 1923, according to the Geological Survey, totaled 12,620,000 barrels, as compared with 11,557,000 barrels in the corresponding month of 1922, and 12,382,000 barrels in June, 1923. Shipments for the month were 13,712,000 barrels, as compared with 13,850,000 barrels in July, 1922, and 13,307,000 barrels in June, 1923. Stocks at the end of July amounted to 8,076,000 barrels, as compared with 8,433,000 barrels in July of last year, and 9,168,000 barrels in June of this year.



Placing Winding on Locomotive Armatures

TO insure the best life from an armature, extreme care should be used to see that every point that might cause failure is guarded in a satisfactory manner while the armature is being wound. First of all, any sharp corners and any roughness in the slots that might damage the coils should be filed down and all chips and filings removed before applying the insulating material to the core. In applying the insulating material on the coil supports, the material should be evenly placed, and thin spots avoided.

Fit of Coil in Slot.—The coils should fit tightly in the slot and wind so that the top of the coil is $\frac{3}{8}$ in. above the band groove. Fillers should be used between the coils if necessary to meet these conditions. This will permit the bands to pull the coils down tightly and at

back to such a distance that there will be no untinned copper in the commutator neck. The cotton sleeving on the leads should not be allowed to get into the commutator slot, as it may hinder soldering to such an extent that a poor connection will result. The tool used in driving the leads into place should be free from sharp corners that might nick the leads, as a nicked wire may result in a broken lead.

Layout of Commutators.—Most direct-current windings used in haulage motor work are of the wave or two-circuit type. In laying out such a winding it is necessary to know the throw of the coils and the throw of the leads. The throw of a coil is the distance spanned on the core designated in terms of the slots—that is, if the coil throw is stated as 1 and 8, the bottom of the coils lies in slot No. 1, while the top of the coil is in slot No. 8. In a similar manner the throw of the leads is the distance spanned on the commutator in terms of the commutator bars.

When there is an odd number of leads per coil or if, when a dead coil is taken care of, an odd number of leads remain, the following is the method to be used:

Locate the center between the slots indicated by the coil throw. If the lead throw is an odd number of bars, this center will line up on a commutator bar, and if it is an even number of bars, it will line up on the mica between bars. This bar or mica is the starting point for laying off the commutator. If there is an odd number of bars in the throw, take one less than the number of bars and count off half of this number each direction from the starting bar, and this will give the first and last bar of the commutator throw. If there is an even number of bars in the throw, count off half the number in each direction from the starting mica. A check is to count from the first to the last bar, and see if it agrees with the information given. As the first coil put down will have an odd number of leads, the center one of the top and bottom leads should be placed in

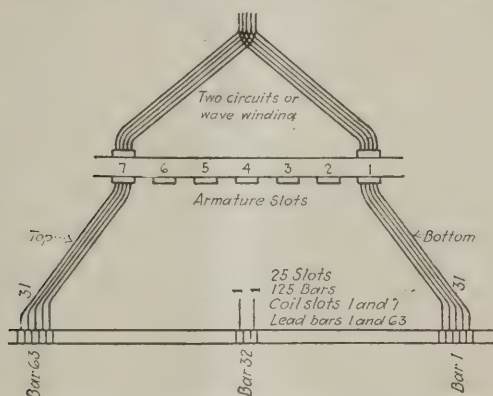


FIG. 1—LAYOUT OF WINDING WITH AN ODD COIL THROW AND AN ODD THROW OF LEADS

Care should be exercised at all times while placing the winding; this is especially true when placing the first coil, which locates the others which follow.

the same time finally rest on the iron, which allows minimum movement of the coils in the slots. If the coils are wound too high the bands will not rest on the iron and when the insulation dries out in service loose bands will result.

Winding Coils in Slot.—The coils should not be twisted, bent or abused any more than is absolutely necessary to get them in place. Care should be taken not to get the wires or leads crossed in such a manner that when pressure is applied in banding short-circuits will occur. The coils on the end windings should be down, so as to make a solid foundation for the bands, but pounding should not be carried to the extent that the coils or leads will be damaged. Insulating protecting pieces should be placed at all points where the coils cross and where there is danger of short-circuit occurring. It is good practice to weave braid between the leads directly back of the commutator, both on the top and bottom layers.

Armature Coil Leads.—The leads should be tinned

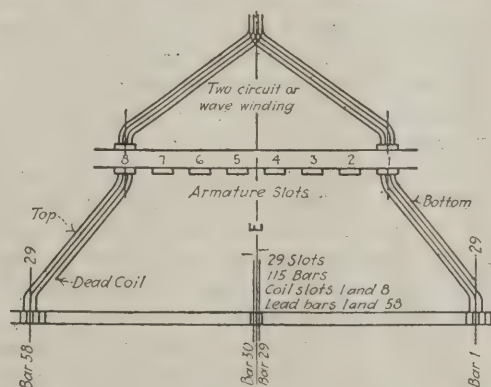


FIG. 2—LAYOUT OF WINDING WITH AN EVEN COIL THROW AND AN EVEN THROW OF THE LEADS
With this development there is a dead coil. This results when there are an even number of coils per slot.

the first and last bar of the throw as determined. Sample layouts are shown in Figs. 1 and 2.

A slightly different method is necessary when there is an odd number of coils per slot and an even number of slots. This seldom occurs, however. In this case, if the lead throw is an odd number of bars, the center, as indicated by the coil throw, will line up on the mica, and if an even number of bars, it will line up on a bar. If there is an odd number of bars in the throw, take one less than the number of bars and count off half this number to the left and one more than half to the right, and this will give the first and last bar of the commutator throw. If there is an even number of bars in the throw, count off half the throw to the right and one less than half to the left. If there are two leads in the first coil, No. 1 lead should lie in No. 1 bar, and if there are four leads in the first coil, No. 2 lead should lie in No. 1 bar.

ALIGNMENT OF COMMUTATOR BAR AND MICA WITH ARMATURE TOOTH AND SLOT CENTER LINES

Coil throw	even	} mica with tooth
Lead throw	even	
Coil throw	odd	} bar with slot
Lead throw	odd	
Coil throw	even	} bar with tooth
Lead throw	odd	
Coil throw	odd	} mica with slot
Lead throw	even	

Winding Rules.—The wave or two-circuit winding always requires an odd number of commutator bars.

When an even number of coils per slot are used there always will be an idle or dead lead.

When an odd number of coils per slot are used and there are an even number of slots on the armature, there will always be an idle or a dead lead.

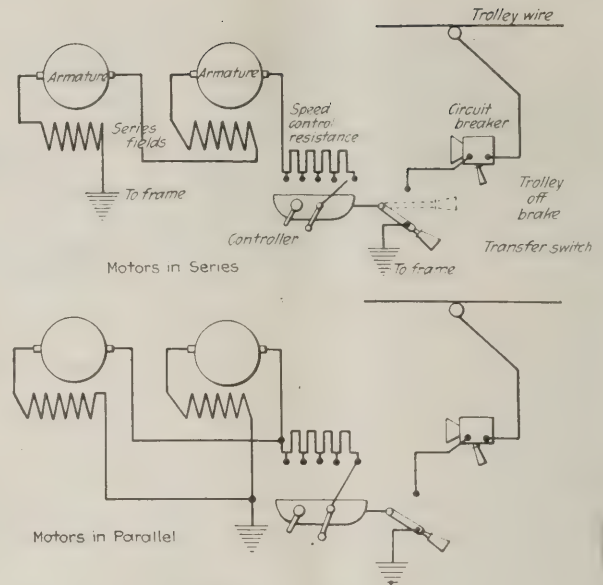
When an odd number of coils per slot are used and there are an add number of slots on the armature, there will never be an idle or a dead lead.

Dynamic Braking of Electric Mine Haulage Locomotives at Hazleton Shaft Colliery

IN THE development of the local coal basins of the Hazleton Shaft Colliery it was found necessary to drive backswitch gangways on account of basins rising ahead on an average of approximately 8 per cent. The length of these gangways is about 2,000 ft. The customary way of gathering and handling 12 loaded cars down the grades was by attaching an electric locomotive to the trip and placing steel shoes under the car wheels. Trouble was frequently experienced due to the shoes becoming dislodged and falling out from under the car wheels. This exposed the motorman as well as the locomotive and equipment to the danger of a runaway or wreck, with the result that the motorman reverted back to the method of hand spragging the wheels.

This method was found to be very injurious to the running gear of the mine cars as well as the locomotives in general and resulted in a high maintenance cost. Due to this method flat spots developed on the wheels very rapidly. A few trips in this section was sufficient to ruin the locomotive and car wheels due to sliding over the heavily sanded rails. Wheels in this condition reduced the number of mine cars possible to cage at the foot of the mine shaft with a normal force of men.

The question of a more suitable means of controlling the load on these grades became a problem for the colliery electrical department to solve. After careful consideration it was decided to apply means for dynamic



LOCATION OF TRANSFER SWITCH

These sketches show the connections of the motors in series and in parallel when effecting electric braking. Without any further change than grounding the trolley cable, electric braking is accomplished. Under certain conditions the parallel operation may cause one motor to generate power into the other motor and tend to drive it as a motor.

braking on the locomotives and this was to be accomplished with the minimum delay. The present or standard control equipment on the locomotives was used with the addition of a single pole double throw knife blade switch for the purpose of disconnecting the trolley circuit from the motors and to provide a circuit through the motors for control of the transition from motor to generator action, as it will be understood that the motors are converted into generators when driven in this manner, the trailing load furnishing the necessary power for electric braking.

The operation for braking is to reverse the motors so that they are connected in series or parallel depending upon the amount of retardation desired. The reverse handle on the controller provides this means, and the control handle is used for varying the resistance in series with the motors now operating as generators. The braking effect can be controlled by decreasing the resistance which increases the braking power, and this in turn decreases or controls the speed of trains down grade. The resistance here referred to is the same resistance used for speed control when operated as a haulage locomotive. This method of electric braking has been in successful operation for the past several months. The accompanying wiring sketch will give a clear idea of the arrangement and operation.

PETER BROADT.

Division Electrician, Lehigh Valley Coal Co.,
Hazleton, Pa.

Owing to the steepness of the grades on which this locomotive is used and the weight of the loaded trip it is probable that the braking is nearly always done with the motors in series. This being the case the difficulties mentioned by Mr. Holsopple in his article, which appeared in the Aug. 23 issue of *Coal Age*, when operating the two motors in parallel as generators is not experienced.

This is a real case where greater safety, less maintenance cost and better output are realized at once, through the application of the principle of electric braking. No doubt many opportunities similar to this one exist in nearly all mines.



Problems of Operating Men

Edited by
James T. Beard



Developing Two Coal Seams on Steep Pitches

Mine Opened by Cross-Tunnel—Main and Counter Levels Driven Right and Left in Seam—Coal Mined by Chutes on the Full Pitch of the Seam

REFERRING to the inquiry that appeared recently in *Coal Age* (June 7, p. 942), regarding the best method of developing two coal seams, pitching 45 deg. and separated by 125 ft. of strata, where the physical conditions are such that the seams must be approached from the hanging wall side, I will say that the plan suggested of driving a cross-tunnel to reach these seams is quite practical.

In British Columbia there are two coal properties, both of which were opened under conditions that must have been similar to those here described—the Hosmer mine, on the Canadian-Pacific Ry. and the Coalmont mine, formerly operated by the Columbia Coal & Coke Co. The Hosmer mine was developed by two tunnels, while the mine at Coalmont was opened by a single tunnel only.

In the inquiry to which I have referred, no mention is made of the seams generating gas; but I will assume they do, as that is most common under conditions such as have been described. My plan would be to make ample provision in the cross-tunnel for a permanent traveling way for the men going to and from their work, as the town will undoubtedly be built where the plant is located.

DETAIL DESCRIPTION OF THE DEVELOPMENT

The tunnel should be driven 18 ft. wide and 7½ ft. high, which will give room for a double-track haulage road and a manway on one side. Safety holes should be provided on the manway side of the tunnel, at intervals of 100 ft. apart, and these should be cut 5 ft. wide and 8 ft. deep and kept whitewashed and free of every obstruction at all times.

For the ventilation of the tunnel while driving and also for that of the mine until a second opening and return air-course is provided, a good substantial partition should be built in the center of the tunnel. The partition should be provided with explosion doors, every 100 ft., which will serve to relieve the pressure on the brattice caused by the heavy blasting common in tunnel-work.

To provide ventilation during the development of the mine, a fan of sufficient capacity should be installed on the surface, at one side of the tunnel, where it will not be in a direct line with the heavy concussion due to blasting. A conduit built on an easy curve should connect the fan with the tunnel opening.

Where the cross-tunnel intercepts the coal seam I would start driving the main entries to the right and

left of the tunnel, on a grade of 8 in. per 100 ft., in favor of the loading cars. These main entries should be 12 ft. wide and 8 ft. high and provided with a ditch 2 ft. wide and 18 in. deep, made in the coal on the low side of the entries.

At the same time, an air-course should be started in the formation above each main entry, leaving a 50-ft. pillar of coal between the entry and the air-course. The air-course should be driven 10 ft. wide and 8 ft. high and connected by crosscuts with the main entry, at intervals of 60-ft. centers.

COAL LAGGED ON HIGH SIDE OF ENTRIES

In order to prevent the coal from falling from the rib on the high side of these openings, posts 12 in. in diameter should be set 5 ft. apart and properly lagged, in both the main entry and the air-course above. In the later development of the mine, the crosscuts will serve as chutes for the extraction of the coal in the rooms.

When the entries and air-courses have advanced 100 ft., on each side of the tunnel, I would at once start two pairs of rise headings, one on each side of the tunnel. I would push these raises through to the surface or outcrop with all possible speed, employing three shifts for that purpose.

The idea of making three shifts is to provide second openings as quickly as possible and enable the full development of the mine to proceed without delay. This is important inasmuch as the mining law, in most cases, limits the number of men to be employed in a mine, until a second opening and escapeway is provided.

At the points where the rise headings reach the surface, two large ventilating fans should be installed. These fans should have ample capacity for the future development of the mine; and great care must be taken in laying out the work in respect to this feature, in order to reduce to a minimum the expense of ventilation and make the mine healthy and safe for work.

RETREATING PLAN, CHUTE MINING

When this preliminary work has been accomplished the development of the mine can proceed without further delay. If the invested capital will permit, the main entries and air-courses should be driven to the boundary lines of the property and extraction of the coal commenced at those points on the retreating plan of the room-and-pillar method of mining. The rooms should be driven 25 ft. wide, on 60-ft. centers, leaving 35-ft. pillars between them.

The general plan adopted in working this seam of coal is that known as "chute mining." I do not consider it practicable to make the length of the chutes or the distance between levels such that there will be danger of breaking and crushing the coal on this account. The length of the chutes and distance apart of the levels must be determined with this idea in view.

Counter-levels and air-courses are driven to the right and left of each pair of raises, after the manner described in respect to the main entries and air-courses. In order to preserve a proper breaking line across the several levels, it is important to see that the work in the upper level is kept in advance of that in the level next below, in each case.

In conclusion, I would suggest that it is possible to adopt some economic system of dropping the coal mined in each level, by a suitable conveyor system installed on the rise headings mentioned, and that matter should receive careful consideration.

AJAX.

Welch, W. Va.

[We assume this correspondent has in mind the mining of the two seams independently, completing the extraction in the upper 5-ft. seam, before attempting to work out the 6-ft. coal lying 125 ft. below.—EDITOR.]

ANOTHER LETTER

Tunnel to reach seam—Main heading driven up pitch, with levels to right and left—Extraction by longwall face at angle with pitch.

MY METHOD of working the two seams pitching 45 deg., mentioned in the inquiry of L. L. Travis, *Coal Age*, June 7, p. 942, would be to adopt the longwall system of mining. The plan should be carried out in such a way that the longwall face can be arranged at an angle with the pitch best adapted to the working of the coal in question. This will vary with the conditions existing in the seams and can only be determined in the course of development.

When the cross-tunnel has reached the upper or 5-ft. seam a main heading should be driven directly up the pitch to the outcrop of the seam, a distance described as about 2,000 ft. At the same time I would drive two levels, respectively right and left in the seam, giving to each road a grade that will afford the best results in hauling the loaded and empty cars out and into the mine. This grade must be carefully calculated according to the size and number of cars hauled in a trip. The main levels must be driven perfectly straight to insure good haulage.

MAIN LEVEL AND AIR-COURSE DRIVEN IN ROCK

One of the chief points to be considered, in driving the levels in a steeply pitching seam, is to provide for the support of the rib on the high side of the road. For that reason, I would drive the main right and left entries starting from the face of the tunnel by taking out 10 ft. of bottom rock on the high side. Then, for a clear width of roadway of, say 8 ft. and 6 ft. of headroom, on a pitch of 45 deg., there would be 2 ft. of rock to lift on the low side of the road.

By this means, the main road would not be materially affected in the extraction of the coal all of which is to be taken out in the longwall method. In this plan, a low level should be driven about 30 ft. below the main level and, in the course of development, this low level could be cut off at distances of 400 ft. by an angle road from the main level. The extraction of the coal between the two levels would afford ample room for the storage of the waste rock taken from the main level.

When the main heading has been driven up the pitch 150 ft., two more levels can be driven to the right and left, respectively. Unlike the main level, however, these counter-levels must be brushed mostly in the top, since the heading has to serve as a chute into which the coal

from these levels must be dumped. As the levels are advanced a suitable distance, a panel is formed and the extraction of the coal between the two levels started by arranging a longwall face at a suitable angle with the pitch of the seam.

CONVEYOR USED ON LONGWALL FACE

My idea would be to erect a conveyor on the line of this longwall face so that all of the coal can be carried to the main level and there loaded into cars to be hauled out of the mine. The size of the panel, distance between levels, the angle of the longwall face with the pitch and the style of conveyor adopted must all be made to conform to conditions found to exist in the seam.

Regarding the support of the roof, it should be stated that wooden cribs will be required to be built on the high side of the road on all counter-levels, while the main heading will require to be cribbed on both sides of the road. It will be necessary to brush the roof on the heading, the rock from which can be built on each side of the road. The longwall face will also require cribbing at intervals and these cribs must be taken out as the work is advanced. After the first great break-occurs, the settlement of the roof will be more gradual.

My preference for the longwall method of working is that it will require far less timber, practically no explosives and afford a more complete extraction of the coal. If this system is found to work in the upper 5-ft. seam, the company has got an "Eldorado," as cross-levels can be driven, at suitable points on the main level, and the coal in the second seam taken out through these openings.

JOHN MCNEIL.

River Herbert West, N. S.

Arbitration of Disputed Authority of Mine Inspector

Protracted method of arbitration prescribed by law fails—The law in British Columbia more direct in accomplishing results.

IT WAS with some surprise that I read, a short time ago, in *Coal Age* (May 24, p. 862), an account outlining the practical working of the Bituminous Mine Law of Pennsylvania, in respect to the settlement of dispute between the district mine inspector and the operator of a mine, regarding an order of the former.

My impression on reading the account was that it revealed a very unsatisfactory condition of affairs and one that might seriously affect the safety of the workmen engaged in the mine, to say nothing of the security of the property in question, for which, however, the operator would take his own chances, in disputing a claim of the inspector and refusing to obey his orders.

DISAGREEMENT IN OPINION WILL OFTEN ARISE

It cannot be denied that a situation in which an operator disagrees with the conclusions of a district mine inspector, concerning conditions in the mine, will often arise. If my recollection serves me rightly the outline of proceedings, described in the letter to which I have referred as the method laid down in the bituminous law, was such that a possible six weeks or more might elapse before any final decision could be reached.

In the management and operation of a coal mine, nothing is of greater importance than the safety of the workmen employed; and there should be no delay in removing any alleged dangerous condition, or in reach-

ing a settlement of a dispute that might arise regarding its existence. In this connection, I should like to point out the law laid down in the statutes of British Columbia, relating to such a situation.

The Coal Mines Regulation Act (Sec. 79, 1) reads as follows:

If an inspector, upon careful investigation, is of the opinion that a mine or any part thereof is in any respect dangerous; or that any matter, thing or practice done, followed, or permitted in, about, or in connection with such mine, constitutes a defect calculated to impair the efficiency of mining operations, or to endanger the safety of any persons in or about such mine; such inspector shall give notice thereof, in writing, to the owner, agent or manager of the mine, stating in such notice the grounds of his opinion; and shall, by the said notice or otherwise, order that such remedies be applied and such provision be made for the safeguarding of those employed in or about the mine as he thinks requisite.

If the inspector is of the opinion that any delay in remedying such matter would be dangerous he may order the closing of the mine or any part thereof, or may order the stopping of all work therein or connected therewith, until the matter complained of be remedied; and, in every such case, the inspector shall forthwith transmit to the minister of mines a copy of the order and a full report of the reasons therefor.

Any owner, agent, manager or other person refusing or neglecting to obey any order given by the inspector under this subsection shall be guilty of an offence against this act.

To prevent the abuse of this power by the inspector, however, the law (Sec. 81) provides as follows:

If the owner, agent or manager of the mine objects to any order of an inspector, under either of the last two preceding sections, he may, within twenty-one days after receipt of the notice of such order, send his objection, in writing, stating the grounds thereof, to the minister of mines; and thereupon the matter shall be settled by arbitration, in the manner provided by this act, save and except that in such arbitration the parties to such arbitration shall be the owner, agent or manager of the mine, on the one hand, and an inspector (on behalf of the minister of mines), on the other; and the date of the receipt of such objection shall be deemed to be the date of the reference.

Inquiries Of General Interest

Calculating Required Grade of Slant Road in Mine

Three Angles A, B, C Involved in the Calculation
-First Find Rise on Full Pitch, per 100
Ft.—Then Find Grade Angle for Same Rise

KINDLY explain, in the columns of *Coal Age*, how it is possible to calculate the grade of a slant road, in a seam having a given inclination, when the slant road makes any given angle with the direction of the full pitch of the seam. I have seen this method explained somewhere but have lost track of it and am anxious to know the process of easy calculation, as we have a number of such problems occurring in the mine.

Mahanoy City, Pa.

ASSISTANT FOREMAN.

The problem is a simple one and can be made quite clear by reference to the accompanying figure, which shows three vertical planes and a horizontal plane. The vertical plane $o y n$ marks the full pitch of the seam. We will assume that the rise $y n$ corresponds to the horizontal distance $o y$, equal to 100 ft.

Now, the vertical plane $o x m$ marks the direction of the slant road. The rise $x m$ is equal to the rise $y n$, since $n m$ is a strike line or level line in the seam. Evidently, the horizontal distance $o x$ being greater than 100 ft., the assumed basis of calculation, and the rise for this distance being equal to the rise on the full pitch of the seam, the slant road will have a less per-

centage of grade, or a lesser grade angle B , than the angle of pitch A .

Under the Coal Mines Regulation Act, each of the parties appoints an arbitrator, which must be done within twenty-one days. If either of the parties fails to appoint an arbitrator within that time the appointee of the other side proceeds to hear and determine the matter in dispute and his conclusions shall be final. On the other hand, should both parties appoint an arbitrator the two appointees shall select an umpire to decide on any points of difference that may arise between them. Failure of the arbitrators to agree upon the selection of an umpire gives the minister of mines the right to appoint an umpire, on the application of either party to the dispute.

Now, the point to which I wish to draw particular attention is the fact that the order of the inspector of mines stands good during all this proceeding. In other words, if I am not mistaken, the mine cannot be operated and the order of the inspector disregarded. All work affected by the order must cease, until such time as the matter in dispute has been finally decided.

There should be no hesitation in admitting that safety is the first consideration. That being true, it is right that work should cease where there is any doubt regarding the safe condition of a mine where men are employed. At the best, the work of mining coal is a dangerous occupation and should not admit of the taking of chances in questions of dispute.

Fernie, B. C.

GLEN CALDER.

centage of grade, or a lesser grade angle B , than the angle of pitch A .

The first step, then, is to calculate the horizontal length $o x$ of the slant road, corresponding to the horizontal distance $o y$ of 100 ft., in the direction of the full pitch of the seam; thus

$$o x = \frac{o y}{\cos C} = \frac{100}{\cos C} \quad 1$$

But, in the vertical plane $o y n$ corresponding to the full pitch of the seam, the rise $y n = 100 \tan A$. Again,

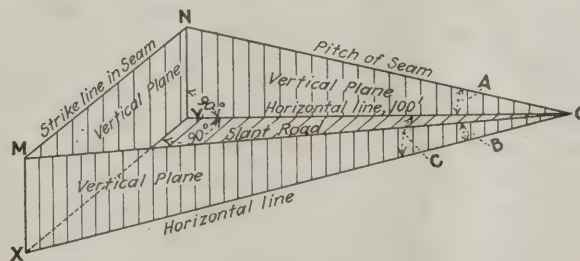


DIAGRAM SHOWING SLANT ROAD DRIVEN ACROSS PITCH

in the vertical plane $o x m$ through the slant road, the rise $x m = o x \tan B$; and since $x m$ is equal to $y n$, we write

$$100 \tan A = o x \times \tan B \quad 2$$

Finally, combining equations 1 and 2, we find for the value of the cosine of the grade angle C ; thus,

$$100 \tan A = \frac{100}{\cos C} \times \tan B$$

and

$$\cos C = \frac{\tan B}{\tan A}$$

In other words, the cosine of the angle that the slant road makes with the full pitch of the seam is equal to the ratio of the tangent of the grade angle to the tangent of the pitch angle.

To illustrate, let it be required to find the bearing of a slant road having a grade of 10 per cent, in a

seam having an inclination of, say 45 deg., when the pitch of the seam is due north. In this case, the tangent of 45 deg. being 1 and the tangent of the grade angle B , for a grade of 10 per cent being 0.1, $\cos C$, equals 0.1; and the slant road, therefore, makes an angle of $89^\circ 25'$ with the meridian corresponding to the full pitch of the seam. The bearing of a slant road turned to the right of the full pitch (due north) would then be N. $89^\circ 25'$ E. In this case the slant road would make an angle of 35 minutes with the strike of the seam.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 3-7 incl., 1923

(Selected Questions)

QUESTION—*Explain the manner in which you would make a test for firedamp with a safety lamp.*

ANSWER—When making a test for explosive gas in a mine, the flame of the lamp should be lowered so as to cut out practically the bright luminous portion of the flame. The best results are obtained when a uniform height of flame is adopted. Holding the lamp in an upright position, it is carefully raised toward the roof or into any cavity where gas is suspected. While doing this the flame is closely watched for the first appearance of a faint blue cap surmounting the lamp flame, or any lengthening of the lamp flame, which would indicate the presence of gas. The height of the cap is an index of the percentage of gas present.

On the first appearance of any indication of gas, the lamp should be carefully withdrawn, making no quick movement of the lamp, which would tend to cause the flame of the gas burning within the lamp to pass through the mesh of the gauze and ignite the gas surrounding the lamp. When making a test in a quiet atmosphere a thin layer of gas at the roof may escape notice. To prevent this, the fireboss should blow a gentle whiff against the roof so as to disturb the gas and bring it down to where it will enter the lamp. In no case, should the lamp be tilted to one side, which would cause the heat of the flame to bear directly on the gauze and make the lamp unsafe. This is a dangerous practice of some firebosses.

QUESTION—*State the requirements of a good safety lamp for general mining use.*

ANSWER—The lamp must give a good light. It should be simple in construction, of few parts that can be assembled without danger of mistake or omission of any part, which would render the lamp unsafe for use. The design of the lamp should be such as to render it least liable to accident, fairly safe in strong air currents, light and portable. The flame should be so set in the lamp as to give a good range of illumination, upward on the roof and downward on the floor. The lamp should be provided with a lock fastening that will betray any attempt to tamper with the lock. The chimney of the lamp should be provided with a bonnet for protection against strong air currents and falling dust and dirt.

QUESTION—*What oils are generally used in safety lamps?*

ANSWER—A vegetable oil, as cottonseed, or an animal oil, as sperm or seal oil, is commonly used; except in lamps designed to burn a volatile or light mineral oil such as naphtha or benzene. The vegetable and animal oils first mentioned are the safest for common use, because they are not explosive. Greater precaution is needed when burning a volatile oil, and the vessel of the lamp must then be designed for that purpose.

QUESTION—*How should all doors affecting the ventilation in a mine be adjusted?*

ANSWER—Mine doors must be set in a substantial frame and in such a manner that they will close with the air current. The door must be given a slight fall so that it cannot stand open without being propped back. Doors controlling the main air current in a mine should be in duplicate and so arranged that when one door is open the other will always be shut. This is important in order to prevent the short-circuiting of the air when it is necessary to pass through a door separating the main intake and return airways. Besides these requirements, the anthracite law also requires an extra main door to be kept standing open where it will not be in danger of accident and can be at once closed should the door in use be destroyed from any cause.

QUESTION—*What portions of a mine would you most carefully examine in your rounds as a fireboss?*

ANSWER—Portions of the mine requiring the most careful attention on the part of the fireboss are those where danger from gas or bad roof conditions are most expected to develop. This does not mean, however, that other portions of the mine should be neglected in any manner. Where gas is being generated a good fireboss will naturally make a more careful test where he suspects gas than in places generally known to be free from gas.

QUESTION—*After passing the workmen into the mine in the morning what would be your duty as a fireboss?*

ANSWER—Upon completing his morning examination and the making out of his report in the book kept for that purpose, as required by law, and having passed the men into the mine, except those in whose places danger has been found, and having made a verbal report to the mine foreman in charge, the fireboss returns for his breakfast, after which he must start his second examination of the mine, by visiting those working places first where danger has been found. It is his duty to see that the work of removing those dangers is being performed in a safe manner and as promptly as possible. Following this, it is the fireboss' duty to visit in order every working place in his section and give the men any needed instructions in the safe performance of their work.

QUESTION—*What is dynamite and what proportion of nitroglycerine is contained in each grade?*

ANSWER—Dynamite is a detonating explosive formed by the absorption of nitroglycerine in some inert substance capable of absorbing and holding the liquid. Infusorial earth has been largely used as an absorbent. Wood meal and sawdust are also largely employed in the manufacture of dynamite. The percentage of nitroglycerine in the several grades of this explosive is generally given as follows:

Grade No. 1.....	50-70 per cent,
Grade No. 2.....	33-50 per cent,
Grade No. 3.....	27-30 per cent,
Grade No. 4.....	20-25 per cent.

Labor's Cause Safe in Hands of Coolidge, Says McMenimen

U. S. Railroad Labor Board Member, in London, Cites Official Record of New President as Showing Friendship to Labor.

BY PAUL WOOTON
Special Correspondent of *Coal Age*

LONDON, Aug. 12.—Labor will make no mistake in placing absolute confidence in Calvin Coolidge, in the opinion of W. L. McMenimen, a member of the U. S. Railroad Labor Board, who is in Europe to study certain phases of railroad operation here. Mr. McMenimen is one of the labor members of the board and is recognized nationally as one of the most capable of the country's public servants who have been recruited from the ranks of labor.

"Because of the action Mr. Coolidge took in handling the unfortunate and ill advised police strike in Boston," said Mr. McMenimen, "many think Mr. Coolidge is unfriendly to union labor, at least. Such is not the case. Prior to the police strike his record had been all that labor could desire. This applies to his entire period of public service, which included such important posts as membership in the lower and upper houses of the State Legislature, the Lieutenant Governorship and the Governorship of the state and covers his official career at Northampton.

"Shortly prior to the police strike Mr. Coolidge had attended the convention of the state section of the American Federation of Labor as the special guest of the Federa-

tion. While a member of the Massachusetts Senate he supported the full-crew bill and was among those who voted to pass it over Governor Foss' veto. As Governor he signed the forty-eight-hour bill despite the fact that the measure was opposed with unusual bitterness by the owners of textile mills and by such influential organization as the Associated Industries and the Arkwright Club. No longer ago than last August, in the course of an address before the American Bar Association at San Francisco, he declared that he would rather be known as the Governor who signed the forty-eight-hour bill than the Governor who dealt with the police strike.

"From my long contact with Mr. Coolidge I am convinced that labor can trust him to do the just and fair thing at all times."

Mr. McMenimen's intimate acquaintanceship with President Coolidge began many years ago when Mr. Coolidge was a commuter between Boston and Northampton. Mr. McMenimen was the brakeman on the train which Mr. Coolidge used. The friendship which sprang up between them then has continued since and became closer during the years in which Mr. McMenimen acted as legislative representative of the railroad trainmen at the Massachusetts capital and at Washington.

The fear has been expressed that the succession of Mr. Coolidge to the Presidency would make the United Mine Workers less anxious to submit to the President for final determination any of the matters in which they had been unable to agree in their conferences with the operators. If so stalwart a champion of labor as Mr. McMenimen, who more than any labor leader is in a position to know, is willing it would seem that the anthracite workers are not justified in fearing unfair treatment by the new President.

Industrial Court Uncovers Irregularities in Subleasing of Kansas Coal Lands

Investigation concluded recently at Pittsburg, Kan., by the Kansas Industrial Court, of the terms under which the Jackson Walker Coal & Mining Co. subleases coal land in the southeastern Kansas district developed an inclination to veer frequently from the straight and narrow. In addition to examining the leases, the court sought to trace the lands now held under lease by the Jackson-Walker company to their original owner, the Atchison, Topeka & Santa Fe R.R. Taking another tack, it also inquired into the action officials of District 14, United Mine Workers, in placing Jackson-Walker mine No. 17 on the unfair list a few days before the Industrial hearing was scheduled.

In explanation of the terms by which lessees are required to deliver to Jackson-Walker all coal produced by them on land leased from the Jackson-Walker company, or pay a royalty of 40c. a ton to sell it in the open market, C. P. A. Clough, president of the Jackson-Walker company, told the court his concern had contracted with the Santa Fe R.R. to deliver to it its entire production upon demand. Until the last year, he said, the Santa Fe had taken 85 per cent of the coal produced by the Jackson-Walker company and its lessees, and though installation of oil burners in Santa Fe locomotives had cut this demand considerably, his company was forced to protect its contract by continuing to control the output from its lands.

Firms leasing from Jackson-Walker declared the 40c. royalty made it impossible for them to compete in the open market, and, as a result, when the Jackson-Walker demand slackened they were compelled to close down.

J. H. Keefe, president of the Pittsburg & Cherokee Coal & Mining Co., from which the Jackson-Walker company leases, testified that majority stock in his concern is held in trust by the Central Trust Co., New York, for the Santa Fe R.R. Mr. Keefe also testified that \$100,000 of the \$225,000 paid by Mr. Clough for control of the Jackson-Walker company last winter was lent Mr. Clough by the Santa Fe Land Development Co., majority stock in which also is held by the railroad. Jackson-Walker stock was security for the loan, he said.

Passing to the union's placing Jackson-Walker Mine No. 17 on the unfair list, William Bogartz, president of District

14, examined relative to the union's purpose, admitted that union officials expected miners employed in the mine to cease work. This terminated the court's inquiry, but the district board withdrew its order a few days later, following a conference between its representatives and representatives of the operators, at the instigation of members of the International board.

The Industrial Court has given no date for the announcement of the results of its investigation.

World's Coal Output Higher in 1922 Despite Strike in United States

Although preliminary estimates of the production of coal in the United States in 1922 show a marked decrease as a result of the five-months miners' strike, the world's coal production of 1,208,000,000 metric tons in that year showed an increase of 72,000,000 tons, or 6 per cent, over the output in 1921, according to W. I. Whiteside, of the U. S. Geological Survey. Production in the United Kingdom has risen to the level of the early war years, and this increase counterbalances not only the falling off in the United States but that in other countries. Although Germany lost (beginning in June) about 70 per cent of the Upper Silesian coal production to Poland, so that the Polish output was about three or four times as much as in former years, the total in Germany for the year shows an increase over the output of 1920 and hardly 5,000,000 tons less than that of 1921. The Netherlands lignite industry, which in 1920 had reached an output of almost 1,500,000 tons, has now practically if not entirely ceased.

The following table shows the trend of the world's production for the last 13 years, and the percentage of the annual total produced in the United States:

Year	Production in Part Estimated	Per Cent Produced by United States	Year	Production, in Part Estimated	Per Cent Produced by United States
1910	1,160,000,000	39.2	1917	1,325,000,000	44.6
1911	1,189,000,000	37.9	1918	1,331,000,000	46.4
1912	1,249,000,000	38.8	1919	1,168,000,000	43.1
1913	1,342,000,000	38.6	1920	1,319,000,000	45.3
1914	1,207,000,000	38.7	1921	1,136,000,000	40.4
1915	1,189,000,000	40.6	1922	1,208,000,000	34.6
1916	1,257,000,000	42.7			

The term "coal" as used by the Geological Survey includes

lignite, and the production for the world is simply the total of quantities reported, no attempt being made to reduce the statistics for inferior coals to an equivalent tonnage of coals of higher rank. Where possible, however, coal and lignite are shown separately.

The preliminary statistics of the world's coal production given in the Geological Survey's weekly report No. 295 have been revised and are given in greater detail in the following table. Attention is especially called to the change in Canadian figures. The Dominion Bureau of Statistics now compiles the mineral statistics of Canada, and its figures, which differ somewhat from those published by the Canadian Department of Mines, have been used in this table, in order that subsequent figures may be comparable. The production in countries from which reports had not been received by June 6, 1923, represents only about 3 or 4 per cent of the total, and as estimates for these countries have been included, the margin of error in the total as given is perhaps not over 2 per cent. The table will be revised as final official data are received.

COAL PRODUCED IN PRINCIPAL COUNTRIES OF THE WORLD
IN CALENDAR YEARS 1920, 1921 AND 1922

(In Metric Tons of 2,204.6 lb.)

Country	1920	1921	1922
<i>North America</i>			
Canada { Coal.....	12,020,531	10,684,259	10,561,140
{ Lignite.....	3,353,234	2,975,598	3,087,642
Greenland.....	2,308	2,200	(a)
Mexico.....	(a)	(a)	(a)
United States { Anthracite.....	81,282,000	82,076,000	47,613,000
{ Bituminous and lignite	515,883,000	377,316,000	370,033,000
<i>South America</i>			
Argentina.....	(a)	(a)	(a)
Brazil.....	(a)	(a)	(a)
Chile.....	1,063,185	1,275,117	1,046,378
Colombia.....	(a)	(a)	(a)
Peru.....	361,075	345,481	(a)
Venezuela.....	30,377	(a)	(a)
<i>Europe</i>			
Austria { Coal.....	132,864	137,633	166,540
{ Lignite.....	2,408,865	2,478,862	3,109,926
Belgium.....	22,388,770	21,750,410	21,234,170
Bulgaria.....	757,250	911,664	985,640
Czechoslovakia { Coal.....	11,143,221	11,648,399	9,906,261
{ Lignite.....	19,943,258	21,050,712	18,942,920
France { Coal.....	24,293,000	28,243,000	31,157,984
{ Lignite.....	967,800	735,600	757,633
Germany { Coal.....	140,766,397	145,610,000	141,204,600
{ Lignite.....	111,887,694	123,011,000	137,207,125
Greece.....	197,454	134,000	(a)
Hungary.....	4,963,060	6,148,560	7,117,910
Italy { Coal.....	151,862	114,236	197,920
{ Lignite.....	1,571,735	1,026,035	704,600
Netherlands { Coal.....	4,115,629	4,243,000	4,475,000
{ Lignite.....	1,395,851	121,715	0
Poland.....	6,660,145	7,842,553	23,800,000
Portugal.....	169,165	135,732	(a)
Rumania.....	1,570,393	1,791,224	(a)
Russia.....	6,137,000	9,851,000	10,000,000
Spain { Coal.....	5,420,704	5,012,229	(a)
{ Lignite.....	552,425	408,674	(a)
Spitzbergen.....	130,000	210,000	316,000
Sweden.....	439,584	376,692	(a)
Switzerland.....	74,590	10,714	(a)
United Kingdom:			
Great Britain.....	233,106,377	165,781,404	255,891,786
Ireland.....	109,845	89,958	(a)
Jugoslavia.....	3,412,361	2,949,103	(a)
<i>Asia</i>			
British India.....	18,250,508	19,511,154	19,000,000
China.....	19,484,896	19,876,375	21,300,000
Chosen.....	293,675	(a)	(a)
Federated Malay States.....	251,896	304,156	(a)
Indo China.....	700,267	920,900	1,000,000
Japan (including Taiwan and Karafuto) f	30,550,625	27,418,000	26,000,000
Russia.....	1,537,000	2,384,100	2,000,000
Turkey.....	e700,000	(a)	(a)
<i>Africa</i>			
Algeria.....	7,793	9,541	8,855
Belgian Congo.....	2,000	2,990	(a)
Nigeria.....	183,013	216,262	112,563
Rhodesia, Southern.....	524,796	521,404	467,787
Tunis.....	31,331	22,207	270
Union of South Africa.....	10,408,497	10,339,044	8,822,760
<i>Oceania</i>			
Australia:			
New South Wales.....	10,887,991	10,966,621	10,346,572
Queensland.....	1,127,727	970,087	1,100,000
Tasmania.....	76,640	67,543	70,000
Victoria.....	614,632	603,618	600,000
Western Australia.....	469,436	476,341	450,000
British Borneo.....	(a)	(a)	(a)
Dutch East Indies.....	1,095,718	1,212,665	(a)
New Zealand.....	1,873,296	1,838,131	(a)
Philippine Islands.....	58,888	(a)	(a)
Total.....	1,319,100,000	1,136,000,000	1,208,000,000

(a) Estimate included in total. (b) Includes the Saar. (c) Includes entire output of Upper Silesia for January-May, for June-December only that part of Upper Silesia allocated to Germany. (d) Includes for June-December that part of Upper Silesia awarded to Poland. (e) Estimated on incomplete data. (f) Exclusive of lignite from Japan (annual production of about 200,000 tons), for which estimate is included in total.

Fewer Anthracite Mine Employees in 1922

Employees in and about the anthracite mines decreased slightly in number in 1922. Final returns from the producers of anthracite to the U. S. Geological Survey (including those in the Bernice Basin of Sullivan County) show a total of 156,849 men employed, a decrease, when compared with 1921, of 1.6 per cent. The reports offer no explanation of the cause of the decrease, but it seems probable that the effect on operations of the unsettled conditions that prevailed for some time after the settlement of the general strike during the summer months must have limited for a time the number of men that could be employed. The decrease was general at mines and breakers, but owing to the demand for coal to fill the shortage brought about by the strike the washeries employed a greater number of men than in 1921.

The average number of days worked by the mines and breakers was 151, a decrease of 121 days from the record for 1921, which may perhaps be attributed almost entirely to the strike. In this respect also the washeries benefited by the shutdown of the mines, and the average number of days of operation increased from 118 in 1921 to 136 in 1922. The days worked by dredges decreased from 176 to 169. These are weighted averages that take into account the number of men employed at each individual operation.

The mines in the Lehigh and Schuylkill regions were operated almost exactly the same number of days—157 and 156 respectively—while those in the Wyoming region worked 147 days. The working time for washeries averaged 136 days, and for dredges, 169 days.

MEN EMPLOYED AND DAYS WORKED IN THE PENNSYLVANIA ANTHRACITE REGION IN 1922.

Region	Average Number of Men Employed				Total	Average Number of Days worked
	Surface	Miners etc.	Other	Underground		
<i>Lehigh:</i>						
Freshly mined coal.....	6,160	8,127	5,647	13,774	19,934	157
Washery product.....	228	.....	.....	.....	228	99
Dredge product.....	18	.....	.....	.....	18	125
	6,406	8,127	5,647	13,774	20,180	156
<i>Schuylkill:</i>						
Freshly mined coal.....	15,448	20,909	12,038	32,947	48,395	136
Washery product.....	1,016	.....	.....	.....	1,016	130
Dredge product.....	311	.....	.....	.....	311	174
	16,775	20,909	12,038	32,947	49,722	155
<i>Wyoming:</i>						
Freshly mined coal.....	18,436	43,163	23,909	67,072	85,508	147
Washery product.....	678	.....	.....	.....	678	156
Dredge product.....	19	.....	.....	.....	19	131
	19,133	43,163	23,909	67,072	86,205	147
<i>Sullivan County:</i>						
Freshly mined coal.....	256	328	158	486	742	113
Total freshly mined coal ()	40,300	72,527	41,752	114,279	154,579	151
Total washery product...	1,922	.....	.....	.....	1,922	136
Total dredge product.....	348	.....	.....	.....	348	169
Grand Total.....	42,570	72,527	41,752	114,279	156,849	151

(a) Includes comparatively small number of washery employees who could not be separated from breaker employees.

A better measure of the effect of the great strike may be gained from the table below, which shows by regions the number of days lost through strikes and the number of men involved during 1922. It was reported that a total of 142,442 men were on strike for 138 days on the average during 1922. Part of the days lost were due to local strikes before and after the general strike, but in the main the losses were brought about by it. Computed on the basis of total employees, the average loss per man employed was 125 days.

STRIKES AND LOCKOUTS IN THE PENNSYLVANIA ANTHRACITE REGION, 1918-1922.

District	1918		1919		1920		1921		1922	
	Days	Men	Days	Men	Days	Men	Days	Men	Days	Men
Lehigh.....	2	1,092	4	6,518	15	15,666	18	10,847	137	19,066
Schuylkill.....	4	9,945	4	4,212	17	41,945	5	5,523	137	41,893
Wyoming.....	4	7,785	8	24,409	23	39,229	17	35,747	138	80,753
Sullivan Co.....	2	468							144	730

4 19,290 7 35,139 19 96,840 16 52,117 138 142,442

Statistics compiled by H. L. Bennet, U. S. Geological Survey, July 21, 1923.

High Lights in Governor Pinchot's Address to Miners and Operators

This controversy between the miners and the operators of the anthracite field is not a private quarrel. The general public is a party to this controversy, and its rights, as well as the rights of the two other parties, must be represented and recognized.

A shortage of anthracite means not only a huge loss of profits to the operators—not only a huge loss of wages to the miners—but it means also loss of health among millions of American families, loss of comfort, of working power and of time.

A strike or suspension such as now threatens is a public calamity, and as such every reasonable public means must be used to prevent it.

The interest of the public in the settlement of this

controversy is double. In the first place, the public wants it settled. It is utterly wrong that the people should be called upon again to bear the enormous and most oppressive burden of a shortage of anthracite coal.

The public interest demands that this controversy shall be settled, and that a suspension of anthracite mining shall be avoided. The thing is possible—and it must be done.

Settlement means that neither side can get everything it would like to have. Few people ever do in the world we live in. But the settlement of this dispute is absolutely necessary for the public safety and welfare. The public needs and must have coal, and I am entirely confident that the public is going to have it.

Governor Pinchot Assumes Rôle of Anthracite Mediator

Mine Workers Issue Strike Call—Lewis Denies Report That Bituminous Miners Will Walk Out in Sympathy — Promises Operators "Most Complete Trouncing of Their Lives"

HARRISBURG, PA., Aug. 28.—Possibility of a joint session of the delegates representing anthracite operators and miners late this afternoon or tomorrow loomed big today following a conference Governor Pinchot had with the four operators at his office at the Capitol. The Governor is holding three conferences today, and the fourth, while a possibility, would not be discussed by him.

"I have discussed the case of the operators with them this morning as I did that of the miners yesterday," said the Governor, following his talk of the situation with the four producers today. I am to see both sides again this afternoon, the operators at 4 and the miners at 2." The operators were closeted with the Governor for two hours and a half and as they left the executive department they refused to disclose anything that had transpired there. The Governor continued his reticence relative to the discussion and when asked regarding the possibility of a joint session following two separate sessions with each side, said he had nothing to say.

The presence of W. B. Colver, of the Federal Trade Commission, in Harrisburg was commented upon and the Governor said: "A number of persons with special knowledge which might be useful in the present circumstances have come to this city, some by invitation and some not. As I have said before, I will counsel with anyone and everyone I can reach who can contribute from any angle to the discussion of this proposition." The Governor said that John Hays Hammond, chairman of the Federal Coal Commission, had loaned him several experts and these here today were: W. E. Fisher, David L. Wing, R. A. Walter, F. G. Tryon and Joseph H. Willits, experts in wage scales, cost production, and other matters.

The Governor also has invited here two experts representing the trade unions and two representing the anthracite operators. These experts are working with Dr. Clyde L. King, Secretary of State. There are other experts here watching the proceedings and working with the delegates. Following the organization of the new giant power board today the experts who have been invited to attend that session will also confer with Dr. King and the federal experts.

In an effort to effect a peaceful settlement of the anthracite strike situation, Governor Pinchot of Pennsylvania on Aug. 27 addressed representatives of the operators and miners, presenting a plan for separate conferences with him at the Capitol at Harrisburg. This was agreed to by both sides at an open meeting attended by the operators and the miners and numerous state officials. The Governor at this opening session of the parley outlined the entire situation. While optimistic that a way out of the difficulty, which threatens a general strike throughout the anthracite district on Saturday, can be found, he withheld suggestions of

methods by which the impending strike might be averted.

He said he recognized the rights of both operators and miners and added that the "general public is a party to this controversy and its rights as well as the rights of the other two parties must be represented and recognized." He was acting, he said, as the representative of the Commonwealth and in his capacity as Governor.

The operators at the conference were S. D. Warriner, president of the Lehigh Coal & Navigation Co., Philadelphia; W. J. Richards, president of the Philadelphia & Reading Coal & Iron Co., Pottsville; W. W. Inglis, president of the Glen Alden Coal Co., Scranton, and A. B. Jessup, vice-president of the Jeddo-Highland Coal Co., Jeddo. For the miners there were present Thomas Kennedy, Hazleton, president of District No. 7, United Mine Workers; C. J. Golden, Shamokin, president of District No. 9; Rinaldo Capellini, Hilldale, president of District No. 1, and Philip Murray, Pittsburgh, international vice-president of the United Mine Workers, representing President John L. Lewis.

At the opening session there were present in addition to the authorized representatives of the operators and miners other operators and other mining officials, statisticians and representatives of several scale committees.

The first of the separate conferences was held Monday afternoon, when for three hours the Governor went over the situation in great detail with the representatives of the miners. At the conclusion of this session the Governor announced that a second conference would be held the following day, after he had conferred with the operators. These latter met with the Governor Tuesday morning from 9 a.m. until noon.

Wholly apart from the Governor's public statement and the meeting with the miners' leaders in his chambers, was a session of more than twenty federal, state and local experts at which the practical details of a possible compromise were being worked out.

The Governor in effect is forming his own "fact-finding commission" in an effort to hammer out a practical solution and avert a strike which is but three days away. It is rumored generally that a wage increase of from 5 to 10 per cent will be suggested as the first essential to a compromise settlement.

John L. Lewis, International president of the United Mine Workers, on Aug. 27 transferred his headquarters from Atlantic City to the Bellevue-Stratford Hotel, Philadelphia.

With the selection of Governor Pinchot as mediator by President Coolidge, negotiations between the anthracite operators and miners' representatives took a new turn. Early in the week the subcommittee of operators and union leaders had discontinued their conferences at Atlantic City

because of their failure to agree on the wage demands and the refusal of Mr. Lewis and his associates to accept arbitration of all eleven demands.

At about the time that the appointment of Governor Pinchot as mediator was announced, it was made public at Atlantic City that a statement would be transmitted to the union locals in the coal fields not later than Aug. 28 "containing the rules governing the suspension that automatically will take place on Sept. 1."

The announcement from the miners that plans had been ratified for the suspension of work on Sept. 1 was made by Vice-President Murray. It read:

"The full scale committee met this afternoon and discussed the breaking off of negotiations with the anthracite operators. The committee instructed the subcommittee to prepare a statement containing the rules governing the suspension that automatically will take place Sept. 1.

"This statement will be printed and sent to the local unions in the anthracite coal fields not later than Tuesday of next week and will cover all men, including maintenance men, members of our organization employed in and around the anthracite coal fields.

"The statement will provide specifically, however, that maintenance men be continued at work, provided the anthracite operators invite the mine workers to confer to make a satisfactory agreement governing these men.

"This is the first time in the history of joint relationship that negotiations have been broken off and the operators have not requested the mine workers to supply them with maintenance men. It is not the purpose of union mine workers to furnish the anthracite operators with maintenance men after Sept. 1 unless they ask for them and are willing to make a satisfactory agreement governing their conditions of employment.

"In years gone by we have always effected a joint understanding governing the employment of maintenance men during a suspension."

James Marks, vice-president of District No. 2, United Mine Workers, had a conference with President Lewis at Atlantic City on Aug. 23, which gave rise to reports that it was probable that the bituminous coal workers would go out on strike in sympathy with the anthracite workers. This was later denied by Mr. Lewis, who declared that the union never breaks a contract.

It was hoped that when the anthracite operators and union leaders resumed their wage conferences at Atlantic City on Aug. 20 they would make progress toward a settlement of their differences on the demands of the mine workers. Two days was spent in deliberations and then, failing to agree, another adjournment was taken and the secretary of the joint committee of operators' and mine workers' representatives was instructed to notify the U. S. Coal Commission of the failure to reach an agreement.

After the adjournment on Aug. 21, John L. Lewis promised the operators "the most complete trouncing of their lives." Mr. Lewis said the break resulted from the operators' refusal to consider a wage increase while the operators said the miners' refusal to agree to arbitration was the cause.

Operators' and miners' representatives at the reconvening of the conferences on Aug. 20 immediately took up the demand for an advance of 20 per cent for contract workers and \$2 a day for day workers. Mr. Lewis stood firmly for the increase while Mr. Warriner, for the operators, as strongly opposed it, saying it would mean higher prices.

After adjournment on Aug. 20 Mr. Lewis declared the miners got no satisfaction from the operators and made it plain to the newspapermen that they had not receded from their position on the check-off.

The demand for an increase in wages was renewed at the session the following day, and when it was refused by the operators the latter offered a resolution for the renewal of the present contract to expire March 31, 1925, which was refused by the miners. This was followed by a resolution by the operators offering to submit all eleven demands to arbitration and that the findings be retroactive to Sept. 1, which likewise was voted down by the miners. A motion by the miners to adjourn was rejected by the operators.



GOING UP?

From the New York World

The operators then submitted a resolution that the secretary be instructed to advise the U. S. Coal Commission of the status of the negotiations, and that the sub-committee hold itself in readiness for consideration of such suggestions as they may make. The miners voted "no" on it, but a resolution directing the secretary to notify the U. S. Coal Commission of the status of the negotiations and that the committee adjourn to meet at the call of the secretary was unanimously adopted.

Experts Gather Facts for Pinchot

Facts in connection with points at issue in the anthracite wage dispute are being gathered for Governor Pinchot under the direction of his confidential adviser, Secretary of State Clyde H. King, formerly professor of economics of the University of Pennsylvania. Those who are furnishing information to the Governor include W. B. Colver, Robert W. Bruère, director of the Bureau of Industrial Research of New York; Royal S. Meeker, former Commissioner of Labor Statistics of the U. S. Department of Labor and recently head of the Labor Bureau of the League of Nations at Geneva; W. Jett Lauck, economic adviser to the railroad brotherhoods and to the mine workers; the Right Rev. Michael J. Hoban, Roman Catholic Bishop of Scranton; William Rauschenbusch, author of a book on coal; Joseph J. Walsh, Secretary of the State Department of Mines, and F. G. Tryon, Samuel W. Tater and David L. Wing, statisticians in the employ of the U. S. Coal Commission.

C. L. Poston Dies After Long Illness

Clinton L. Poston, aged 76, a well-known Ohio coal operator died Aug. 23 at Athens, Ohio, after an illness of more than three years. He was one of the last of the old-time operators who amassed a fortune in the coal fields of the Hocking Valley. He was born at Nelsonville in 1847 and was the son of L. D. Poston, who was interested in coal lands for years. After attending the Ohio State University, in 1867 he took charge of business for his father until 1873, when he and his brothers formed a partnership under the name of Poston Bros., to conduct the mining business. In 1881 his brothers sold out and in 1893 Mr. Poston purchased the interests of the outside partners. He was actively connected until 1902, when he relinquished a number of his activities. Later he became interested in Pittsburgh No. 8 field under the name of the Morris-Poston Coal Co., and still had interests in that field at the time of his death.

Wadleigh Gives Governors His Emergency Plan For Coal Distribution

Representatives of the Governors, among them several Governors themselves, of eleven anthracite-consuming states met in New York on Tuesday, Aug. 28, at the invitation of Federal Fuel Distributor Wadleigh, to discuss the best means of handling the emergency in the event that the anthracite mine workers go on strike Sept. 1. Among the Governors present were Cox, of Massachusetts; Flynn, of Rhode Island, and Proctor, of Vermont. General Goethals represented Governor Smith of New York. Interstate Commerce Commissioner Aitchison sat with Mr. Wadleigh, who presided as chairman.

Mr. Wadleigh opened the meeting by telling the Governors of the limitation in the powers of his office, and that the act creating the Federal Fuel Distributor provided that such powers as it conferred shall not extend beyond Sept. 22, 1923. The so-called Brydon plan of emergency distribution of soft coal was discussed and it was pointed out by Mr. Wadleigh that in one important aspect the soft-coal operators' proposal is not feasible. The Brydon plan contemplates that the government set the prices at which bituminous coal shall not be sold during the emergency. The Federal Fuel Distributor or no other federal agency has power to fix the price of coal.

After some discussion of the possibilities of working out some plan the soft-coal operators were invited into the meeting. Mr. Brydon informed them of the plan which he had worked out, which in brief contemplates that so far as possible the ordinary channels of distribution shall not be disturbed, and that an emergency supply of coal would be obtained through a special organization that would have representatives in each anthracite-consuming state to act in conjunction with the state authorities and consumers. He announced that S. L. Yerkes, of Birmingham, would be asked to take general direction of production and distribution.

Mr. Brydon called particular attention to the fact that his emergency plan is designed to deal effectively with a serious emergency where the ordinary channels of purchase and distribution prove insufficient for the effective supplying of the needs of the public, and is predicated "on the government determining that there existed such an actual or threatened shortage in the supply that it was desirable to fix prices by governmental action rather than leaving them to the ordinary processes of competition." He added: "Under existing laws no emergency organization of the operators can itself undertake to agree on or fix prices even for the purpose of keeping prices down in the absence of governmental co-operation. Therefore, until the government may deem the emergency such as to justify it in fixing prices by the method used during the strike of 1922, or otherwise, or will give its sanction to some other method, it would be impossible for any emergency organization of operators itself to receive and place orders for the purchase of coal."

The assistance of the soft-coal operators was offered to the Governors, to wholesalers, retailers and consumers by way of giving information as to the use of soft coal as a substitute for anthracite and the sources of available supply.

Representatives of the petroleum industry were present, and Mr. Welch, secretary of the Petroleum Institute, read a prepared statement pointing out the advantages of oil for household heating. He suggested that the larger homes be equipped with oil-burning apparatus, leaving the supply of anthracite available to those who could not afford the high initial cost of installation. He refused to make any prophecy as to the future price of oil and stated that on present costs of coal and oil material savings in operating expense would be realized by those who use oil.

Several of the state representatives asserted that retail dealers are exceedingly reluctant at this time to buy bituminous coal because of the fear that if there is no strike they will be left with the soft coal in their yards and that eventually they will have to sell it at a loss.

There was spirited debate toward the close of the session between Mr. Ainey, representing Governor Pinchot of Pennsylvania, and Mr. Maloy, representing the Governor of Maryland, as to the proper form in which the assembled Governors and their representatives should express their willingness to co-operate with the Federal Fuel Distributor.

The resolution finally adopted by state representatives, which summarized the results of the meeting, simply pledged state governments to co-operate fully with the Federal Fuel Distributor in whatever plan he should propose, should the necessity for emergency action arise.

The meeting was held in the office of the Port Authority, No. 11 Broadway, New York, and at the outset the press and representatives of the coal trade were excluded. Railroads were represented by their coal traffic managers.

Commission Appraises Hard-Coal Situation

The Coal Commission on Aug. 24 issued a statement summarizing the situation with respect to supply and stock of anthracite and appraising the condition of the country in the event that there is a prolonged strike in the hard-coal fields. The statement follows:

"In the first place, the anthracite mines to date have maintained so high a rate of shipment that by Sept. 1 over 25,000,000 net tons of domestic sizes of anthracite will be in the possession of the consumers or dealers. This supply, representing shipments from April 1 to Aug. 31, is over 7,000,000 tons more than was distributed by Dec. 31 last year and only about 17,000,000 tons less than the average supply on Dec. 31 of the three years previous to the strike year.

"Any complete stoppage of anthracite mining on Sept. 1 would thus involve a deficit of 17,000,000 tons of domestic sizes to be made up before the end of December, or a million tons a week. Indeed, with the present high rate of shipments continuing through this month, the supply on hand would be nearly 2,500,000 tons above the average on Sept. 1, and a real deficit would not exist until after two weeks of shutdown. To that degree is the anthracite-consuming territory prepared to face the threatened strike.

"However, the Sept. 1 stocks of household fuel are not equally distributed and the many households without any anthracite would be forced to prepare for winter by accepting some substitute.

"While, as was true last winter, some byproduct and bee-hive coke will be available, perhaps at a rate of from 100,000 to 200,000 tons a week, the principal substitute must be bituminous coal.

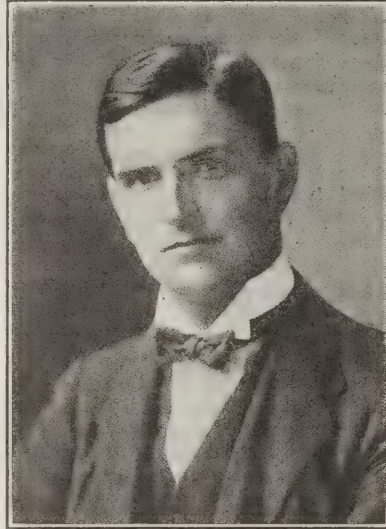
"To sum up the situation: In the event of an anthracite strike, a household fuel emergency would exist in the Eastern United States which the bituminous operators believe could be promptly met by utilizing the excess mine capacity of the bituminous fields normally shipping steam coal to New England, Canada and the Atlantic seaboard. The united effort of soft-coal operators, railroad executives and the Interstate Commerce Commission would probably be in the line of starting this movement of coal before the period of maximum freight movement, for which the railroads are reported to be in excellent condition to handle.

"Stoppage of anthracite mining would be a public emergency to meet which would require the full co-operation of the consumers with the soft-coal operators and all the agencies of distribution, with all the aid possible through executive action by federal and state governments. If those who now control the mining and distribution of anthracite are to continue to think only of their own demands and not at all of the public's demand for coal, the Coal Commission feels that every measure should be taken to supply the domestic fuel needed in the homes of the great mass of the consumers and especially of the industrial workers throughout the East."

Coming of Hodges Recalls Reported Co-operative Strike Agreement

Frank Hodges, secretary of the Miners' Federation of Great Britain, according to a newspaper dispatch, is on his way to Canada, and later will confer with John L. Lewis, president of the United Mine Workers of America, and his associates in Indianapolis. When Lewis recently visited Europe he saw Hodges and shortly after the former's return to the United States it was reported that an agreement in principle had been reached between the two leaders to co-operate in the event of a strike in either country. In view of the wage negotiations now on between the anthracite operators and miners Mr. Hodges' visit at this time has an added significance.

Soon after Mr. Mr. Lewis' return from Europe he was a witness before the U. S. Coal Commission but gave no intimation that there was an agreement between Mr. Hodges and himself. At about the same time Attorney General Daugherty, whose attention had been called to the newspaper articles, sent a letter to the U. S. Coal Commission stating that it would be a violation of the laws of this country if the alleged agreement, whereby British coal diggers would not mine coal for shipment to the United States during a strike here and whereby the American union would conduct itself similarly during a strike in the British Isles, had been entered into.



FRANK HODGES

Enjoin Roads and I. C. C. in Joint Mine Case

The U. S. District Court for the Southern District of West Virginia has granted a permanent injunction against the Chesapeake & Ohio R.R., the Virginian Ry., the United States of America and the Interstate Commerce Commission in Equity No. 1276, commonly called the Joint Mine Case. The decision restrains the carriers involved from putting into effect the Interstate Commerce Commission decision which provided that joint mines could not obtain more cars than local mines. The Court says the restraining order is only meant to hold that circular CS-31, Rule 4 (Revised) is erroneous and the action of the carriers in putting it in force must be enjoined and that an order will be entered without prejudice to the Interstate Commerce Commission making proper orders relative to reasonable car distribution to joint as well as local mines not in conflict with the Court's view, which is that the Commission's decision is not in accordance with the law. The Interstate Commerce Commission intends to appeal the court's ruling to the U. S. Supreme Court.

Federal Bureaus at Variance on New Mine

Considerable interest has been aroused in Washington by the conflict between the attitudes of the Interstate Commerce Commission and the Interior Department toward opening new coal mines. The commission recently denied the Virginian Ry. permission to build a branch line 1.19 miles in length in Wyoming County, W. Va., to reach a proposed coal mine, saying at one place in its decision: "There are at present more mines in the country than is consistent with the most efficient use of carriers' equipment, and their aggregate capacity exceeds greatly the country's demand."

The Commission asserted that the Virginian Ry. had not been able to give a sufficient car supply to the mines already operating along its lines and dependent upon it.

While one government agency thus gives what appears to be a general declaration that too many coal mines are in existence in the country, the Department of the Interior has announced the sale at public auction of mineral rights to 1,840 acres of public land in Fayette County, Ala. The coal rights were purchased by Moss & McCormick, of Birmingham, who paid a cash bonus of \$85,000, with a pledge to spend \$75,000 for improvements on the property within three years and to guarantee the government a royalty of 10c. per ton per annum on a minimum production of 20,000 tons of coal, the stipulations meaning that the coal must be mined.

J. H. Barnes Sees Menace to Fundamental Of American Industrial Relations

Julius H. Barnes, president of the Chamber of Commerce of the United States, issued a statement Aug. 26 on the anthracite situation, declaring that the public will place the blame and condemnation upon the party which refuses to submit their cause to determination by an impartial tribunal. "The coal situation, to my mind," said Mr. Barnes, "has assumed unusual importance because in its present aspect this question has assumed a challenge to a fundamental principle of American industrial relations."

"Now, if it is true that in this dispute there has been on the part of the operators an unreserved offer to submit the questions to impartial arbitration, and if that offer has no conditions which tend to render it unfair or partial in any degree; and if that offer has been flatly refused, then we are, as I said, to the point of a challenge to the principle on which organized society preserves its orderly existence. There has developed, moreover, a feeling that the public has an interest in the settlement of wage disputes and of relations between workers and their employers on such a scale as this such as has not been generally recognized."

"It is now realized that a settlement which grants unfair demands on either side and is reimbursed by a public price levied on every consumer is not a fair settlement, in an article of such common use and of such a character as to assume almost the character of a monopoly. Therefore there is an unusual significance in the direct issue, stripped of all other technicalities, as to whether, in this great industry, the question of the relations between workers and employers is to be subject to the determination of an impartial tribunal, in which the public interest also will be considered, or whether one side or the other shall impose its will brutally upon the other, and the public pay the cost."

"Here is no attempt to weigh the merits of the case, one side or the other, but an attempt to define to the public the clear issue in this case: Shall an industrial dispute, when all other means of conference and discussion have failed, be submitted to the determination of unprejudiced tribunals, or shall the public see its interest jeopardized by a contest of violence and relative strength? In such a case the public, having learned the facts, will attach the blame and visit their condemnation, effective or futile as it may later prove to be, upon the party which refuses to submit their cause to such determination."

Let Coal Contracts for Ohio Institutions

The Ohio Board of Purchase has awarded contracts for 73,900 tons of coal for seventeen state institutions. The awards, based on bids submitted about a month ago, cover 23,900 tons of mine-run at prices ranging from \$1.63 to \$1.79 per ton. The awards on mine-run were made on nine lots, the smallest 900 tons, three lots of 2,000 tons, two lots of 2,500 tons, three lots of 4,000 tons.

Awards also were made for 50,000 tons of nut, pea and slack. The lowest figure was \$1.01 per ton on 6,000 tons. There were 19,000 tons awarded at \$1.10, 2,500 tons at \$1.14, 5,000 tons at \$1.18, 6,000 tons at \$1.19, 3,000 tons at \$1.25 and 6,000 tons at \$1.45. All but two of the companies obtaining the awards have headquarters in Columbus.

Still Hopeful of Peace in Anthracite Field, Washington Prepares to Provide Substitutes if Necessary

Entrance of Governor Pinchot into the anthracite situation came Aug. 24, when the Pennsylvania executive reached Washington and lunched with President Coolidge. Chairman Hammond of the Coal Commission also was a guest. The Governor made it plain that he had come as the result of an invitation. At the White House it was stated that the federal government was abandoning nothing to the state in this movement, but that the object was co-operation between the state and the federal governments. It was reported, without confirmation, that Secretary Hoover had suggested that the Pennsylvania Governor be asked to see what he could do to restore harmony, anthracite production being almost wholly within that state. To assist the Governor at his conference with the operators and miners at Harrisburg, the Coal Commission sent to that city F. G. Tryon and several others of its staff.

Official Washington entered the last week of August outwardly optimistic that there would be no cessation of work in the anthracite mines at the end of the month, when the existing agreement will expire, but confessedly basing this feeling upon deduction and not upon assurances from those connected with the production of hard coal.

While hopeful of peace in the anthracite fields, preparations went forward to provide communities which normally consume anthracite with substitutes in the form of bituminous coal and coke in the event that work in the anthracite collieries should cease Sept. 1.

Eyes were turned expectantly Monday toward Harrisburg, where Governor Pinchot was scheduled to meet representatives of the anthracite miners and operators in an effort to bring about an agreement whereby anthracite production would not be interrupted.

WADLEIGH TO MEET GOVERNORS IN NEW YORK

F. R. Wadleigh, Federal Fuel Distributor, left Washington Sunday for New York, where he had invited governors of Eastern anthracite-consuming states to meet him, in person or through representatives, Tuesday to discuss plans for sending into those states soft coal and coke in the event that shipments of anthracite should cease.

According to Mr. Wadleigh's invitation, which was issued August 22: "An important subject to be discussed will be the matter of education of the consumer in the use of fuels other than anthracite, as it is felt that a systematic plan of public instruction can be made of great service in the practical and efficient use of such fuels and will thereby reduce the actual cost of heating, with resultant savings to the individual consumer and the community." In this connection attention has been directed to "Comparative Tests of By-product Coke and Other Fuels for House-Heating Boilers," by Henry Kreisinger, John Blizard, H. W. Jarrett and J. J. McKitterick, which was issued as Technical Paper No. 315 of the Bureau of Mines, last May.

The termination of the Atlantic City conference between representatives of the anthracite operators and miners Aug. 21 after only two days of a resumption of negotiations following the meeting with the Coal Commission served somewhat to lower the optimistic feeling in Washington, but did not destroy it. John Hays Hammond, chairman of the Coal Commission, immediately reported to President Coolidge, and has been in daily conference with the President since.

Members of the Coal Commission felt that they had nothing further to offer toward bringing together the anthracite groups, having laid the situation before the two sides at the New York meeting. It was stated by Chairman Hammond that the promised report fixing responsibility as between the operators and the miners probably would not be submitted to the President until after Aug. 31, in the event that there was continued failure to reach an agreement.

Nowhere in official Washington was weight given newspaper speculation as to the possibility of a walk-out in the

bituminous fields which are unionized in the event of cessation of operations in the anthracite fields. This speculation is minimized in Washington. It was pointed out, for one thing, that a strike of soft-coal miners would be unauthorized by the United Mine Workers of America, in the face of their contract in the bituminous fields, which does not expire until next April, and that men ceasing work under these circumstances would not receive strike payments from the union treasury.

At a conference of members of the Coal Commission with newspaper correspondents Friday, Chairman Hammond made a detailed statement of the reasons which he said caused him to feel optimistic over the situation.

Summed up, these are that a cessation of operations would prove costly to the operators, because their mines would have to be maintained in readiness to resume work whenever an agreement should be reached, while the market for their product for at least this winter would be destroyed, and possibly much of it taken away permanently by substitutes, while for the miners there would be unemployment during the period the mines were not producing, with possibly a reduction of employment thereafter if the market for anthracite were injured, as expected.

"But," said Chairman Hammond, "before the world war all intelligent men said that such a war would be impossible; yet it came. And I have known intelligent men to run amuck and I have known intelligent men to commit suicide."

Former Vice-President Marshall called attention to the fact that the price of anthracite has reached almost the breaking point, and that it is already a "luxury fuel."

Commission members stated that by Sept. 1 there will be in consumers' bins or in the hands of dealers 25,000,000 tons of domestic sizes of anthracite and that a supply of 1,000,000 tons of substitutes weekly will maintain the situation until Dec. 31. Unfortunately, Chairman Hammond stated, the supply in consumers' bins is not evenly distributed, so that the lack will fall most severely upon the poor who have not been able to lay in their stocks.

Competition, if nothing else, will keep the price of substitutes from mounting to dizzy heights, Chairman Hammond said. Bituminous coal mines have been operating only about 60 per cent of capacity, owing to lack of market, and the operators probably would be glad of an opportunity to increase this percentage at the same margin of profit.

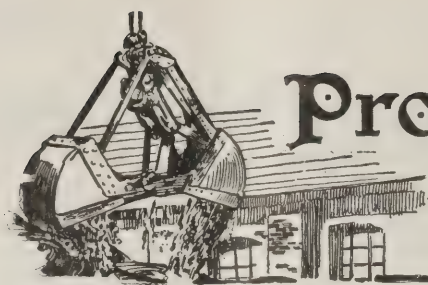
Julius H. Barnes, president of the United States Chamber of Commerce, issued a statement Sunday pointing out that the anthracite miners have rejected arbitration offered by the operators, which, he said, was "a challenge to a fundamental principle of American industrial relations."

The Coal Commission last week made public a report on "Cost of Production of Anthracite Coal," by David L. Wing and James E. Black, of its staff, the data having been used in a previous report by the Commission.

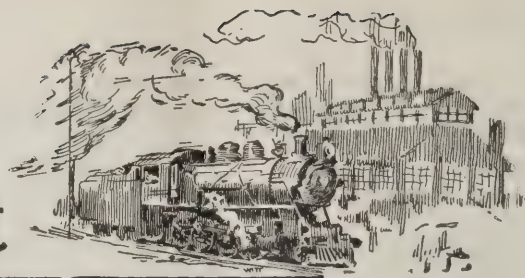
Searles Opposes Soft-Coal Emergency Plan

Ellis Searles, editor of the *United Mine Workers Journal* and personal representative of John L. Lewis, International president of the miners' union, has made an oral statement to John Hays Hammond, chairman of the United States Coal Commission, which is understood to have been in opposition to the bituminous operators' plan to supply the nation's fuel needs in an emergency such as would be brought about if the anthracite miners go on strike next month. No statement was forthcoming from the Commission on the matter.

ON ORDER OF THE DEPARTMENT OF THE INTERIOR the use of black blasting powder has been entirely discontinued in the Matanuska coal field in Alaska. Explosives listed as permissible by the Department of the Interior have been substituted in all operations.



Production and the Market



Weekly Review

Despite the uproar in the press over the possible effect of an anthracite strike on the bituminous-coal market, there is as yet little evidence of any effect on prices. It is true that throughout the Middle West the usual autumn buying of domestic soft coal has begun several weeks earlier than usual, but whether this is due to the threatened hard-coal strike or to a week of unusually cool weather in August is not clear.

Prices of soft coal advanced slightly here and there last week, and producers and shippers are talking about still higher prices for September deliveries. *Coal Age* Index of spot prices of bituminous coal at the mines advanced to 202 on Aug. 27 compared with 197 the previous week. The corresponding average price was \$2.44, a gain of 6c. in the week. The steam-coal market picked up in sympathy with the domestic grades west of the Alleghanies and in Pittsburgh. Practically every market, except New England, registered some degree of improvement in inquiry and buying. Where prices did not actually advance the market stiffened up with very little coal available at the lower prices quoted.

OUTPUT GAINS; TRANSPORTATION HOLDS UP

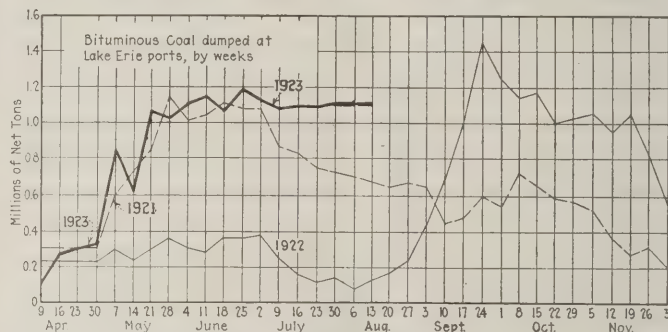
Production is increasing and unless car shortage develops the higher rate of output will soon flatten out the better prices that are in prospect. There are practically no reports of transportation shortage or difficulty in delivery of either hard or soft coal. There is less distress coal in every market and accumulations of "no bills" are disappearing. The market for smokeless is better in the West and has slumped notably at tide, mainly because New England is not buying.

The Lake movement is slowing up because the docks are nearly full of coal. The total Lake movement of bituminous coal to date this year exceeds any previous record for a like period of time. The total dumpings to Aug. 20 were 17,877,000, exceeding by more than 2,000,000 tons the record of 1921.

New England has been taking coal at a high rate this

year, the record showing 127,000 cars shipped all rail into that market from Jan. 1 to Aug. 18, exceeded only by 1918 and 1920. The water movement to New England in the first seven months of this year was 7,267,000 gross tons, exceeded for a like period only in 1918. Buying of soft coal in New England is now only in small tonnages and there is only lukewarm inquiry for coal next month. Constant pressure is required to induce customers to take monthly quotas on contract. The railroads in New England are now receiving the bulk of the soft coal.

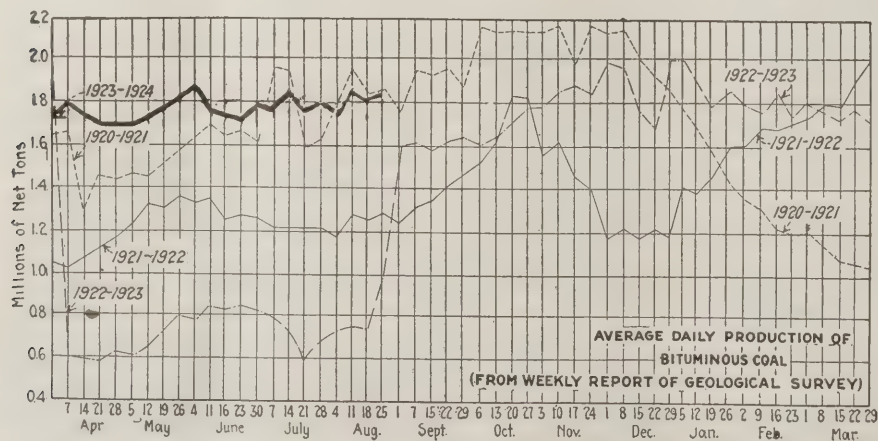
Production of anthracite dropped off about 200,000 tons in the week of Aug. 18 but passed the 2,000,000-ton



LAKE COAL DUMPED
(Net Tons)

	Week Ended Aug. 20	Season to Aug. 20
Cargo	935,882	16,955,167
Fuel	54,022	859,828
Totals	989,904	17,814,995

mark again last week. It is estimated by the government that more than 25,000,000 net tons of domestic sizes of anthracite will be in the hands of consumers or dealers by Sept. 1. This supply is some 7,000,000 tons more than was distributed by Dec. 31 last year and only about 17,000,000 tons less than the average supply to Dec. 31 in recent years. A strike of the anthracite



Estimates of Production

(Net Tons)

BITUMINOUS			
	1922	1923	
Aug. 4 (b)	4,313,000	10,564,000	
Aug. 11 (b)	4,606,000	9,853,000	
Aug. 18 (a)	4,609,000	10,813,000	
Daily average	768,000	1,802,000	
Calendar year	216,823,000	345,662,000	
Daily av. cal. year	1,109,000	1,772,000	
ANTHRACITE			
Aug. 4	29,000	2,018,000	
Aug. 11	40,000	1,735,000	
Aug. 18	38,000	1,858,000	
Calendar year	23,542,000	64,427,000	
COKE			
Aug. 11	112,000	327,000	
Aug. 18 (a)	120,000	336,000	
Calendar year	3,970,000	12,528,000	

(a) Subject to revision. (b) Revised from last report.

miners on Sept. 1 would thus leave a deficit of about 1,000,000 tons a week to be made up by substitutes, of which coke would furnish between 100,000 and 200,000 tons per week and bituminous coal the remainder.

Prices of furnace and foundry grades of beehive coke are up 25c. this week. The sharp recovery in the beehive coke market in the past three or four weeks is due to production and consumption being again in adjustment, if indeed production is not somewhat short of consumption. In July furnaces were blowing out, and ovens were not blown out quick enough, leaving some stocks to be absorbed and temporarily depressing the market. Apparently consumption is now equal to absorbing both the stocks and the current production.

Chicago Short of Smokeless

Conditions have changed for the better around Chicago. There are plenty of orders for every size domestic coal. Prices are holding firm to the circular and "no bills" are being rapidly cleaned up. Screenings also show im-

provement. West Virginia smokeless is becoming scarce in this city and Illinois and Indiana domestic sizes as a result are readily bringing the circular prices. Central Illinois domestic coal is in fair demand and western Kentucky is gaining in price.

No anthracite is now reaching Chicago and the present stocks will not last more than two weeks under normal conditions. Consumers are reconciling themselves to the fact that there will be a shortage of anthracite should there be no strike, and are considering substitutes.

Production is a little better than a week ago in the Southern field, following last week's evidence of a revival in the market. Central Illinois showed no material improvement, however.

There is no change in the Mt. Olive field. Production is low and demand has shown little improvement. Operators generally are carrying large amounts of no-bills and prices on domestic sizes range \$2.75@3.25 with steam egg quoted at \$2.25, steam nut \$2, mine-run \$2.20 and screenings \$1.35. In the Standard field an improvement in demand for domestic sizes is noted, but some operators are experiencing difficulty in moving steam sizes.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Aug. 21 1922	Aug. 13 1923	Aug. 20 1923	Aug. 27 1923†
Smokeless lump.....	Columbus....	\$6.10	\$5.85	\$5.85	\$5.75@	\$6.00
Smokeless mine run.....	Columbus....	6.00	3.00	3.00	2.75@	3.25
Smokeless screenings.....	Columbus....	5.90	2.35	2.35	2.25@	2.50
Smokeless lump.....	Chicago....	6.85	5.75	5.75	6.25@	6.50
Smokeless mine run.....	Chicago....	6.25	3.00	3.00	3.25@	3.50
Smokeless lump.....	Cincinnati....	5.75	6.00	6.10	6.00@	6.25
Smokeless mine run.....	Cincinnati....	5.50	2.75	3.00	3.00@	3.50
Smokeless screenings.....	Cincinnati....	5.15	2.85	2.75	2.50@	3.00
*Smokeless mine run.....	Boston....	8.70	5.60	5.30	5.00@	5.15
Clearfield mine run.....	Boston....	7.60	2.35	2.35	1.90@	2.50
*Cambria mine run.....	Boston....	8.75	2.85	2.85	2.50@	3.25
Somerset mine run.....	Boston....	8.00	2.60	2.60	2.25@	2.75
Pool 1 (Navy Standard).....	New York....		3.25	3.05	3.00@	3.50
Pool 1 (Navy Standard).....	Philadelphia....		3.45	3.40	3.00@	3.25
Pool 1 (Navy Standard).....	Baltimore....					
Pool 9 (Super. Low Vol.).....	New York....	8.00	2.45	2.55	2.25@	2.75
Pool 9 (Super. Low Vol.).....	Philadelphia....	8.25	2.75	2.75	2.40@	2.70
Pool 9 (Super. Low Vol.).....	Baltimore....		2.50	2.50	2.50	
Pool 10 (H.Gr. Low Vol.).....	New York....	7.50	2.25	2.20	2.00@	2.50
Pool 10 (H.Gr. Low Vol.).....	Philadelphia....	8.00	2.30	2.30	2.00@	2.35
Pool 10 (H.Gr. Low Vol.).....	Baltimore....	7.75	2.25	2.25	2.25@	2.30
Pool 11 (Low Vol.).....	New York....	6.50	1.80	1.85	1.75@	2.25
Pool 11 (Low Vol.).....	Philadelphia....	7.75	1.96	1.85	1.70@	1.90
Pool 11 (Low Vol.).....	Baltimore....	7.75	2.05	1.90	1.90	
High-Volatile, Eastern						
Pool 54-64 (Gas and St.).....	New York....		1.75	1.75	1.60@	1.95
Pool 54-64 (Gas and St.).....	Philadelphia....	6.60	1.85	1.75	1.65@	2.00
Pool 54-64 (Gas and St.).....	Baltimore....	7.50	1.75	1.85	1.85	
Pittsburgh se'd gas.....	Pittsburgh....		2.65	2.80	2.85@	3.00
Pitts. gas mine run.....	Pittsburgh....				2.40@	2.50
Pittsburgh mine run (St.).....	Pittsburgh....		2.05	2.05	2.15@	2.25
Pittsburgh slack (Gas).....	Pittsburgh....		1.55	1.55	1.50@	1.60
Kanawha lump.....	Columbus....	6.40	3.00	3.00	2.85@	3.25
Kanawha mine run.....	Columbus....	6.25	1.85	1.85	1.75@	2.00
Kanawha screenings.....	Columbus....	6.00	1.05	1.05	1.00@	1.15
W. Va. lump.....	Cincinnati....	5.35	3.00	3.25	3.25@	3.75
W. Va. gas mine run.....	Cincinnati....	5.35	1.60	1.70	1.65@	1.85
W. Va. Steam mine run.....	Cincinnati....	5.50	1.60	1.70	1.65@	1.85
W. Va. screenings.....	Cincinnati....	5.10	1.05	1.05	1.10@	1.35
Hooking lump.....	Columbus....	6.65	2.75	2.75	2.50@	3.00
Hooking mine run.....	Columbus....	6.25	1.85	1.85	1.75@	2.00
Hooking screenings.....	Columbus....	5.75	1.10	1.10	1.00@	1.20
Pitts. No. 8 lump.....	Cleveland....	6.10	2.55	2.60	2.30@	3.00
Pitts. No. 8 mine run.....	Cleveland....	6.10	2.05	2.05	2.10@	2.15
Pitts. No. 8 screenings.....	Cleveland....	6.10	1.25	1.20	1.30@	1.40
Midwest		Market Quoted	Aug. 21 1922	Aug. 13 1923	Aug. 20 1923	Aug. 27 1923†
Franklin, Ill. lump.....	Chicago....		\$3.90	\$3.90	\$4.00@	\$4.35
Franklin, Ill. mine run.....	Chicago....		2.85	2.85	2.75@	3.25
Franklin, Ill. screenings.....	Chicago....		1.65	1.65	1.50@	1.85
Central, Ill. lump.....	Chicago....		2.60	2.60	2.50@	2.75
Central, Ill. mine run.....	Chicago....		2.10	2.10	2.10@	2.35
Central, Ill. screenings.....	Chicago....		1.35	1.35	1.35@	1.50
Ind. 4th Vein lump.....	Chicago....		3.35	3.35	3.25@	3.50
Ind. 4th Vein mine run.....	Chicago....		2.60	2.60	2.50@	2.75
Ind. 4th Vein screenings.....	Chicago....		1.60	1.55	1.40@	1.75
Ind. 5th Vein lump.....	Chicago....		2.85	2.75	2.50@	3.00
Ind. 5th Vein mine run.....	Chicago....		2.10	2.10	2.00@	2.25
Ind. 5th Vein screenings.....	Chicago....		1.45	1.40	1.30@	1.50
Mt. Olive lump.....	St. Louis....		3.00	3.00	2.75@	3.25
Mt. Olive mine run.....	St. Louis....		2.00	2.00	2.00	
Mt. Olive screenings.....	St. Louis....		1.50	1.50	1.50	
Standard lump.....	St. Louis....		2.40	2.40	2.40@	2.65
Standard mine run.....	St. Louis....		1.85	1.85	1.75@	1.95
Standard screenings.....	St. Louis....		1.05	1.00	0.95@	1.05
West Ky. lump.....	Louisville....	6.00	2.30	2.20	2.35@	2.50
West Ky. mine run.....	Louisville....	6.00	1.65	1.75	1.95@	2.05
West Ky. screenings.....	Louisville....	6.00	1.05	0.90	0.90@	1.25
West Ky. lump.....	Chicago....	6.00	2.10	2.10	2.50@	3.00
West Ky. mine run.....	Chicago....	6.00	1.30	1.30	1.25@	2.00
South and Southwest						
Big Seam lump.....	Birmingham..	4.25	3.50	3.50	3.40@	3.65
Big Seam mine run.....	Birmingham..	4.25	2.00	1.95	1.75@	2.15
Big Seam (washed).....	Birmingham..	4.25	2.35	2.35	2.25@	2.50
S. E. Ky. lump.....	Chicago....	6.15	3.10	3.10	2.75@	3.00
S. E. Ky. mine run.....	Chicago....	6.00	1.80	1.80	1.60@	2.00
S. E. Ky. lump.....	Louisville....	5.90	2.85	2.85	2.75@	3.25
S. E. Ky. mine run.....	Louisville....	5.75	1.75	1.85	1.50@	2.25
S. E. Ky. screenings.....	Louisville....	5.65	1.00	1.00	0.85@	1.40
S. E. Ky. lump.....	Cincinnati....	5.90	3.10	3.25	3.00@	3.50
S. E. Ky. mine run.....	Cincinnati....	5.75	1.60	1.60	1.60@	1.85
S. E. Ky. screenings.....	Cincinnati....	5.10	1.10	1.05	1.10@	1.25
Kansas lump.....	Kansas City..		4.00	4.00	4.50	
Kansas mine run.....	Kansas City..		3.25	3.25	3.50	
Kansas screenings.....	Kansas City..		2.60	2.60	2.60@	2.75

* Gross tons, f.o.b. vessel, Hampton Roads.

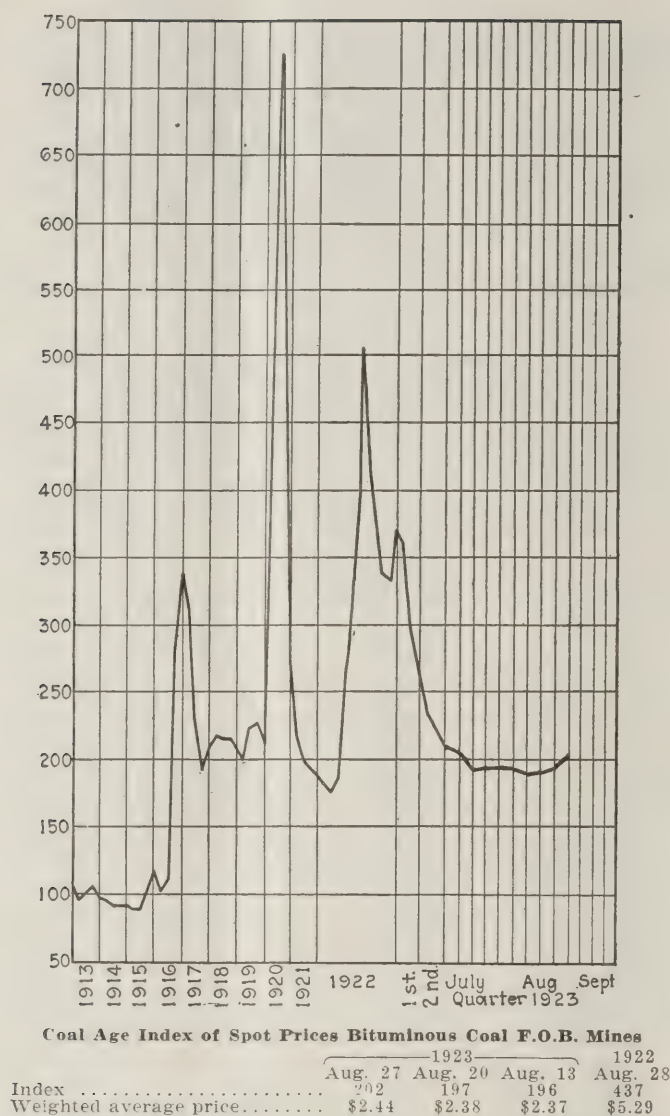
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Aug. 20, 1923		Aug. 27, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia....	2.39		7.90@ 8.10		7.90@ 8.10		7.90@ 8.10
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 12.50	8.00@ 8.35	\$8.50@ \$13.00	8.00@ 8.35
Egg.....	Philadelphia....	2.39	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35	\$8.50@ 13.50	8.00@ 8.35
Stove.....	Philadelphia....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 12.50	8.00@ 8.35	\$8.50@ 13.00	8.00@ 8.35
Chestnut.....	Philadelphia....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Ranges.....	New York.....	2.34		8.25		8.30		8.30
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.50	6.00@ 6.30	6.75@ 8.50	6.00@ 6.30
Pea.....	Philadelphia....	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	3.00@ 3.50	3.50@ 4.15	3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia....	2.14	5.00	4.00	3.50	3.50	3.50	3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	2.25@ 2.50	2.50	2.50	2.50
Rice.....	Philadelphia....	2.14	2.50@ 2.75	2.75@ 3.00	2.50	2.50	2.50	2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.25 1.50	1.50	1.50	1.50
Barley.....	Philadelphia....	2.14	1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye.....	New York.....	2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

St. Louis Has No Interest in Strike Talk

Owing to cooler weather and more favorable unloading conditions, dealers are finding it easier to move their tonnages with a slight increase in the domestic demand. As usual, this early demand is for southern Illinois domestic sizes. The threatened strike in the anthracite fields has had no effect on the demand for anthracite in the St. Louis market. Dealers are well supplied, in view of which late buyers are showing little or no interest in the matter of their supply. Very little demand for smokeless or coke has appeared locally. There is an increased demand from country points for both southern Illinois and Standard coals with no change in local retail prices.

The fall season is making itself felt on the western Kentucky market. Operators are holding prices more firmly and there is a marked reduction in distress coal.

Louisville Market Unsettled

Guessing as to future conditions, especially as to the effect of the anthracite situation, if a strike materializes, has disturbed this market. A lot of operators, claiming to be sold up for a week or ten days, are not especially in need of business, and are only quoting the high side of the market quotation range, and in some cases adding 25 to 50c. to even that price for September delivery.

It is reported on good authority that some of the operators in southeastern Kentucky, in the Straight Creek and Jellico fields are quoting \$3.75@\$4 a ton on prime block coal, but \$3.50 appears to be the top of the market on such coal in the Louisville district, and not much block from eastern Kentucky is selling above \$3.25, with some sales made at around \$3. Western Kentucky prices are firmer on the local market, and as some operators are fairly well sold up, quotations are firmer. Industrial buying is better, especially in the South.

Soft Coal Declines in Northwest

The rush for anthracite which has been on in the Northwest for some time has finally spread to the cities, which have been quite backward until lately. The hard-coal situation is fairly satisfactory in the Twin Cities. There has been received this season at Lake Superior ports in the neighborhood of 800,000 tons of hard coal—perhaps two-thirds to three-quarters of an ample supply for a full winter, depending on its severity.

The fight for business has brought about some very low figures on Illinois coals, and the quotations named are more or less nominal, ranging from around \$3.50 down to \$3 at the mine as the exigency seems to require. Kentucky coal is going into the local market on the same policy of "get the business," with prices even lower than the Illinois figures.

The anthracite market is active in Milwaukee, for if there is a strike Milwaukee faces the prospect of pulling through the coming winter with only half of its normal supply of hard coal. There is anthracite on the docks for six weeks or two months under normal demand, but a general rush of orders would soon wipe out the supply. Receipts of soft coal by lake are slowing down, due to the fact that there is little storage room left on the docks.

Cargo receipts at Milwaukee up to date aggregate 575,710 tons of anthracite and 1,755,920 tons of soft coal. These figures match up fairly well with the receipts during the corresponding period of 1921. The outlook is that the docks will go into the winter with more than a normal supply of soft coal and more than enough to meet any deficiency in anthracite.

Soft-coal prices have taken another drop at Duluth. Prices of Youghiogheny and Hocking, which are indicative of the general trend, are off \$1 from the opening price this year. Pocahontas is off \$2. Anthracite holds firm and is in much demand.

Screenings are a drug on the market. Dock men are not anxious to hold them any longer than necessary and buyers feel that there may be further reductions before the weather gets really cold. There is much interest in substitutes for hard coal and a demand is evident for Pocahontas.

The Southwestern market continues steadily, if somewhat slowly, to improve. Few mines closed early in the summer have been reopened, but those that were kept in operation through the summer are working three days a week.

Utah operators are gaining steadily on working time, now averaging three days a week. Prices remain the same as last week. Slack is moving at a fair pace and bringing an average of \$1.25 at the mine. Utah production in July was 355,000 tons compared with 374,934 in that month last year.

Strike Talk Stiffens Cincinnati Market

Strike talk and a blast from John L. Lewis seem to breathe more strength into the Cincinnati market than any other known invigorative. Within the past week there has been a general righting of sails and business took on the biggest spurt of activity since last March or April.

There have been material advances in prices by operating companies who are filled up with business for August and who are going slow about taking on more business than can be cared for in the next couple of weeks. Slack showed the best improvement of the bituminous while domestic lump also has picked up.

River business has been favored by rains but artificial means to get the barges down is still in use. With the exception of slack there has been no change in Cincinnati

retail prices—which are: Smokeless lump, \$10.50@11; mine-run, \$7.75@8.25; bituminous lump, \$7.50@8.50; slack, \$5@5.50.

Production in the Hocking, Cambridge, Jackson and Pomeroy fields is about 20 to 25 per cent. The No. 8 field, on the other hand, made a new record for a week's production with 460,000 tons the week ended Aug. 18, which is about two-thirds capacity.

Transportation facilities continue ample, cars being available to the extent that they are ordered—practically a 100-per cent car supply. No market as a factor is diminishing.

Bituminous coal receipts at Cleveland during week ended Aug. 18 show a slight decrease from the preceding week, which was heavy. Total arrivals were 1,812 cars, divided 1,299 for industries and 513 for retailers.

Coke Prices Advance

On a general average in the Pittsburgh field mine-run and lump steam and gas are up about 10c. in the week, with steam slack up 5c. and gas slack no stronger. Youghiogheny gas lump, quotable up 15c. last week, has advanced about 10c. more to a range of \$2.85@\$3. At the moment most of the business is going at close to \$2.85. Gas mine-run is quotable at \$2.40@\$2.50, or 5c. advance, while gas slack is \$1.50@\$1.60 and not overly strong at that, so that if anything gas slack has weakened. Steam mine-run, quotable lately at \$2.00@\$2.15, with but little doing at under \$2.10, is now fairly steady at \$2.15@\$2.25. While the advance on paper is 10 to 15c. the increase in average realized prices at 5@10c. Steam lump is slightly higher, at \$2.40@\$2.50. Steam slack is quotable again at \$1.30@\$1.40, having recovered the 5c. loss reported a week ago.

The spot coke market has advanced about 25c. in the week. Furnace coke, quotable a week ago at \$4.50@\$4.75, according to grade, is now at \$4.75 as minimum, with a number of sales known to have been made at \$4.90 and conjectures that \$5 had been paid in a few cases, while the usual asking price is \$5.

Interest Lukewarm in New England Market

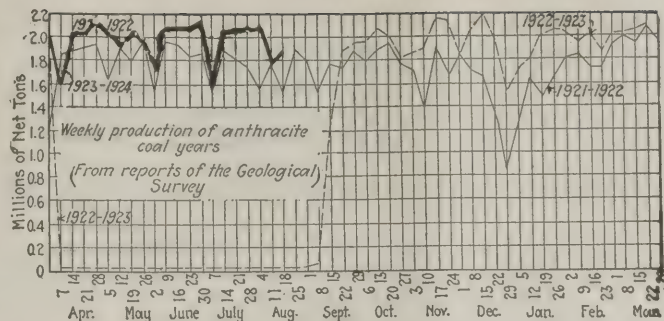
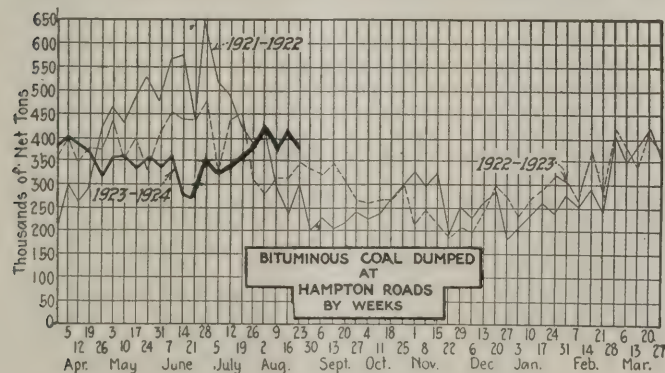
The prospect in New England for screened coal is not encouraging. Accumulations at Hampton roads are heavier than at any time since June and quotations are softer than even a week ago. No. 1 Navy standard coal has sold down to \$5 per gross ton f.o.b. vessel, and while there were sales early in the week at \$5.25 the range is now \$5@\$5.15. Pool 2 coals have sold within a few days at less than \$5.

Practically all the shippers from central Pennsylvania need business for September and while there is little disposition to operate at less than cost there is reason to suppose that distress coal may soon put in an appearance at the New York and Philadelphia piers. The railroad terminals already have on hand more coal than loading orders call for and a marked falling off in tonnage is expected.

In connection with a possible anthracite tie-up much is being said about the use of bituminous as a substitute, but in this territory it will take a real emergency to induce even the dealers to take on any considerable reserve supply.

East Buys Welsh Anthracite

Inquiry for Welsh anthracite is growing and orders have been placed for New York delivery at close to \$12 New York harbor. One English firm reports having booked orders for about 100,000 tons of Welsh anthracite to points along the



Atlantic seaboard from Newfoundland to New York for shipment during September, October and the early part of November. Orders for shipment later than the early part of November have been refused. The largest portion of the tonnage already booked has been for Boston interests. Other shipments were reported as having been booked for New York delivery at around \$12.50 c.i.f. and for Boston at \$12.75@\$13.50.

Export demand is quiet. Quotations for Pocahontas, New River and Kanawha gas coal showed declines from last week. No new business was reported in most quarters although Canada was reported as in the market for gas coals. A contract for 20,000 tons of Fairmont gas coal for French Railways was reported as having been closed with a New York house at \$6.50 c.i.f. Rouen, Nantes and LaPallice.

Interest in the soft-coal market in New York centered around screened and prepared bituminous coals as substitutes for anthracite last week. Inquiries were numerous and considerable business was placed.

Nearly all local houses reported inquiries for screened and prepared bituminous coal, as well as for coke. Quotations for high-volatile nut coal ranged \$2.50@\$3.25 f.o.b. mine; low-volatile screened coals \$2.75@\$3.25; Broad-top egg, stove and nut around \$5.30; low-volatile prepared coal, \$5.75@\$8 and high-volatile screened coal \$6@\$6.25.

All grades of coke were in strong demand and shippers reported many orders placed. Quotations ranged about as follows: Medium sulphur furnace, \$5.50 f.o.b. ovens; stove and egg, \$6.50@\$7; nut, \$5.50@\$6.50; run of oven, \$5@\$5.50, and pea coke \$4.50@\$5.

Dealers in Philadelphia are spreading around every car of anthracite received by cutting orders down. Their main object is to give all of their customers at least some coal to start with when the coal-burning season arrives.

The point has not yet been reached where the Philadelphia consumer is willing to take substitutes. This has always been a most difficult city in which to induce the consumer to take coke and bituminous in lieu of anthracite.

Steam sizes are still well sold, but all depends on the outcome on Sept. 1, for if work continues there will then be a surplus.

A slight increase in export coal movement has come at Baltimore following the slump of two weeks ago. The amount exported for the week ended Aug. 18 was approximately six times greater than that shipped from this port to foreign countries during the week previous. There also was one coke shipment cleared during the first-named period.

The coal trade in Birmingham is still suffering from a lack of satisfactory demand for commercial coal. Consumers are buying a few cars at a time where dependent on the spot supply and are not taking care of their needs beyond the immediate future. Trade in bunker or export is very quiet.

Car Loadings, Surpluses and Shortages

	Cars Loaded—	
	All Cars	Coal Cars
Week ended Aug. 11, 1923.....	973,162	177,259
Previous week.....	1,033,130	190,531
Same week in 1922.....	842,690	82,898
	Surplus Cars—	
	All Cars	Coal Cars
Aug. 14, 1923.....	78,404	6,293
Same date in 1922.....	153,880	118,044
Aug. 8, 1923.....	74,168	6,546
		Car Shortage
		8,315
		4,193
		10,149
		4,897

Foreign Market And Export News

British Coal Prices Hold at Steady Level, Though Welsh Outlook Is Unsettled

Though the outlook in Wales is unsettled, business is active enough to maintain prices at a steady level. The operators are cautious in view of the possibility of a strike in the United States anthracite field and also because of an intimation that Belgium is about to stop the export of coal. The Welsh pits have sold the bulk of their anticipated output for the next few months, and the operators, on the whole, are optimistic on the prospects for the rest of the year.

During the week ended Aug. 11 British collieries produced only 3,566,000 tons, according to the official reports, a decrease of 1,688,000 tons from the previous week's total of 5,254,000 tons. The falling off is accounted for by bank holiday week.

France and Italy are buying slowly, but business with Belgium, Spain and South America is good. The Great Northern Railway of Ireland is in the market for 50,000 tons of locomotive coal for delivery over the next six months, or alternatively 100,000 tons over the next twelve months.

The anthracite market is quiet, but heavy orders have still to be filled for Belgium and France. A steady business is being maintained with Canada.

The Newcastle market is quiet. The European situation is making itself felt and the Continent is buying slowly. Forward business is dull. Orders placed include Amsterdam gas works, 40,000 tons Durham gas coals for delivery August-November; Helsingfors gas works, 7,500 tons Wear special gas at 33s. c.i.f., delivery September-October; two orders for best steams at 31s. 9d. c.i.f.

French Imports of British Coal Fall Owing to Exchange Rate

During the last week arrivals of British coals in France showed a marked decrease, the reason being that actual quotations for such coals are absolutely prohibitive, owing to the rates

of exchange. There is a feeling that some other kind of fuel must be obtained to solve the problem, but this cannot easily be found.

On the whole the position of the French coal market remains unchanged. Offers of industrial coals practically meet the demand. The inquiry for house coals is quite dull for the time being and retailers are with difficulty replenishing their stocks for the coming winter.

Much interest is manifested in whether export permits for coal become operative in Belgium, as exportation is a vital point for Belgium, which is producing much more coal than she can ever have needs for. A meeting of the Charleroi collieries was to take place Aug. 27, with a small increase in prices likely to ensue. The men are coming back from the fields to the pits.

Reparation deliveries of fuel to France and Luxemburg improved during the latter part of July, the figures being coal, 182,300 tons; coke, 160,200 tons (17 per cent distributed to Luxemburg); lignite patent fuel, 6,300 tons, or a total of 349,700 tons, as against 465,300 tons for the month of June.

French supplies of coke for the first thirteen days of August have amounted to 51,000 tons or a daily average of about 3,920 tons. Should this continue, purchases of foreign cokes could then be avoided.

Coal Paragraphs from Foreign Lands

Assistant Trade Commissioner Charles B. Spofford, at Calcutta, reports the total output of coal in British India during 1922 to be 18,168,988 tons as compared with 18,358,934 tons in 1921.

A cable from Assistant Trade Commissioner W. E. Embry, at Santiago, to the Department of Commerce, at Washington, says that lower prices, together with lower freight rates, permit coal from the United States to compete successfully against Australian coal in Chile.

Export Clearances, Week Ended Aug. 25, 1923

FROM BALTIMORE

For West Indies:	Tons
Am. Sch. Ellen Little	1,174
For Italy:	
Br. SS. Betwa	5,903
For France:	
Br. SS. Hinderstan	7,650

FROM HAMPTON ROADS

For Italy:	
Ital. SS. Emanuele Accame, for	
Porto Farrajo	11,255
For Holland:	
Br. SS. Sunheath, for Rotterdam	7,886
For Spain:	
Br. SS. Nile, for Porto Vecchio	8,167
For France:	
Nor. SS. Mexicano, for a French	
Port	4,310
For Cuba:	
Nor. SS. Krosfond, for Havana	3,126
For West Indies:	
Br. SS. Manaqui, for Kingston	3,278
For Holland:	
Br. SS. Turkestan, for Amsterdam ..	6,826

FROM PHILADELPHIA

For Cuba:	
Nor. SS. Svartfond, for Havana	—

United States July Domestic Coal Exports

(In Gross Tons)

	Month of July 1922	1923
Coal		
Anthracite	16,698	455,370
Value	\$150,032	\$4,852,564
Bituminous	366,287	2,278,241
Value	\$2,011,523	\$11,679,570
Coke	27,686	60,462
Value	\$251,669	\$600,728

Seven Months Ended July
1922 1923

Coal		
Anthracite	1,020,830	2,827,629
Value	\$10,587,367	\$30,631,007
Bituminous	4,666,196	11,448,917
Value	\$24,395,672	\$65,695,204
Coke	194,688	738,003
Value	\$1,732,244	\$8,407,287

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	Aug. 16	Aug. 23
Cars on hand	1,443	1,476
Tons on hand	83,024	85,715
Tons dumped for week	177,636	114,392
Tonnage waiting	1,000	12,000

Virginian Ry. piers, Sewalls Pt.:

Cars on hand	2,140	2,024
Tons on hand	122,560	115,140
Tons dumped for week	75,820	103,708
Tonnage waiting	0	14,963

C. & O. piers, Newport News:

Cars on hand	1,815	1,515
Tons on hand	94,125	80,355
Tons dumped for week	110,437	129,590
Tons waiting	9,410	17,710

Pier and Bunker Prices, Gross Tons

	PIERS	
	Aug. 18	Aug. 25†
Pool 9, New York	\$5.35@ \$5.75	\$5.25@ \$5.75
Pool 10, New York	5.00@ 5.25	4.75@ 5.00
Pool 11, New York	4.65@ 4.85	4.50@ 4.75
Pool 9, Philadelphia	5.30@ 5.70	5.25@ 5.65
Pool 10, Philadelphia	4.55@ 5.30	4.60@ 5.20
Pool 11, Philadelphia	4.15@ 4.75	4.15@ 4.75
Pool 1, Hamp. Roads	5.15	5.25
Pools 5-6-7, Hamp. Rds.	4.90	5.00
Pool 2, Hamp. Roads	5.10	5.15

BUNKERS

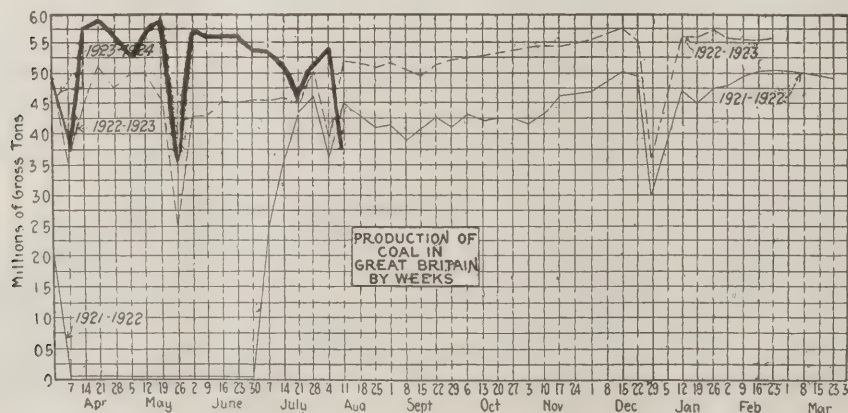
Pool 9, New York	5.65@ 6.05	5.55@ 6.05
Pool 10, New York	5.30@ 5.55	5.05@ 5.30
Pool 11, New York	4.95@ 5.15	4.80@ 5.05
Pool 9, Philadelphia	5.65@ 6.00	5.60@ 6.00
Pool 10, Philadelphia	4.90@ 5.65	5.00@ 5.60
Pool 11, Philadelphia	4.35@ 5.00	4.50@ 5.00
Pool 1, Hamp. Roads	5.25	5.25
Pool 2, Hamp. Roads	5.10	5.15

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Aug. 18	Aug. 25†
Admiralty, large	30s. @ 31s.	29s. @ 30s.
Steam smalls	19s. @ 20s.	19s. @ 21s.
Newcastle:		
Best steams	22s. 6d. @ 26s.	22s. @ 24s.
Best gas	24s. @ 25s.	23s. @ 24s.
Best bunkers	23s. @ 24s.	20s. @ 21s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

The Tennessee Coal, Iron & R.R. Co. plans erection of 350 bungalows at Fairfield.

The Alabama Iron & Coal Co., a Delaware corporation, dealers in coal, iron and other minerals and mineral rights, has established a branch office in Birmingham.

The I. O. Drewry Contracting Co. has purchased a large steam shovel for its stripping operations at Sunlight. This equipment weighs 340 tons and is capable of moving 500 cu. yd. of material per hour. The company also is constructing a 300-ton washery.

J. H. White, who has been district manager of the Senet-Solvay Co. for a number of years at Birmingham, has been promoted to the position of assistant manager of the coke department and will have headquarters in Syracuse, N. Y. Mr. White will be under A. F. Hilleke, formerly district manager at Birmingham but for several years general manager of the coke department of the corporation. It is announced that no one will be appointed to fill the position vacated by Mr. White, local superintendents at Ensley, Holt and Chattanooga reporting direct to the head officials at Syracuse.

C. P. Moore, who has been superintendent of the Empire Mines, formerly operated by the Empire Coal Co., but recently merged with the DeBardeleben Coal Corporation, has resigned his position at Empire and, effective Sept. 1, will become general manager of the Pratt Fuel Corporation, owned by the Walter Moore interests, formerly operating the Empire Mine.

COLORADO

The Canon District Coal Co. has been incorporated in Canon City, with a capital stock of \$50,000, by James L. Morgan and John Lippis.

ILLINOIS

The Paradise Coal & Coke Co. has resumed operations at Paradise after several weeks' shutdown for repairs.

Hanna City Mining Co., Peoria, has been incorporated with a capital of \$20,000. Incorporators, Cass F. Balm, L. E. Kauffman, J. F. Bartley.

Chicago Williamson Coal Co., Chicago, has been incorporated with a capital of \$10,000 to buy, sell and mine coal and other fuel. Incorporators, W. M. Stephenson, J. S. Bash, William J. Bash.

Mine No. 1 of the Wasson Coal Co., near Harrisburg, has resumed work after being idle since June 1. A new steel tippie was erected at the mine during the shutdown and is now practically completed ready for operations.

The Republic Coal & Coke Co. will handle the output of the recently organized Hanna City Mining Co., which has purchased the Hanna City mine of the Clark Coal & Coke Co. R. R. Ronk, of Peoria, is president of the Hanna City Co.; C. F. Salm, vice-president, and L. E. Kauffman, secretary and treasurer. Both Mr. Kauffman and Mr. Salm are connected with the Republic company.

Dr. F. C. Honnold, secretary of the Illinois Coal Operators' Association, is trying to obtain the endowment of a research scholarship in the college of engineering at the University of Illinois, to further advance the science of coal mining. In an announcement he states that the late Prof. H. H. Stoeck had urged such action and that Professor Stoeck's successor, Prof. A. J. Hoskins, is desirous of seeing it carried out. It is also brought forth in the circular that various industries, among them the electric, the steel, the telephone and the cement, are doing exactly the same thing with notable results. The scholarship would be in the form of a post-graduate scholarship and would cost \$600 a year. One-half of such a student's time would be devoted to research and the other half to his advanced studies. This is in line with the idea advanced by the Taylor Coal Co. of establishing endowments to put students through school with a view of developing technical mining engineers.

The Valier Coal Co., at Valier, has resumed work after a shut down of more than three weeks. Repairs and improvements were made about the plant during the intervening time.

INDIANA

Less than 73 per cent of the mines in the Terre Haute, Princeton and Sullivan coal fields are working as much as half time at present, according to a survey. The estimate was based on reports made on 123 mines in the field. A compilation of figures shows that during July American mine No. 1 of the Knox Consolidated Coal Co. hoisted the greatest tonnage—96,143 tons of coal. The mine was operated seventeen and one-half days. The best record for steady work was made by the Maumee Collieries mine No. 7, which operated 22½ of the 26 working days in the last month. The reports show that during July 1,219,628 tons of coal was mined at the three fields. Lack of orders was given as cause for the idleness of the mines.

Several thousand dollars damage was done at the Deep Vein mine between West Terre Haute and St. Mary of the Woods, Ind., recently when a fire, thought to have been caused by spontaneous combustion, burned away the entire tippie. Bruce Jeffers, top boss, was painfully injured in fighting the fire, by falling from the top of the tippie onto a pile of slack. A hose company was sent to the scene, but was handicapped by the lack of water at the mine. The supply in the cistern provided for fires was quickly exhausted and the city firemen were compelled to allow the fire to spread unhampered. The place has been idle for about a month.

A receiver for the Love Coal Co., Anderson, is asked in a complaint brought in the Superior Court by Charles L. Runyan Co., wholesale dealers in coal at Terre Haute. The Terre Haute firm alleges that the Love Coal Co. owes it \$10,000 and that a change in ownership was made without notice to creditors.

Star City Coal Mining Corporation, Indianapolis, has been incorporated with a capital of \$300,000; directors, Edward J. Boleman, Paul Kirk and Burrell Wright.

KENTUCKY

The Rowe Coal Co. has been incorporated in Madisonville by Lee S. Rowe, H. D. Rutledge and Daniel Kirkwood.

The Jerico Coal Co. has been incorporated in Whitesville with a capital of \$50,000, by W. Minter, Memphis, Tenn.; B. D. Williams, Jr., and Dolph Woodruff, of Mannington, Ky.

Western Kentucky coal companies in an effort to give the Northwest the sizes of prepared coal desired, are spending a lot of money on rescreening plants and boom loaders. The Black Diamond Coal Mining Co., Drakesboro, Ky., has installed a plant, and placed it in operation. The Rockport Coal Co., Rockport, Ky., Pacific Coal Co., Mercer, Ky., Holt Brothers Mining Co., McHenry and the Gibraltar Coal Co., Central City, also have installed such systems. The latter company installed two, one at its Brownie mines and the other at its Gibraltar mines.

An interesting case was settled last week when Chancellor Davis W. Edwards handed down an opinion in litigation between the Louisville & Nashville R.R. and Charles S. Nield, president of the Edgemont Coal Co., the railroad being awarded judgment of \$11,482.57, less a credit of \$457.33. The suit dates back to 1914, over the building of a spur track by the railroad to the Edgemont Coal Co., properties in Bell County, the question argued being whether the coal company had entered a contract whereby it would pay cost of construction of the track or a given part of it. A letter written by the late Milton H. Smith, president of the road, detailing the question of paying for the track, was construed by Judge Edwards as a contract, and he said that the letter had been accepted by the coal company, which would be bound by its provisions.

MICHIGAN

During July, 2,771,709 net tons of soft coal and 353,924 net tons of anthracite passed through the canals at Sault Ste. Marie. Of this tonnage 2,757,269 tons of soft coal and 349,424 tons of hard coal passed through the United States canal. The balance passed through the Canadian canal.

MISSOURI

The shaft for a new coal mine that is being sunk by Thomas Wood, west of Kirksville, is now down to 90 ft. The vein of coal is about 45 in. thick.

The Mendota Mining Co. has been incorporated in St. Joseph with a capital of \$200,000, to engage in the coal mining business, by B. C. Collins, J. J. Casey and J. H. Karnes.

A. E. Marriott and Evan Jones have obtained options on a tract of coal land near Higbee, and drilling machinery has been placed on the ground to test out the lease for the opening of a shaft. A switch will be built later to join that of the Walton Coal Co.

MONTANA

The Gilbert-Crawford Coal Co., of Round Up, is getting under way with a new property and expects to be shipping coal soon. This company was organized recently by Charles A. Crawford, formerly city passenger agent for the Northern Pacific at Helena, and Walter Gilbert of Minneapolis, Minn. Harry Bronstein, of Minneapolis, is one of the vice-presidents. Fred K. Huston, of Helena, is chief engineer and W. D. Hungate, of Helena, is secretary-treasurer.

NEBRASKA

What is said to be an extension of the coal fields of Kansas is believed to have been discovered near Auburn. A test well for oil was being sunk when the vein of coal was encountered. It is said to be large enough to warrant its mining on a paying basis.

NEW YORK

Sealed proposals will be opened, by the Superintendent of Lighthouses, Staten Island, N. Y., 2 p.m., Sept. 7, 1923, for approximately 1,800 tons bituminous steam coal during October, November and December, 1923, in quantities as required, trimmed in vessels' bunkers under contractor's coal chute, New York Harbor. Information on application.

D. R. Lewellyn, Merritt, Price, Ltd., miners and shippers of Cardiff coals, have removed their offices from 44 Whitehall street to the 11th floor of the Whitehall Building, 17 Battery Place, New York City. The office is in charge of W. H. Kelynack.

OHIO

After one week of existence under the title of the Swa-wood Coal Co., the name of this company has been changed to the Swain Coal Co., with practically the same personnel it started with. Its offices are in the Union Central Building, Cincinnati.

The Midvale Goshen Coal Co., of Cleveland, is erecting a complete steel four-track tippie at Wainwright. Roberts & Schaefer Co., of Chicago, are the contractors.

Hugh McVeagh, assistant general manager of the Big Four railroad and in charge of the fuel department of that road, resigned recently to become affiliated with a coal company operating through Cincinnati.

Geo. D. Cameron, Inc., Cleveland, has been chartered with an authorized capital of 2,000 shares, no par value designated to mine, buy, and sell coal and coke. Incorporators are George D. Cameron, Elizabeth Cameron, Winifred Cameron, W. H. Dickey and George B. Young.

The Kehota Coal Mining Co., which has headquarters in Pittsburgh and a large stripping operation at Redfield, near New Lexington, has suspended operations entirely owing to lack of orders.

The High Peak Coal Co., of Columbus, has been chartered with a capital of \$75,000 to mine and sell coal in various fields by Ralph G. Martin, R. McMurray, John W. Bricker, Ralph E. Marburger and E. H. Hauck.

The Blue Flame Coal Co., of New Lexington has been chartered with a capital of \$25,000 to operate in the Hocking Valley, by Sheldon Kinsel, R. W. Murray, Raymond Diller, T. M. Potter and Thomas Ward.

The Board of County Commissioners at Columbus has rejected all bids opened Aug. 8 for approximately 3,000 tons of mine-run coal for various county departments, as too high. It has been decided to purchase the supply on the open market for the present.

Asking appointment of a receiver for the Union Coal Stripping & Mining Co., of Cleveland, and also foreclosure of a \$204,580 mortgage on the property, B. D. Northrup, of Washington, Pa., recently entered suit in Belmont County Common Pleas Court against the company.

The Heinman Coal Co. has been chartered with a capital of \$50,000 to mine and sell coal in the Massillon field. The incorporators are August Heinman, Albert Heinman, Joseph A. Seifert, Albert H. Ess and Felix R. Shepley.

A. P. DeVennish, who has been in charge of the coal department of the Hocking Valley Products Co., for about a dozen years, has resigned to become sales manager of the Jay Miller Coal Co., Columbus. Mr. DeVennish has purchased an interest in the company.

W. J. Buchanan, superintendent of the Willis-Harlan Coal Co., was seriously injured while in the mines and was taken to the hospital in Pineville, according to advices that reached the Kentucky Fuel Co. in Cincinnati, which controls the Willis-Harlan Operations.

A general sales office of the Universal Coal Co. has been opened in Cincinnati, in charge of W. J. Richardson, vice-president, to take the place of those which were maintained at Price Hall, W. Va., where the seven operations of the company are located in the New River district. Eastern sales offices have been located at Richmond, Va., for some time and will not be disturbed.

Appointment of a receiver for the Union Coal Stripping & Mining Co., a \$4,500,000 Cleveland concern, and foreclosure of a \$204,580 mortgage on the company's property were asked in a suit filed in Belmont County Common Pleas Court, July 18. The suit was brought by B. D. Northrup, owner of a Washington (Pa.) foundry, holder of the mortgage.

The Groff-Sharshall Mining Co., chartered several weeks ago with an authorized capital of \$75,000, has taken over the properties of the Consolidated Mining Co., located near Shawnee. The properties consist of five openings and are being operated on a lease basis. Albert L. Groff has been named president and John S. Sharshall, secretary and treasurer. The Consolidated Mining Co., of which Henry Watkins is at the head, has moved into smaller quarters in Columbus, where a general jobbing business will be conducted. K. W. Rittenhouse, sales manager of the Consolidated Mining Co., has resigned, effective Sept. 1.

In an effort to stamp out the I.W.W. propaganda which has been freely circulated among miners in eastern Ohio of late, the district board of sub-district 5, United Mine Workers of Ohio, has suspended **Joseph Bryan** from the union for six months, sustaining Frank Ledvinka, president of the sub-district, who sanctioned not only Bryan's discharge from the plant at Stewartsville where he was working but also his suspension from the union when Bryan and other I.W.W. sympathizers fomented a strike at the plant of the Cleveland & Western Coal Co. and sought to prevent miners from returning to work after the strike was settled.

The American Export & Inland Coal Co. has announced that it intends to liquidate. In its place the Black Diamond Coal Mining Co. has been formed by the six operating companies in eastern Kentucky that have controlled the affairs of the company that passes out. The American Export & Inland Coal Co. was an Ohio corporation formed to take over the business of the American Export & Inland Coal Corporation in Huntington and Cincinnati. This organization figured prominently in the Ford coal deal when the Detroit manufacturer decided to close down his plant as a slap at the coal brokers. The operators found it necessary to take over the corporation in order to get their money. H. E. Mahan will be the president of the Black Diamond company and L. M. Birk its secretary and H. K. Howard general manager. Ernest Heasley and E. C. Randolph have stepped out.

The Dominion Coal Co. Columbus, has been chartered with a capital of \$25,000 to mine and sell coal and also to do a jobbing business in coke. The incorporators are K. W. Rittenhouse, L. C. Rittenhouse, D. F. Shafer, R. S. Oxley and Carl H. Valentine. The company will open offices at 16 East Broad St., in rooms formerly occupied by the Ohio & West Virginia Coal Co. A general jobbing business will be conducted and

a number of mine connections have been made. K. W. Rittenhouse was formerly sales manager of the Consolidated Mining Co., of Columbus.

OKLAHOMA

The Sullivan Machinery Co., Railway Exchange Building, St. Louis, announces that its Oklahoma branch office and warehouse have been moved from Henryetta to Muskogee in order to serve the coal industry to better advantage in that territory. The new office is at 428 North Second Street and Lysle D. Chase continues as local manager.

PENNSYLVANIA

C. F. Barrett, assistant sales manager of George E. Henry & Son, of East Brady, has resigned his position and intends to enter college.

Business in the Connellsville coke region seems to be picking up a little, and inquiries are more numerous, probably in anticipation of an anthracite strike. The Superior Coal Co., which had been idle for over a month, has resumed operations. The American Coke Corporation is firing 70 of the 142 ovens at the Linn plant, which has been practically idle for a few weeks.

Cosgrove & Co., large operators and shippers of fuel, with main offices in Johnstown, have purchased the **R. L. Sprout** mine operations and coal holdings near Windber. A new firm has been organized which will be known as the Windber Standard Coal Co., with H. J. Meehan as president and John C. Cosgrove, president of Cosgrove & Co., as secretary-treasurer of the new firm. A charter has been applied for. The new firm has taken charge. The coal is of the best quality in central Pennsylvania.

In filing appeals from tax assessments in Cambria County, the Blubaker Coal Co., owning 8,000 acres of fuel land in the county, and the Clearfield Bituminous corporation, which control 12,000 acres, set forth that the amount of taxes assessed against their lands exceeds the amount of the royalties collected annually on leases in which the owners assumed the burden of paying the taxes. The royalties were fixed years ago when the valuations were exceedingly low. Judge John E. Evans heard the arguments on the appeals and announced that decisions would be rendered later.

Coal production in the Somerset County field is now the heaviest in the history of the field, announces J. S. Brennan, secretary of the Somerset County Coal Operators' Association. Announcement is made that the Baltimore & Ohio R.R. has removed the percentage car supply in the Somerset field and expects to be able to furnish an ample supply of cars daily for the various mines. The removal of the percentage car supply became effective Aug. 9.

TENNESSEE

An involuntary petition in bankruptcy has been filed by three creditors of the Valley Coal Co. and the Valley Coal & Dock Co., Chattanooga.

UTAH

B. W. Dyer, of Billings, Mont., has arrived at the State Capitol to succeed **Chief Mine Inspector Allen**, who died a few months ago while on a special assignment for the U. S. Coal Commission.

VIRGINIA

Hoffman Bros., Punxsutawney, Pa., are drilling on the Crab Orchard property, Little Black Mountain, near Keokee, Lee County, for the **Blackwood Coal & Coke Co.,** who are planning extensive development work.

WEST VIRGINIA

The capital stock of the **Man Mining Company of Huntington** has been increased from 1,000 shares par value \$100, to 5,000 shares.

The Lambert Run Coal Co., of Fairmont, in which Clarence D. Robinson and others are interested, has been authorized by the Secretary of State of West Virginia to increase its capital stock from 250 shares of a par value of \$100 each to 5,000 shares of a par value of \$100 each.

In addition to the other indictments in connection with the trial of William Blizard, president of subdistrict 2, District 17, United Mine Workers, the grand jury on Aug. 10 returned two more indictments against **G. C. Mickey**, one of the defense witnesses in the first Blizard trial, concluded several weeks ago. He is charged with offering the Rev. J. E. Wilburn \$1,000

to leave the county and not testify for the prosecution and with having attempted to bribe jurors summoned for the second trial of Blizard. Although the grand jury was discharged after returning the indictments mentioned, it has been announced by Prosecuting Attorney S. M. Austin that a special grand jury will be called to inquire further into the bribery question.

The Prestonia Coal & Lumber Co. has just been organized with a view to developing the coal and timber resources of Braxton County, being capitalized at \$200,000. Sutton is to be the headquarters of the company. Identified with the new enterprise are C. Paul Heavener, Fred L. Fox, Thomas McCale, P. B. Adams and E. M. Smith all of Sutton.

With a view to operating in the Kanawha field, the Jennings Coal Co. has just been organized by northern West Virginia coal men, having a capital stock of \$25,000. The office of the company is to be at Monongah. Incorporators are: K. P. Beckner, J. W. Cross and Mary Beckner of Belington, S. J. Jennings of Monongah and J. S. Blackman of Shinnston.

Officials of District 17, United Mine Workers, announce that a **constitutional convention of the district organization** will be held soon as the outcome of an agitation started by R. M. Williams, James Hart and others in subdistricts 3 and 4 to obtain a stricter accounting of moneys paid into the district treasury. Williams and others working with him assert that fully \$70,000 is paid into the district treasury every month and yet that there is little pretense at accountability. Those behind the movement for a special convention also desire to have the miners' election of last December aired.

One thousand acres of coal land in the Fairmont region have been sold for approximately \$600,000 to Mortimer L. Hudson, of Chicago, secretary of the Hines interests. The purchase includes the plant and holdings of the Rivesville Coal Co. as well as certain tracts of Sewickley coal from the New England Fuel & Transportation Co., John F. Phillips, C. D. Robinson and Jacob F. Straight. The acreage is situated just west of the properties of the Fairmont & Cleveland Coal Co. Senator R. A. Pollock, who was president of the Rivesville Coal Co., will sever his connection with that company to re-engage in the operation of mines, having several propositions in view, although he has not yet consummated a deal. Jacob F. Straight, for some time secretary of the Rivesville Coal Co., will actively manage the Rivesville property for the new owner or owners.

The trial of Edgar Combs, charged with the murder of John Gore, during the armed march against Logan in 1921, will not be held until the October term of court, it was agreed early in August at a conference between John Chafin, prosecuting attorney of Logan County, and C. J. Van Fleet, who appeared for Combs and other defendants. The case had been called for trial on August 2. Combs was not admitted to bail. The most important witness against Combs is the Rev. J. E. Wilburn, who testified in the Lewisburg trial of Blizard that it was Combs who fired the shot which killed Gore. The case of the state against Harold W. Houston, general counsel for the miners' union in West Virginia, indicted on the charge of being an accessory to the murder of Gore and two other citizens of Logan County, also will go over to the October term through an understanding between Chafin and Van Fleet. When the cases against Combs, Houston and others do come up for trial a change of venue will be sought by attorneys for the union and union men involved in the armed march who have not already obtained such a change.

Having just obtained 150 acres of coal land at Beech Bottom in the Northern Panhandle of West Virginia **A. S. Burger and associates** are making preparations to begin development. The coal acquired is in the Pittsburgh seam and is said to be of unusual thickness. The acreage acquired is said to have cost approximately \$60,000. In opening a new mine, the new owners of the coal property will construct a tippie which may be utilized for loading coal either by rail or water.

S. A. Moore and associates, of Charleston, have launched the **Charleston Coal Corporation**, which is capitalized at \$50,000, with a view to engaging in the coal business in the Kanawha region. The office of the company is to be at Charleston. Associated with Mr. Moore as incorporators are A. J. Peck, J. F. Meadows, E. L. Ballard and W. Frederick, all of Charleston.

Purchase of 110 acres of Pittsburgh coal underlying the Lewis Cunningham estate on Dolls Run in Monongalia County, by W.

K. Hatfield, is regarded as the forerunner of extensive development in that section. The tract adjoins other tracts already held by Mr. Hatfield who it is said will soon sell the combined acreage to an independent coal company. That company is understood to be preparing to undertake the development of the acreage. The consideration involved for the 110 acres was \$50,000 or approximately \$455 an acre.

The Pond Creek Pocahontas Co. has closed a contract with Harry M. Waugh, a railroad contractor of Bluefield, to construct trackage leading to the company's operation and around the plant. The company is preparing to operate on an extensive scale at Bartley, in McDowell County, served by the Dry Fork branch of the Norfolk & Western railroad. A shaft is being sunk to the Pocahontas seam. Coal men chiefly identified with the Pond Creek Pocahontas Company are also the principal figures in the Island Creek Coal Co., operating in Logan County. Thomas E. Davis, of New York, is president of the Pond Creek Pocahontas Co. as well as of the Island Creek Coal Co.

Coal mines in the Winding Gulf, New River and Kanawha fields sustained heavy damages along with the Chesapeake & Ohio Ry. and the Chesapeake & Potomac Telephone Co. as the result of cloudbursts on the morning of Aug. 12, following freshets of the week previous. Numerous landslides were caused on the main and branch lines of the Chesapeake & Ohio in the very heart of the coal regions of southern West Virginia and particularly between Sewell and Quinnimont, there being several large slides near Piney Creek, Loop Creek and Laurel. On the main line coal freight traffic was held up for 36 hours.

Improvements now under way at the Thacker mines of the Thacker Coal & Coke Co. in the Williamson field will make the plant one of the most modern in the state. The cost will be not less than \$500,000. The company expects in September to show just what the improvements may mean in point of increased production. The Thacker company, of which Col. T. E. Houston is the directing head, is developing the territory on the west side of the creek preparatory to producing coal on both sides of the creek. The new tippie, of the endless chain, or conveyor type, is the last word in mining methods, making it possible to load five different grades of coal at one time. The tippie has a capacity of a railroad car per minute. The company also is building new stone headhouses, new stone retaining walls and is eliminating many curves in its trackage. It is proposed to install many new mining machines and to add many new steel mine cars to the equipment. In installing scales, the company will in the future pay its miners on a tonnage basis instead of a car basis.

The safety-first meet of the Bethlehem Mines Corporation, in which teams from eight different operations of that company participated on Aug. 17, is said to have been the most successful ever held in the Decker's Creek Valley. The contest was won by the team representing the Bretz mine. The Sabraton team took second place and the team from the Richard mine took third place. On the winning team were Edward S. Gurr, Charles B. Eye, N. B. Watson, E. J. House, H. Friend and William G. Johnson. The winning team was presented with a silver loving cup, purchased with the proceeds of a fund raised by the contributions from the superintendents of the various mines. The winning team will be sent to Buffalo on Sept. 22 to represent Preston County Division No. 3 in the general competition of the Bethlehem corporation when mine men will be pitted against mill men. Teams were entered from the following mines: Richard mine No. 21, O. T. Barnard, superintendent; Bretz mine No. 22, Weston Datson, superintendent; Kingwood mine No. 24, Harry Shaffer, superintendent; Sabraton mine No. 25, W. L. Coburn, superintendent; Masontown mine No. 26, C. C. Werner, superintendent; Burke mine No. 27, Ira Fluck, superintendent. A. W. Lauther is the general superintendent of the company in the district and was in charge of the meet held at Masontown. There was printed on the program for the day's events a list of "some of the things a first-aid man should know."

WISCONSIN

The Link-Belt Co., Chicago, Ill., has obtained the contract for furnishing the equipment for handling coal and ashes at the new Riverside pumping station, Milwaukee. The amount involved in the contract is \$40,000.

WASHINGTON, D. C.

The Finance Committee of the National Coal Association appointed to serve during

the company year includes: Ira Clemens, president, Clemens Coal Company, Pittsburgh, Kan.; L. C. Crewe, president, LaFollette Coal & Iron Co., LaFollette, Tenn.; E. L. Douglas, vice-president, First Creek Mining Co., Cincinnati; Harry L. Gandy, executive secretary, National Coal Association, Washington; M. L. Gould, president, Linton Coal Co., Indianapolis; S. Pemberton Hutchinson (chairman), president, Westmoreland Coal Co., Philadelphia; W. J. Sampson, president, Witch Hazel Coal Co., Youngstown, Ohio.

No definite steps will be taken by the District Commissioners to supervise the coal situation in Washington this winter until the national government has concluded its present efforts to avert a strike. In the meantime the city heads will keep in closest possible touch with every development so that they will be prepared to act intelligently and promptly should another fuel emergency arise this year.

CANADA

Howard Stutchbury, Alberta Trade Commissioner, has been addressing the boards of trade of a number of cities in Ontario where resolutions have been passed calling on the Government to assist in securing better freight rates from Alberta to Ontario than have yet been promised.

The Ferguson administration in Ontario will spend no more money on the Alfred peat manufacturing experimental plant. An Order-in-Council has been passed authorizing disposal of the premises and the newly developed cutting and drying machinery to a private individual who will operate it as a private enterprise.

According to Secretary Peacock of the Alberta mine workers, some five thousand of whom are out of work, a formal protest will be framed by the United Mine Workers against the importation of coal from the United States for use on certain sections of the Canadian National Railways.

Sir George B. Filmer and H. C. Zwarg, of the Anglo-Canadian Collieries & Refineries, Ltd., Edmonton, Alberta, are in Toronto in the interests of their company. The company, which recently obtained its charter, has acquired the rights of the Molecular Process, which was originated in Germany, and proposes to manufacture briquets from Alberta coal.

John McLeish, of Ottawa, Director of Mines for the Department of the Interior, said recently that over one thousand tons of Minto coal were used for domestic purposes in Ottawa last season. In addition to this amount which has been used for domestic purposes, the importation into Ottawa of 30,000 tons of Minto coal has been advertised there.

William Sloan, Minister of Mines, and George Wilkinson, chief inspector, inspected Nos. 4 and 5 Mines, Canadian Collieries (D), Ltd., Aug. 7 and 8. The Minister was impressed with the development work being carried on at No. 5 Mine, where two rock slopes have been driven to tap what is known as the Farm Seam.

Roy M. Wolvin, president of the British Empire Steel Corporation, which includes the Cape Breton coal mines, said recently at Montreal that irrespective of the quantity of bituminous coal coming in from the United States, there is ample soft coal in sight produced in Canada to meet all requirements for the future, whether American strike conditions make an abnormal demand or not. With regard to the British Empire Corporation, Mr. Wolvin said that during the strike it lost a great deal of production and had to replace a lot of this from the United States, which was a dead loss to Canada and Canadian labor. Due to the strike, their bituminous production in July had been 380,000 tons less than in June.

Fifty carloads of Alberta coal have been shipped to Ontario points over the Canadian National Ry. lines at the rate of \$7 per ton. This will enable a number of tests of the coal to be made to ascertain whether it will be acceptable to consumers. The officials of the Canadian Pacific Ry. have decided against the proposal to transport Alberta coal to Ontario at a \$7 rate, which is regarded as being below the actual cost of transportation.

One hundred thousand tons of Alberta coal placed on the Ontario market at prices which will compete with American anthracite is the proposition put forward by a deputation from the western province which called upon Premier Ferguson in Toronto. Attractive prices which will make this competition possible are to be secured by shipment by rail as far as Fort William and by the lake route thereafter to Ontario points.

Premier Ferguson, of the Province of Ontario, is reported to be working for a lower freight rate on coal shipped from the Province of Alberta to Ontario. He proposes presenting certain facts and figures to Sir Henry Thornton, president of the National Railways, which he hopes will result in the fixing of a lower rate than that of \$7 a ton, which has been extended to cover trial shipments aggregating 6,000 tons. Premier Ferguson is convinced that sufficient tonnage could be guaranteed to justify a rate that would permit Alberta's product to compete with Pennsylvania coal.

The newly introduced Self-Rescuer is being thoroughly tested in British Columbia and, if found to meet the claims of the manufacturers no doubt will be introduced on a considerable scale. Experiments are being carried out at Cumberland and at Nanaimo this month. The apparatus is said to give the wearer protection for seventy minutes against carbon monoxide gas.

Coal production of British Columbia during July exceeded that of June by about 26,649 tons. This is due chiefly to the Coal Creek Colliery of the Crow's Nest Pass Coal Co., whose output rose from 22,254 to 45,905 tons. The explanation is better demand and, as the market for this coal, particularly at this time of the year, is industry, in the forms of railways, smelters, etc., the improvement is both significant and gratifying. In the main the other active collieries of the province have about held their own. On Vancouver Island the Canadian Collieries (D), Ltd., mined 4,442 tons more in July than in June but the Western Fuel Corporation, Nanaimo, dropped some 846 tons. The Granby Collieries, Cassidy, also had a shorter output by some 912 tons while Messrs. King & Foster, operating the new mine in the vicinity of Nanaimo, show an advance of about 100 tons. In the Nicola-Princeton field the Coalmont Collieries produced in July 595 tons more than in the previous month while the Middlesboro Collieries and the Princeton Colliery dropped slightly. Aside from the Coal Creek Colliery the situation in the Crow's Nest field shows little change from that prevailing in June, the Michel Colliery and the Corbin Coal & Coke Co. being about in the same position in July as in the previous month as to production. Following are the details for July:

VANCOUVER ISLAND DISTRICT		Tons
Comox Colliery	.....	25,111
Extension	.....	20,027
South Wellington	.....	7,393
Western Fuel Corporation of Canada		
No. 1 Mine	.....	25,294
Reserve	.....	18,471
Wakesiah	.....	7,569
Granby M. S. & P. Co.	.....	18,714
Nanoose Wellington Colliery	.....	5,317
East Wellington Colliery	.....	3,824
King & Foster	.....	913
Total	.....	132,633

NICOLA-PRINCETON DISTRICT		Tons
Middlesboro Collieries	.....	5,737
Coalmont Collieries	.....	10,204
Princeton Collieries	.....	780
Total	.....	16,721

CROW'S NEST PASS		Tons
Coal Creek Colliery	.....	45,905
Michel Colliery	.....	14,491
Corbin	.....	3,059
Total	.....	63,455
Total for province	.....	212,809

Three thousand miners in District 18, United Mine Workers of America, including Alberta and part of British Columbia, are now out of work and in many places mines are running only on half time, according to the union officials. Much of the unemployment is in the mining fields that customarily supply the Canadian National Rys. with steam coal, while the slackening in the demand for domestic coal has resulted in the laying off of approximately 1,500 men in the Drumheller Valley.

A delegation of Alberta coal mine operators, headed by Sir George Filmer, waited on the Government of Ontario on Aug. 15 and announced that they were prepared to deliver 100,000 tons of coal during the coming autumn and winter at a price that would compete with United States coal, despite the unfavorable freight rates that the Canadian National Rys. have quoted. Sir George and his associates are interested in the Drumheller coal mines which at the present time are suffering from lack of business, in the neighborhood of half of the miners in the district being out of employment.

Obituary

James Burns, for fifteen years district field man of the Illinois Coal Association, died at his home in Springfield, Aug. 13. Mr. Burns' death was sudden and unexpected. He had been ill for a few days.

Louis H. Spier, traffic manager for the Stephens Fuel Co., New York City, died on Aug. 12. He had been connected with James Stephens & Son, later the Stephens Fuel Co., with the exception of a short period, since 1891.

Oscar F. Arnold, 79 years old, a veteran of the Confederacy and for many years in the coal business at Webb City, Mo., died recently at his home in that city. He was a native of Virginia and early in life moved to Bunceon, Mo. He served one term as a member of the lower house of the Missouri Legislature. The widow and one son, W. M. Arnold, of Kansas City, survive.

David Taylor, vice-president of the Coal and Iron National Bank, died in New York City Aug. 22, at the age of fifty years. Born in Jersey City, he was graduated with honors from the Pennington Seminary in 1888. Previous to his connection with the bank, of which he was vice-president, he had been with the Western National Bank and the Liberty National Bank. He was a director of Burns Brothers, the Madison Trust Co., the Wendell P. Colton Co., and the Harry J. Schnitzer State Bank. His home was in Madison N. J., where he was trustee of the First Presbyterian Church.

Thomas Fitzsimmons, 43 years old, one of the owners of the coal mines at Melbourne, Mo., died at the Wright Hospital in Trenton, Mo., where he had been taken to have an operation performed following an injury at the mine when a rock weighing 300 lb. fell from the roof of the mine and crushed him. His back was broken in three places and his entire body was paralyzed. In spite of his grave injuries he lived two weeks after the accident. He was a native of England and had lived for a time in Canada.

James M. Savage, general manager for Canadian Collieries, Ltd., died suddenly Aug. 12 at Wilson Creek, Washington, while on a motoring trip through that state. Mr. Savage was born at Three Rivers, Quebec, in 1865. He was identified with railroading and lumbering in Ontario and Manitoba until 1906, when he with associates organized the Pacific Coast Coal Mines, from which he retired five years later. He was appointed manager for Canadian Collieries in 1916, with head office at Victoria, and held that position until his death.

William Prince, one of the leading business men of the Winding Gulf region of West Virginia and closely identified with the coal industry of that section, died at Prince, W. Va., on Tuesday night, Aug. 14. Mr. Prince was largely interested in several mining companies and owned much stock in going coal concerns. He was 81 years of age and until within a few months prior to his death he had taken an active interest in the many enterprises in which he was interested.

Association Activities

The Illinois-Wisconsin Retail Coal Merchants' Association called an informal conference of the heads of the various mid-West coal merchants associations to a conference which was held recently in the offices of Secretary I. L. Runyan of the bi-state organization. Those in attendance, in addition to Mr. Runyan, were: C. A. Bruce, secretary of the Twin City Coal Exchange, Minneapolis; W. J. Womer, chairman of the transportation committee of the Chicago Coal Merchants' Association; F. E. Reeves, secretary of the Detroit Coal Exchange, and D. F. Roberts, traffic manager of the Indiana Coal Merchants' Service Bureau, at whose instance the conference was called. Various problems in regard to the handling of loss and damage claims and faulty weight problems were considered. It was declared to be the desire of those in attendance to evolve some standard basis for filing of claims, as it is thought uniformity in this matter will be advantageous. This was the first of a series of meetings which are planned to be held at intervals of about ninety days.

The regular meeting of the **Columbus Coal Bureau** was held Aug. 20 at the Chittenden Hotel, when F. W. Braggins, president of the Lorain Coal & Dock Co., was the principal speaker. Mr. Braggins, who was one of the prime movers in the formation of the bureau and also chairman of the publicity committee told of the purposes of the organization. He also talked on present conditions in the coal trade and predicted better times for the producer as well as others engaged in the industry. It is planned to have speakers in other lines of industry appear before the association at various intervals and tell of their experiences in other lines of business.

Traffic News

W. J. Smith has been appointed district manager of the Car Service Division of the American Railway Association with headquarters in Omaha, Neb., effective Aug. 15, 1923. Mr. Smith will have the authority of the Car Service Division in Nebraska, Wyoming, Colorado, Utah, Idaho, exclusive of Pan Handle, and Iowa terminals at Council Bluffs and Sioux City. The apportionments of territory assigned in circular of Jan. 11, 1923, which extended jurisdiction of the district manager at St. Louis over the State of Nebraska, of the district manager at Dallas over the State of Colorado, and of the district manager at Chicago over the terminals at Council Bluffs and Sioux City, Iowa, are thus amended accordingly, effective Aug. 15, 1923.

It has become definitely known in the past few days that the **Louisville & Nashville R.R.** has plans for two physical connections to its recently leased **Carolina, Clinchfield & Ohio R.R.**, provided the Interstate Commerce Commission approves of the lease, which is being fought by the Seaboard Air Line R.R. and the State of Georgia. The Louisville & Nashville proposed to connect its Eastern Kentucky division as well as Cumberland Valley division, one connection being made from the Lynch, Ky., district, and the other from McRoberts.

In the case of the **Indiana Power Co. vs. the Pittsburgh, Cincinnati, Chicago & St. Louis R.R.** and James C. Davis, Director General of Railroads, as agent—No. 13946—the Interstate Commerce Commission on July 20 ordered that defendant, James C. Davis, Director General of Railroads, as agent, pay unto complainant on or before Oct. 17, 1923, the sum of \$63.28, with interest thereon at the rate of 6 per cent per annum from Aug. 30, 1919, as reparation on account of an unreasonable rate exacted for the transportation of three carloads of run-of-mine bituminous coal from the steam tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis R.R. at Edwardsport, Ind., to complainant's plant at that place.

The **Seaboard Air Line R.R.** system, backed by the Georgia Railroad Commission, will appear before the Interstate Commerce Commission on Sept. 24, at the hearing relative to the Atlantic Coast Line R.R., through its subsidiary the L. & N. Ry., having leased the Carolina, Clinchfield & Ohio R.R., under a 999 year lease, as an outlet from southeastern Kentucky to the A. C. L. connections to the Atlantic coast. The Seaboard will argue against the Interstate Commerce Commission's granting permission for the L. & N. to operate as proposed.

In the case of the **Webb Fuel Co. vs. the Director General of Railroads**, as agent—No. 13258—the Interstate Commerce Commission ordered July 20 that the defendant pay the complainant, on or before Oct. 17, 1923, \$45.09, with interest at the rate of 66 per cent from Jan. 1, 1919, as reparation on account of an overcharge on a carload of coal shipped from Ferndale, W. Va., to Madrys Spur, N. C.

A test is to be made of the federal statute enacted in 1920 providing that charges on C. O. D. freight must be collected before delivery. This case is the outgrowth of a suit by the Western Maryland Ry. against James E. Cross, a prominent coal operator of Mineral County, W. Va., for the recovery of freight charges on coal delivered before the freight bill was paid. The lower court found for the plaintiff on the strength of the federal statute mentioned. The case is to be appealed to the West Virginia Supreme Court.

Judge Thomas R. Gordon and Judge Henry S. Barker, in a written opinion, have decided in favor of seventy-five foreign railroads, defendants in a suit of the Commonwealth of Kentucky, seeking to collect taxes on rolling stock in the state and not listed for taxation. The opinion, a lengthy one, held that the state had no right to collect

the taxes, pointing out that witnesses on both sides had testified that no accounting is kept as to the number of cars in Kentucky at any given time. To keep the sort of check necessary if the cars were to be taxed, each railroad would have to maintain a bureau in the state, the court held, thus placing a burden on interstate commerce which would be prohibitive.

According to well authenticated reports, **Henry Ford** and **George L. Carter**, who had a prominent part in building the Virginian R.R., are about to combine forces in building a new railroad from Bluefield to Wilmington, N. C., and thus provide another route from the coal fields of Kentucky, West Virginia and southwest Virginia to the seaboard. It is understood that the automobile manufacturer has given his endorsement to the project, although plans for the construction of the road are said not to have gone beyond the embryonic stage. Soon after acquiring the Pond Creek coal properties, Mr. Ford indicated that he might extend the D. T. & I. Ry. to Pond Creek and since then there have been rumors that he might seek to build through the Logan field. If the D. T. & I. should be extended to Williamson there would still be another link between Williamson and Bluefield to be built, before constructing a line through to Wilmington, N. C. Mr. Carter, formerly identified with several railroad projects in Tennessee, is making his headquarters at Millsville, Va., where he is an operator of coal mines.

The Interstate Commerce Commission on Aug. 15 ordered a hearing on the lawfulness of the rates, charges, regulations and practices of the schedules contained in the new tariff of the **Mobile & Ohio R.R.** known as Supplement No. 3 to I. C. C. No. B-540, applying to bituminous coal from mines in Illinois to certain stations in Missouri, to have become effective Aug. 16. The hearing is to be held Sept. 18 at 10 a.m. at the Hotel Jefferson, St. Louis, Mo., before Examiner Flynn. The commission also ordered that the operation of the said schedules contained in said tariff be suspended, and that the use of the rates, charges, regulations and practices therein stated be deferred upon interstate traffic until Dec. 14, 1923, unless otherwise ordered by the commission, and no change shall be made in such rates, charges, regulations and practices during the said period of suspension unless authorized by special permission of the commission.

The Interstate Commerce Commission has issued an order, effective Sept. 5, supporting the contention that the **Chestnut ridge**, not **Laurel ridge**, should be the dividing line for rate making purposes, between the Meyersdale and the Connellsville districts. The effort to relieve the Indian Creek Valley from the differential imposed by making the rate from points on the Indian Creek Valley railroad the Meyersdale rate plus 10 cents, began about eight years ago, when the commission was petitioned to extend the western boundary of the Meyersdale rate district to a line marking the crest of Chestnut ridge. The action was opposed by the Baltimore & Ohio Ry. on the ground that Laurel, not Chestnut, ridge was the natural boundary between the Somerset and Fayette county thin vein coal deposits.

Coming Meetings

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The **American Mining Congress** will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the **Buffalo Statler Hotel**, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The **West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers** will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, SEPTEMBER 6, 1923

Number 10

Small but Irritating

IN DIGGING up and publishing the records on 750 cars of anthracite shipped into New England last winter the Coal Commission airs some coal-trade scandal. It is a scandal, of course, that a car of coal should be subject to not one but several rake-offs totaling from \$4 to \$5 per ton. Such extravagant profits as these, of course, are unusual and could be possible only under such conditions as last winter. When the demand for coal can be met only by exercise of such trade practice it is well to inquire into causes.

The first cause was the strike of the miners, which cut off some 40,000,000 tons of needed production. The other causes are small by comparison. There is nothing and no way to prevent the repetition of such pyramiding of middlemen's profits, or for that matter of extraordinary operators' profits on the part of those who will take them, if there is another winter of strike and short hard-coal supply.

Startling as the figures are the total tonnage on which such margins are extorted or even possible of extortion is small. When New England takes several thousand cars of anthracite each week throughout the year, 750 cars on a part of which there was gouging, is small but irritating—even exciting—news.

Punishment—Not Dissolution

OUR contemporary the *Iron Age* last week urged that the government take steps to dissolve the United Mine Workers as "an organization that is inimical to public welfare and illegal in its practices." We cannot hold with the *Iron Age* that the union should be abolished, nor do we believe that is really what is meant in this instance.

In the first place it is useless to talk of doing away with the miners' union. It is too strong and too dear to the hearts of many workers. Furthermore, unionism is an important and necessary factor in the coal industry. It has brought the mine worker to an advanced position, has stabilized his wages and prevented in large areas a form of cut-throat competition of bygone times that made operators sell their men rather than their coal. It has even stabilized conditions in the non-union fields—put those districts on good behavior. The working conditions and wages of non-union coal miners in recent years have been above the average for the organized workers. No, the coal industry does not want the union dissolved—not even the non-union operators wish it—nor would it be in the public interest. The conduct of the United Mine Workers since the war has been such as to call for punishment rather than dissolution.

The policy and methods of the union are and have been militant, arrogant and unreasoning in the extreme.

John L. Lewis, as head of the organization, takes the firm position that he is hired by some 600,000 fighting industrial workers to exact from society every concession, advantage and dollar that the "full economic strength" of such a body can be made to yield. It is admitted that he does a good job. Also he believes in his cause.

The country is impotent before such a policy and type of leadership. It is impotent because our political leaders fear its power and are timorous about telling the public the whole truth. Some hold to the charitable belief that by soft dealing the good that is in the union can be made to assert itself. The only way to bring the Lewis policy to an end is to defeat its workings. That means, in plain language, for the country to get behind a strike and see it through. No wonder Lewis opposes arbitration—he can get the same or better terms by direct action that at once entrenches his position and solidifies the union. The present strike will end when the public says "enough."

Roosevelt and Pinchot

GOVERNOR PINCHOT has not followed the plan of action of his former chief, President Roosevelt, who in 1902 had a similar situation on his hands. After the anthracite mine workers had been on strike for some five months in the summer of 1902, the President forced the reluctant operators to agree to arbitration. He did not attempt to tell either party what it should do or to dictate the terms of settlement for that momentous strike. In one important respect conditions were similar to those of today. The operators, prior to the closing of the mines, were insistent that the public would not meet the advance in price necessary to cover a wage increase and that competition with bituminous coal had already set an upper limit to what could be charged for hard coal.

Governor Pinchot, on the contrary, has set himself up as the arbitrator and seemingly has taken the position that the public interest is so great that both the operators and the mine workers must accept at once his snap judgment of the terms of settlement and not stop the production of coal. It is true that he lacked not in sources of information. He was not obliged to start investigation, for the resources of the Coal Commission were put at his disposal. So, with some two days and the assistance of experts of all shades of opinion—volunteers and otherwise—at his command, the Governor worked out and announced his formula for a settlement.

It is not pertinent or necessary to comment on Mr. Pinchot's idea of what constitutes even-handed justice for all three parties at interest, save to note that his very evident anxiety to be the one to prevent a strike must have prompted his proposal to grant a 10 per cent

increase in wages. A makeshift compromise always involves concessions. That was one for the miners. For the operators he said that the question of the open or closed shop is not involved, and thus laid aside the demand for the check-off. And for the public, which already finds the price of hard coal too high, he proposes the fantastic theory that the added cost of production, which he recognizes must be absorbed somewhere along the line by someone, will come out of freights and distributors, because he thinks it should.

Governor Pinchot deserves credit for his attempt to break the second deadlock in negotiations, but his valor is more praiseworthy than his discretion. The strike is on; production has stopped. Negotiations between the operators and miners, with Mr. Pinchot as a go-between, are still on. As an unsought arbitrator he failed; it remains to be seen whether as a mediator he will fare better.

Defeatism

DERAILMENTS in our coal mines have often been considered as acts of God—as something that cannot be avoided and for which no one is responsible. They are surely more amenable to treatment than this attitude would indicate. If railroads had dismissed the matter as cavalierly as do our managers, engineers and mine foremen, people would be afraid to travel on the railroad. As a plain matter of fact we have only just begun to study mine track. Our speeds are slow but our curves are sharp and one operating condition compensates for the other.

Mr. Martin in this issue gives the mining engineer much to think about when he shows that curves and switches cause loss of power where the speed must be lessened by braking for their safe "negotiation," when he indicates that they may give a resistance equal to a 2-per cent grade even when properly laid and elevated and when he tells us that the rails should be spread almost $1\frac{1}{2}$ in. for a radius of 50 ft. where the wheelbase is 42-in.

But what is the real wheelbase? Surely on a curve it is the projected distance in the line of the track between the point where one of the front wheels of a truck rubs the ball of one rail and the point where one of the rear wheels rubs the opposing rail. It would be well if this clearance wheelbase were given for every locomotive so that the correct spread of the rails for every curve might be determined. Certainly the clearance wheelbase is much greater than the wheelbase as we understand it. Assuming that the flange is not coned and the ball of the rail is not rounded at the edge and that the contact between the two is at the top of the rail—three things which are not true—the clearance wheelbase would be longer than the true wheelbase by over 11 in. Supposing we have a 1-in. flange and the wheel is 30 in. in diameter and, further, let us assume that the tread has been worn all over 1 in., then the flange depth will be 2 in. and the increase in wheelbase from the point of view of ability to turn on a curve will be $15\frac{1}{2}$ -in. This added to a 42-in. wheelbase is quite important. As stated, there is a degree of uncertainty about such a figure the determination of which would be well worth while. Why should not the manufacturer give it for a standard shape of mine rail the weight of which is recommended for his locomotive?

Until we know more about sharp curvature, and at coal mines our curves are sharp at best, we must not

permit ourselves to indulge in defeatism and declare that derailments are inevitable. Some companies rarely have a derailed locomotive, and if they have succeeded why cannot others? We can avoid derailments by using easier curves and save money thereby doubtless, but that is an unscientific way of approaching the problem. Economically speaking, curves should be made as sharp as they can be operated with safety and economy. Easy curves weaken pillars and roadways, often involve heavy timbering and always expensive trackwork.

For this reason we should know just how sharp curves can be made and still be "negotiable" at speed, and if the answer is that they cannot be made safe then let us know the sharpest curve that is safe and how it can be laid to avoid accident and also just what curve will be most profitable for a certain daily tonnage with given conditions of roof, always bearing in mind the diameter of the wheel and the size of the flange.

With the limitations of the coal mines in view the whole problem of tracks and trucks arises anew. A few years hence doubtless we shall find it has been so carefully studied that it has assumed a new and more definite aspect.

Substitutes

GOVERNORS and Governors' representatives from eleven anthracite-consuming states gathered in New York last week at the invitation of the Federal Fuel Distributor to talk over ways and means of keeping the people warm in the event of a sustained hard-coal strike. The significant thing about the meeting was that there was but one concrete proposal made. So far as the Governors were concerned, they just "marched up the hill and then marched down again." Most of them had experience last winter and previously in handling coal shortages and they know that it is no sinecure. But when it came to talking over the prospects in the recent situation they were headed nowhere.

The one concrete proposal was made by the soft-coal operators. It was simply stated. If there is no hard coal, then the people must use something else and that something else must be largely bituminous coal. Nothing can fill the gap so quickly. And the soft-coal men said they were prepared to see that their product was properly distributed and to co-operate with the various state authorities in taking care of emergencies. They offered to have the government set what it considered a fair price. And then the soft-coal men left the meeting. The Governors took the very sensible view that there is nothing to do now and that their job is to accept the good intentions of the bituminous-coal operators at their face value and to do whatever the Federal Fuel Distributor might from time to time suggest in the way of getting coal to their people.

There will be no rush for substitutes; that will be one of the difficulties. So long as there is hope that the strike is to be of short duration retail dealers are and will be reluctant to buy something that they may not be able to sell. Householders will buy substitutes only when they are close to actual need. Really all there is to do now is to continue the education of the householder and many of the retailers in the possibilities of substitutes, show them whenever and wherever possible how such fuel can be used and let the normal channels of distribution take care of getting it to them as the need arises.

Southern Field Has Most Beds and Deepest Workings In Entire Pennsylvania Anthracite Region*

Fifty Years' Operation Sees Output per Man Increase 8.1 per Cent,
While Every Other Field Except Panther Creek Loses — Irregular
Seams Present Many Problems and Delay Complete Electrification

BY DEVER C. ASHMEAD
Kingston, Pa.

A NUMBER of superlatives are necessary in discussing fifty years of operation in the Southern field of the Pennsylvania anthracite region. The field is underlaid with twenty-two beds, the largest number in any section of the whole region. The maximum depth is the greatest there. Geologic upheavals left the beds in the most disturbed positions, some of the coal having been pulverized to a point of worthlessness in the process. The production per man in this field shows the greatest increase since 1872 of that in any field, though this increase is only 8.1 per cent and leaves the average daily output per man at a bare 1.67 tons. Electric haulage motors appeared earliest there, though electrical development thereafter lagged behind the other fields. In most respects, however, the field has followed the general course of the whole anthracite region toward ever-increasing difficulty and cost of operation.

The Southern field outlined for the purposes of this article is practically identical with the territory commonly called by that name. However, a few collieries at the east end of it were added to the Panther Creek field discussed previously, and are excluded here. Data for the Southern field are sparse because the companies did not furnish to the State Department of Mines information on depth of workings and thickness of beds. Practically no data on the number of employees, tonnage and haulage were reported by inspectors during the years 1872 to 1877—the first period in the fifty years covered in this study—but a considerable amount is available after 1877.

TABLE LX. NUMBER OF COLLIERIES IN THE SOUTHERN FIELD

Years	Total as Reported by Department of Mines	Having Thickness and Depth Data	Having Tonnage Data
1872.....	64	0	0
1877.....	39	0	3
1882.....	54	0	38
1887.....	31	0	19
1892.....	32	0	22
1897.....	37	0	30
1902.....	33	0	28
1907.....	35	0	30
1912.....	35	0	30
1917.....	39	0	31
1922.....	41	0	35

Although the maximum number of collieries shown as operating in any one year is only sixty-four, there have been, according to the state reports, a total of 134 opened during the fifty years since 1872. Only nine of these have operated the whole eleven periods covered by this study. Three collieries operated through ten periods, four through nine periods, three through eight periods, six through seven periods, six

*This is the seventh in a series of articles by Mr. Ashmead describing conditions in the fields of the Pennsylvania anthracite region. Previous articles appeared in *Coal Age* on Feb. 22, March 22, April 5, May 10, May 31 and June 21. The final article, which summarizes the study for the anthracite region as a whole, will appear later.

through six periods, eleven through four periods, ten through three periods, twenty-two through two periods and fifty-two operated in only one period. This short-time operation of the collieries has affected the production of coal as will be brought out later in this article.

Twenty-two beds appear in this district—probably more than in any other of the anthracite regions. They are especially numerous in what is now known as the 18th Anthracite Inspection District. In the whole Southern coal field the following beds are found, named in order from the surface down. Lewis, Palmer, Little Tracy, Big Tracy, Diamond, Little Orchard, Orchard, Primrose, Holmes, Mammoth, Skidmore, 7 ft., Buck Mountain, Scotts Steel, Lykens Valley No. 0, No. 1, No. 1½, No. 2, No. 3, No. 4, No. 5, and No. 6. Of course all of these beds are not workable over the whole area of the Southern coal field. The coal lies as is shown in Fig. 75 in a great trough. This makes the beds steeply inclined. Bed

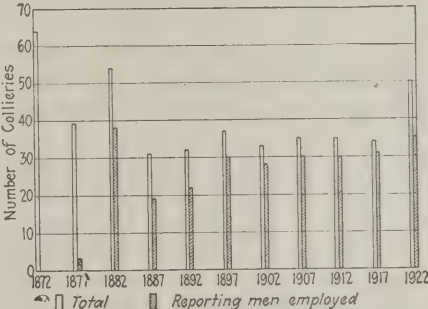


FIG. 74 — NUMBER OF COLLIERIES IN SOUTHERN FIELD

This diagram shows the number of collieries on which depth and thickness and tonnage data were available. It also shows the number of collieries in the field.

depths are greater here than in any other region in Pennsylvania. At one operation a shaft 2,500 ft. deep is contemplated. In parts of the region the upheaval has been so great that the coal has been rubbed between the top and bottom rock and has been almost pulverized, so that at the present time this coal has little value and cannot be mined.

The power-consumption curve in Fig. 76 and the figures in Table LXI show the same general decrease in tons of coal produced per boiler and engine horsepower installed that has been noted in articles describing the other districts.

Generally speaking, the collieries in this region have been more backward in adopting the use of electricity than elsewhere. Centralization of mine power plants such as may develop in this district will have a tendency to reduce the amount of power required to produce the coal or it will permit the greater use of electricity and electrical machinery, which may increase the power consumption per ton, but will tend to decrease the man-power and therefore increase the production per employee.

In 1921 the State Department of Mines reported that the boiler-horsepower installed amounted to 71,360 as against 72,620 in 1917. At the same time the number

TABLE LXI. POWER USED IN PRODUCTION OF ANTHRACITE IN THE SOUTHERN FIELD

Years	Boiler Horse-power Installed	Engine Horse-power Installed	Tons Produced per Boiler Horse-power	Tons Produced per Engine Horse-power	Tons of Coal Hauled per Mule per Day	Underground Locomotives per 100,000 Tons Produced per Year
1887.....	16,080	.....	0.68	.....	13.7	0.003
1892.....	23,790	.....	0.53	.....	11.7	0.003
1897.....	44,512	.....	0.53	.....	18.2	0.003
1902.....	48,134	50,135	0.50	0.48	18.6	0.05
1907.....	65,973	88,164	0.37	0.31	16.8	0.40
1912.....	68,965	105,703	0.44	0.29	19.6	0.62
1917.....	72,620	116,555	0.44	0.27	23.0	1.05
1921.....	71,360	.....	0.42	.....	21.8	1.28

of collieries reported in the region increased from 39 in 1917 to 41 in 1921. So instead of expecting a decrease in the boiler-horsepower installed, one would expect an increase. Part of this decrease may be explained by the fact that some of the independent collieries have abandoned their boiler plants and have purchased power from central power stations. At one of these there had been a plant with a boiler installation of about 2,000 hp.

It was in this region that electric motive power was first introduced in the haulage of coal. Nevertheless, the number of underground locomotives is smaller in this region than in many of the other regions. The Lackawanna County district has 3.12 motors per 100,000 tons of coal produced annually in 1921; the Wilkes-Barre district, 2.64; Nanticoke, 2.36; Eastern Middle field, 1.06; Panther Creek, 2.03; Western Middle field, 1.17; and the Southern field has but 1.28.

Of course the geological conditions in many of the mines do not permit the use of a large number of locomotives, for the beds are steeply pitching and the locomotives can be used only for main haulage. Fig. 77 shows that the number of locomotives has had practically an even, steady increase since 1902.

Unfortunately, data on the number of mules in service do not extend to the period before 1887, so it is impossible to estimate the amount of coal hauled per underground locomotive. The curve is of value only as it shows the influence of the motor on the amount of coal hauled per mule.

Although the number of collieries in the Southern field increased from 39 in 1917 to 41 in 1921, there was a decrease in the number of mules in service from 1,385 in 1917 to 1,376 in 1921. Although this decrease amounts to only 9 mules, there were 3 more collieries and these collieries were mostly small ones where locomotives were few, so the decrease is significant.

Output per man in the Southern field increased 8.1 per cent since 1872. This is the greatest increase in the whole anthracite region. Only one other district—Panther Creek—showed any increase whatever. The others decreased. Taking the Southern field curves shown in Fig. 78 and for the moment considering only the bottom set of curves, which show the production per employee, it is seen that the solid line which represents the original data shows an increase in the amount of coal produced per man. When these original data are corrected for sizes not shipped in the earlier years, and further corrected to reduce all data to an 8-hour day basis from the 10-hour day in effect before 1902 and the 9-hour day before 1916 the dot-and-dash curve results. This shows the same general increase in production although in a somewhat less degree. If the year 1897 is disregarded, as in the previous article, because of unsatisfactory state reports that year, and the average for 1892 and 1902 is taken in its place, then for the period from 1887 to 1921 there is a steadily increased production per man, if the hectic war year 1917 is properly discounted.

In the Lackawanna County district the decrease in the production per man amounted to 31.2 per cent; Wilkes-Barre, 30.2 per cent; Nanticoke, 21.1 per cent; Eastern Middle field, 30.6 per cent; Western Middle field, 9.1 per cent; in the Panther Creek district production increased 1.6 per cent, while in the Southern field the increase was 8.1 per cent.

TABLE LXII. MULES AND LOCOMOTIVES IN SOUTHERN FIELD

Years	Mules in Service	Inside Locomotives	Years	Mules in Service	Inside Locomotives
1887.....	795	1	1907.....	1,494	33
1892.....	1,138	1	1912.....	1,543	57
1897.....	1,501	2	1917.....	1,385	100
1902.....	1,286	7	1921.....	1,376	115

The average tonnage per man in 1921 in these fields was as follows: Lackawanna County, 1.74; Wilkes-Barre, 1.48; Nanticoke, 2.02; Eastern Middle, 1.95; Panther Creek, 1.89; Western Middle, 1.80; Southern,

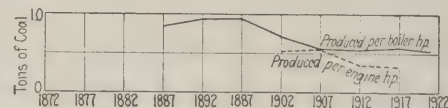


FIG. 76—DAILY PRODUCTION OF COAL PER BOILER AND ENGINE HORSEPOWER INSTALLED

The method of calculating these curves will be found in the Feb. 22 issue of *Coal Age* under Fig. 8 on page 326.

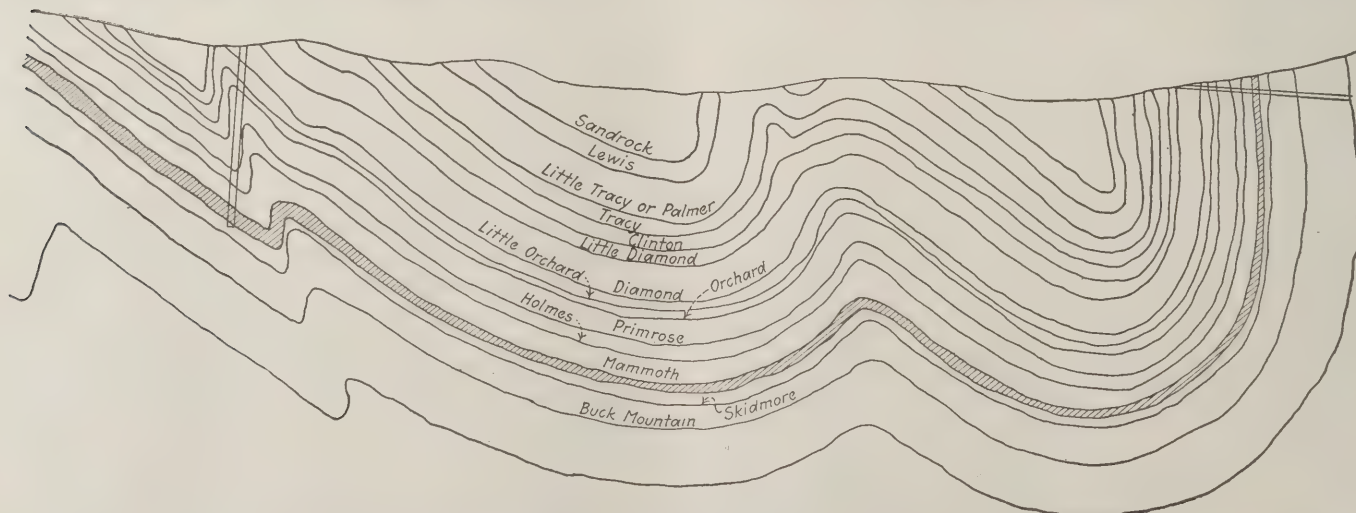


FIG. 75—A GENERAL CROSS-SECTION OF THE SOUTHERN COAL FIELD

1.67 tons. Thus only Wilkes-Barre showed a lower tonnage per employee than the Southern field. In spite of the general increase in output per employee the average production per inside employee dropped 5.8 per cent. The middle set of curves in Fig. 78 illustrates this trifling decrease. The lines undulate uniformly through

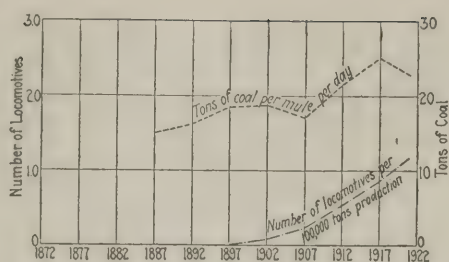


FIG. 77—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS

On page 327 of *Coal Age* in the Feb. 22 issue under Fig. 9 will be found the description of the method used in the calculation of this curve.

TABLE LXIII. PRODUCTION AND DAYS WORKED IN SOUTHERN FIELD

Years	Production in Gross Tons	Average Number of Days Worked	Years	Production in Gross Tons	Average Number of Days Worked
1882.....	2,152,503	220	1907.....	5,938,368	264
1887.....	1,860,336	231	1912.....	6,318,398	235
1892.....	2,977,004	216	1917.....	7,422,697	287
1897.....	3,759,676	170	1921.....	7,042,500	275
1902.....	2,894,120	131			

TABLE LXIV. AVERAGE DAILY PRODUCTION PER EMPLOYEE

Years	Per Total Employee			Per Inside Employee			Per Outside Employee		
	Re-ported	Cor-rected for Small Sizes	Cor-rected for Time	Re-ported	Cor-rected for Small Sizes	Cor-rected for Time	Re-ported	Cor-rected for Small Sizes	Cor-rected for Time
1882.....	1.25	1.76	1.54	2.01	2.83	2.57	3.45	4.86	3.89
1887.....	0.98	1.32	1.15	1.52	2.04	1.86	2.78	3.73	2.98
1892.....	1.24	1.54	1.34	1.90	2.36	2.15	3.59	4.48	3.58
1897.....	1.74	2.07	1.81	2.79	3.32	3.07	4.62	5.50	4.40
1902.....	1.69	1.80	1.59	2.71	2.89	2.63	4.45	4.76	4.23
1907.....	1.46	1.53	1.42	2.24	2.34	2.09	4.25	4.44	3.95
1912.....	1.66	1.72	1.60	2.37	2.45	2.31	5.56	5.74	5.10
1917.....	1.90	1.90	1.90	2.58	2.58	2.58	6.16	6.16	6.16
1921.....	1.67	1.67	1.67	2.42	2.42	2.42	5.80	5.80	5.80

the 50 years, descending in the first period, then rising between 1887 and 1902 (considering 1897 statistics in error), sinking again to 1907 and finally climbing in the final period to a point just 58. per cent short of the start. The three peak points on the curve—1882, 1902 and 1917—are all within 0.05 tons of each other. During the early years of the half century under discussion a number of collieries were in operation for only a short period. Most of their mining was done above water level. This can plainly be

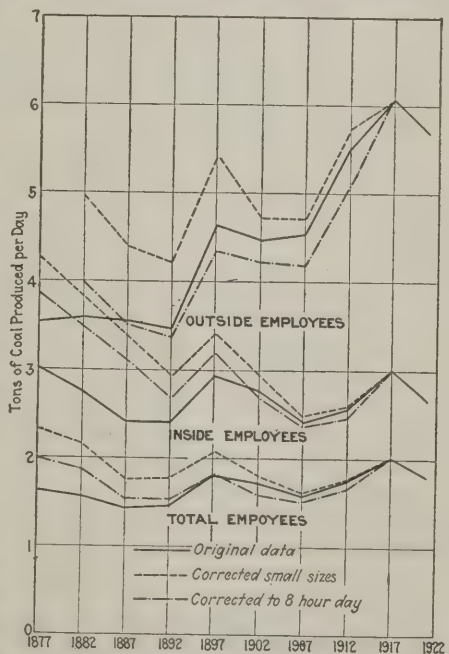


FIG. 78—AVERAGE DAILY PRODUCTION PER EMPLOYEE

A full description of the methods used in the calculation of these curves will be found in the footnote to Fig. 10 in the Feb. 22 issue of *Coal Age*, page 327.

shown by the report of the Second Geological Survey of Pennsylvania, which shows the workings of the mines in 1888. A mine with only a short life is apt to use many men in development work, which naturally tends to reduce the production per man. So in this case the shape of the curve is largely influenced by the fact that many mines in the region were short lived. Thus the production per man in the earlier periods was reduced but the curve actually shows an increase. For example, in 1882 there were reported 13 new operations and it is probable that a considerable amount of development work was carried on. In this same year 16 mines shut down. These mines probably had a greater production per man as the development work in them had probably ceased. In 1887 there were five new mines and 11 quit. In 1892 six opened and nine closed; in 1897 eight opened and seven closed; in 1902 only three opened and seven closed. In 1907 seven opened and three closed; in 1912 only one opened and none closed; in 1917 three opened and two closed. It can readily be seen what influence this continual change in the mines being opened and abandoned in a region would have. From the foregoing it is seen that the greatest change was in the earlier years and that from year to year changes were fewer. This falling off shows the changed policy of the operators, who are now operating their collieries more systematically than in the past.

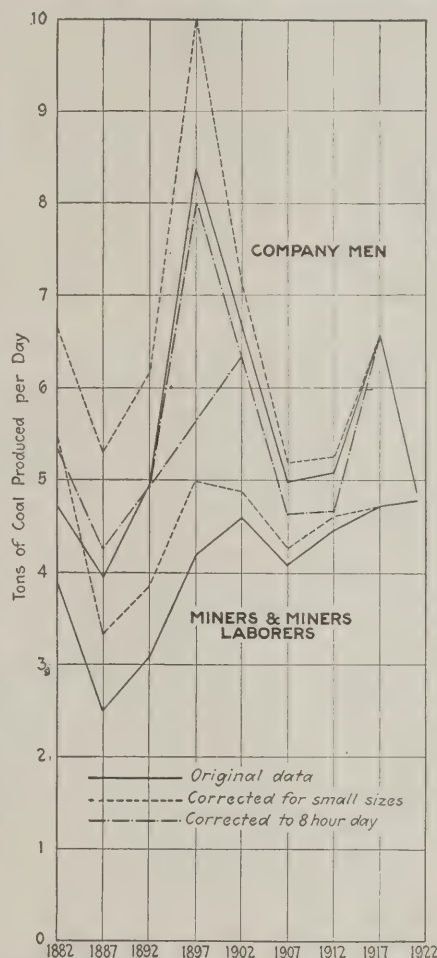


FIG. 79—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES

A detailed description of the methods used in the calculation of these curves will be found in the description of Fig. 11 in *Coal Age* for Feb. 22 on page 328.

The upper set of curves in Fig. 78 shows how the improvement in the preparation of coal has affected the production of coal per day per outside employee. There has been a steady increase in the production of this field from 1887 to date. From 1882 to 1921 the increase was 49.1 per cent.

By districts this increase from 1887 was: Lackawanna County, 34.4 per cent; Wilkes-Barre, 2.9 per cent; Nanticoke, 43.1 per cent; Eastern Middle, a decrease of 11.4 per cent; Panther Creek, an increase of 80.6 per cent; and Western Middle, 41.5 per cent. If, however, the lowest point in the production is compared with 1921 the following proportions of increase

TABLE LXV. AVERAGE DAILY PRODUCTION OF INSIDE MEN

Years	Miners and Miners' Laborers		Inside Company Men		
	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected for Time
1882.....	3.90	5.49	5.72	7.59	8.04
1887.....	2.48	3.34	3.95	5.31	4.25
1892.....	3.08	3.85	4.95	6.17	4.94
1897.....	4.19	4.99	8.39	10.00	8.00
1902.....	4.58	4.89	6.67	7.13	6.34
1907.....	4.08	4.26	4.98	5.20	4.63
1912.....	4.46	4.61	5.07	5.25	4.67
1917.....	4.72	4.72	6.56	6.56	6.56
1921.....	4.77	4.77	4.89	4.89	4.89

are shown; Lackawanna County, 46.8 per cent; Wilkes-Barre, 47.5 per cent; Nanticoke, 75.2 per cent; Eastern Middle, 47.7 per cent; Panther Creek, 80.6 per cent; Western Middle, 69.1 per cent, and the Southern field, 72.5 per cent. This shows the real improvement in each of the districts due mainly to improved methods of preparation.

In the lower set of curves in Fig. 79, which shows the tons of coal produced per day per miner and miners' laborer, one sees by the dash line, which is the corrected line for small sizes, that in the period 1882 to 1887 there was a sharp decrease in the output. From 1887 to 1902, cancelling the doubtful year 1897, there was an increase. Then the curve turns downward during the next five-year period and the last fourteen years show an increase.

The general increase in production during the fifteen-year period from 1887 to 1902 probably was caused by the general abandonment of the policy of working a colliery only a short time. The decrease in 1902 to 1907 will be discussed later in the article of this series when similar decreases which occurred in other districts are discussed.

The increase during the last 14 years of the curve, probably was caused by a further change in mining policy. During this period there seems to have been a concentration of work. Second mining was conducted more systematically and thoroughly. The amount of development work was not as intensive as it had been in the previous periods. This permitted of greater production. This greater production was influenced by the release of mine cars from the development work, permitting them to be used for coal loading, thus giving the miners better turn.

An example of this is enlightening. At a certain colliery in the Eastern Middle field there is a stripping plant and a slope under operation. Due to an accident, the stripping had to be shut down for a few days and the mine cars, which had been loaded by the steam shovel, went into the slope. With these extra cars the miners were able to load 40 per cent more coal from the slope than they had been able to do in the past. This 40-per cent increase in production counterbalanced the loss of the stripping coal. No more men were employed in the slope than were normally used.

TABLE LXVI. MEN EMPLOYED IN THE SOUTHERN FIELD

Years	Total Employees	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men
1882.....	7,708	4,878	2,830		
1887.....	8,055	5,202	2,854	3,195	2,007
1892.....	9,724	6,367	3,357	3,927	2,440
1897.....	12,732	7,908	4,824	5,277	2,631
1902.....	13,121	8,151	4,970	4,838	3,313
1907.....	15,417	10,037	5,280	5,518	4,519
1912.....	16,171	11,334	4,837	6,028	5,306
1917.....	13,607	9,407	4,200	5,467	3,940
1921.....	15,469	10,325	4,629	5,232	5,093

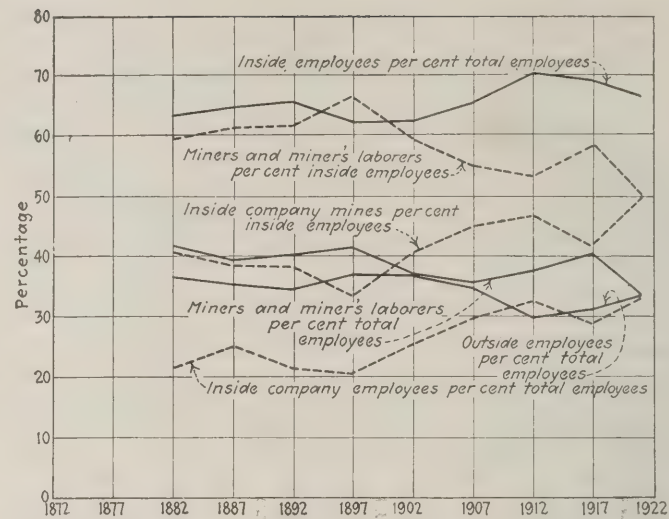


FIG. 80—PERCENTAGES OF EMPLOYEES BY CLASSES

These data were obtained from the reports of the mine inspectors of the Department of Mines of Pennsylvania.

It is possible that the introduction of underground haulage has had a considerable influence on the production of coal. Mechanical haulage naturally handles the mine cars with greater rapidity and therefore less

TABLE LXVII. PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED IN THE SOUTHERN FIELD

Years	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (A)	Inside Company Men (A)
1882.....	63.3	36.7	41.9	21.4	59.4	40.6
1887.....	64.6	35.4	39.6	25.0	61.4	38.6
1892.....	65.6	34.4	40.4	21.2	61.7	38.3
1897.....	62.1	37.9	41.4	20.7	66.7	33.3
1902.....	62.1	37.9	36.9	25.2	59.4	40.6
1907.....	65.1	34.9	35.8	20.3	55.0	45.0
1912.....	70.1	29.9	37.3	32.8	53.1	46.9
1917.....	69.0	31.0	40.2	28.8	58.2	41.8
1921.....	66.7	33.3	33.8	32.9	50.5	49.5

(A) To inside employees.

time is consumed from the time of loading to the time of dumping and the return to the loading place. It may be interesting to note that one of the largest of the companies in the anthracite region, having operations in many of the coal fields described in this series of articles, reports that its mine cars make a general average of 1.2 trips per day.

The upper set of curves in Fig. 79 shows the daily production of coal per inside company employee. Here again the 1897 data are manifestly incorrect and the average of 1892 and 1902 should be considered instead. From 1902 there has been a general decrease in the daily output per man. This is partly because of the introduction of electricity into the mines. The development of haulage has tended to decrease the number of men required for this purpose.

There has been a gradual decrease in the number of miners and miners' laborers in this region during the past 40 years. The decrease in the number of outside employees has not been as great as one would be led to believe when one views the curve showing the increased production per outside employee.

IN STUDIES OF LOW-TEMPERATURE CARBONIZATION of coal made by the Bureau of Mines, various sections of coal from the Pittsburgh seam and roof were distilled. The Pittsburgh seam gives as an average 33 gallons of tar per ton. The "rooster" coal above the roof averages 28 gallons per ton; and the roof itself 23 gallons per ton. All tars have the same characteristics.

Curve Resistance Greatly Impedes Mine Haulage; Much Track Spread Needed on Sharp Turns*

Need for Investigation Into Loss of Power in Mine Haulage—Curves
May Increase Tractive Effort as Much as a Two-per Cent Gradient
—Correct Switch Design Will Make Deceleration Unnecessary

BY J. D. MARTIN

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NOTHING perhaps that adds to the cost of coal production is more neglected than the design of mine tracks. You can inspect a plant and find up-to-the-minute hoisting equipment, tippie, power plant, machinery and locomotives and may find them properly installed and functioning economically, but when you reach the track, switches and auxiliary apparatus you are likely to find that little progress has been made. The fault does not lie with the manufacturer of track equipment but with the engineers at the mine.

We find at the mines no end of delays due to derailment of locomotive trips, yet it is well realized that derailments always result in time lost, which means less tonnage and consequently lower profits. Perhaps less engineering skill is applied to mine tracks than to any other feature in the installation of mines so far as individual plants are concerned. It is a feature which has been allowed to drift along by itself and to make whatever progress it could. The engineer, superintendent or manager who is precise in his specifications covering a contract for a structure, hoist, or locomotive may order trackwork with only a passing thought as to its application; thus what development and progress has been made has been achieved without any help from the mining industry as a whole.

On the other hand, railroad trackwork design has been placed on a high plane and valuable data and theory have been tabulated for practical use. The investigations of the various engineering societies and the products developed by the manufacturers and tested out in practice have led to a basis of standardization for standard-gage railroad work, and part of the results have found their way into the equipment for use on light track. The classes of equipment are radically different, however, and the same general designs and the same formulas do not generally apply.

As has been stated already, there is much research work to be done, experiments to be performed and formulas to be evolved before we are ready to standardize light-rail track. This is work for engineers scientifically trained; the work must be done in a scientific manner if the results are to be as they should.

The study must include not only the frogs, switch points, switch throws and the necessary fittings, together with the proper design and application of each, but the widening of the gage on curves, curve resistance and curve compensation, as well as track and train resistance, allowable widening of gage for different weights of rail, the size of wheels and tires for various classes of rolling equipment and track, the gage of trucks with relation to the gage of tracks and the increment or decrement in the track gage for different

wheelbases, as well as other factors, less important but nevertheless requiring consideration.

In order that the tractive effort of the locomotive shall be kept at a minimum all the factors tending to increase it must be kept at a minimum. Consider:

(1) The grade resistance. This, of course, is determined to a great extent by the local mine conditions, which may not permit the necessary grading to reduce the track grade to that desired. We can, however, in any given case determine just what per cent this grade will be.

(2) The equivalent grade due to journal friction, train resistance and curve resistance. Journal friction clearly depends upon the type of trucks and bearings used, whether plain or roller-bearing. Train resistance depends upon the condition of the track. Curve resistance depends upon: (a) The amount of slipping and sliding of the wheels due to the difference in length between the outer and inner rails on the curve, which difference in length must be taken up in the slipping and sliding of wheels and cannot be compensated by coning the tires, as is sometimes assumed. (b) Flange resistance due to the bearing of the flange against the outer rail wherever the super-elevation of the outer rail does not reduce this resistance to zero. (c) Resistance due to the vertical height to which one or two wheels are lifted vertically throughout the length of the curve wherever the gage of the track is not sufficiently widened.

(3) Resistance due to change in velocity. As the

The combined resistance of the curve due to sliding of wheels and flange resistance may be summarized in the formula deduced by Raymond: The total curve resistance in pounds per ton total load.

$$R_c = 0.4 + D \left(\frac{500 f (G + b + \sqrt{G^2 + b^2})}{5,730} + 0.04 \right)$$

Where D = degree of curve
G = track of gage
b = wheelbase
f = coefficient of friction

RESISTANCES FOR CERTAIN CURVES AND WHEELBASES

Wheelbase, Ft. In.	Resistance in Pounds per Ton	Total Resistance in Pounds per Ton			
		50 Ft.	100 Ft.	150 Ft.	200 Ft.
2 0	0.4 + 0.20D	36.4	12.4	8.2	6.2
2 3	0.4 + 0.21D	38.2	13.0	8.6	6.7
2 6	0.4 + 0.22D	39.0	13.6	9.0	7.0
2 9	0.4 + 0.225D	40.9	13.9	9.2	7.2
3 0	0.4 + 0.23D	41.8	14.2	9.4	7.3

INCREASE IN PERCENTAGE GRADIENT FOR VARIOUS WHEELBASES
AS DEDUCED FROM PRECEDING TABLE

Radius, Ft.	Wheelbases				
	24 In.	27 In.	30 In.	33 In.	36 In.
50	1.82	1.91	1.95	2.05	2.14
100	0.60	0.65	0.68	0.70	0.71
150	0.41	0.43	0.45	0.46	0.47
200	0.31	0.31	0.35	0.36	0.37

FIG. 1—RELATION OF RESISTANCE TO CURVE RADIUS

A truck with a 24-in. wheelbase traveling around a curve of 50-ft. radius on a level is subject to a resistance equal to that acting against the same truck on a straight track and having a grade of 1.82 per cent against the load. The coefficient of friction against sliding is assumed as 0.2.

*Abstract of article entitled "Standardization of Mine Tracks," read before Engineers' Society of Western Pennsylvania.

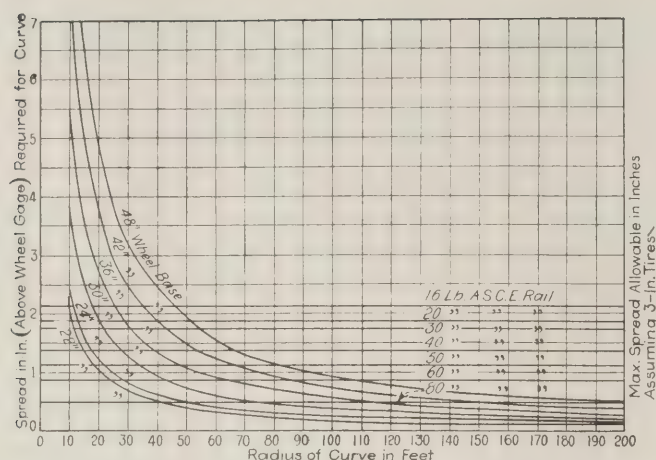
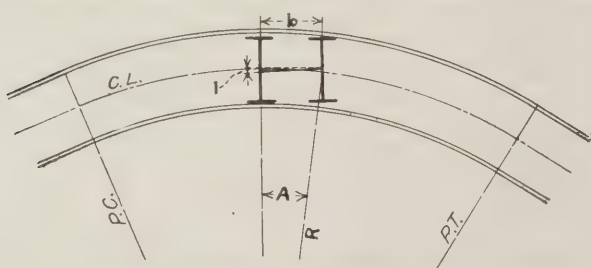


FIG. 2—GRAPH SHOWING GAGE INCREASE ON CURVES

This also shows the maximum spread allowable for wheels with 3-in. tires running over rail of various weights per yard and designed according to American Society of Civil Engineers standards. The curves show that trackwork cannot be designed independently of rolling equipment.

train is accelerated from rest to a certain velocity there is a certain quantity of kinetic energy stored in the train due to the velocity of translation of the train itself and to the velocity of rotation of the wheels. When the train is stopped this kinetic energy is not reclaimed but is lost in heat due to friction as the brakes are applied. Thus it becomes evident that the greater the number of times the train is stopped or retarded in its travel from the face of the shaft bottom or other terminal the greater will be the power loss due to this one cause.

After we have adopted the minimum grade which mining conditions will permit we may have, say, a maximum or ruling grade of 1.5 per cent so far as the track grade is concerned. If the journal, train, and curve resistances are reduced to their equivalent grade, however, we will find that instead of operating a train over a ruling grade of 1.5 per cent we virtually will be operating over as high as 2 or 3 per cent. This can be seen from Fig. 1, where curve resistance alone may be equivalent to as much as a 2-per cent grade.



SPREAD OF RAILS (OVER WHEEL GAGE) FOR A GIVEN WHEELBASE

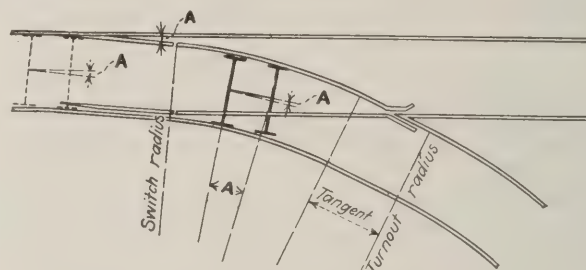
Radius	24 In.		30 In.		36 In.		42 In.		48 In.	
	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
10	0	0.2020	2	$\frac{1}{16}$						
12	6	0.1647	2	$\frac{1}{16}$						
15	0	0.1319								
17	6	0.1146								
20	0	0.0991	1	$\frac{1}{16}$	0.1565					
25	0	0.0801			0.1253					
30	0	0.0667			0.0981		0.1504	$1\frac{1}{16}$		
40	0	0.0500			0.0782		0.1129	$1\frac{1}{16}$	0.1540	$1\frac{1}{16}$
50	0	0.0399			0.0625		0.0903	$1\frac{1}{16}$	0.1226	$1\frac{1}{16}$
75	0	0.0275			0.0417		0.0600		0.0813	$1\frac{1}{16}$
100	0	0.0201			0.0313		0.0450		0.0613	
125	0	0.0160			0.0250		0.0360		0.0490	$\frac{1}{16}$
150	0	0.0134			0.0208		0.0300		0.0410	
175	0	0.0114			0.0178		0.0257		0.0350	$\frac{1}{16}$
200	0	0.0100			0.0156		0.0220		0.0310	$\frac{1}{16}$

FIG. 3—GAGE INCREASE REQUIRED WITH CURVES OF CERTAIN RADIUS

The tabulation does not consider the diameter of the wheels in the widening required on curves. This factor cannot be eliminated and the above tabulation therefore is subject to correction.

These conditions and relations are illustrated graphically in Fig. 2.

The power lost due to overcoming the resistance of acceleration may be diminished considerably if locomotive roads, curves and switches are so designed that the train may be accelerated from rest to the desired velocity and maintained at the same velocity from terminal to terminal. If, however, it is necessary to reduce the speed of the train to a low value for each curve



ANGLES A FOR VARIOUS WHEELBASES AND RADII

Radius	Wheel Base				
	24 In.	30 In.	36 In.	42 In.	48 In.
10'-0"	11°-32'-13"	14°-28'-40"	17°-27'-27"	20°-29'-12"	23°-34'-42"
12'-6"	9°-12'-25"	11°-32'-13"	13°-53'-12"	16°-15'-37"	18°-39'-53"
15'-0"	7°-39'-44"	9°-35'-39"	11°-32'-13"	13°-29'-36"	15°-27'-58"
17'-6"	6°-33'-48"	8°-12'-47"	9°-52'-15"	11°-32'-14"	13°-12'-35"
20'-0"	5°-42'-30"	7°-10'-50"	8°-37'-30"	10°-04'-40"	11°-32'-10"
25'-0"	4°-35'-19"	5°-44'-21"	7°-11'-07"	8°-02'-52"	9°-12'-25"
30'-0"	3°-49'-21"	4°-46'-50"	5°-44'-29"	6°-42'-59"	7°-38'-40"
40'-0"	2°-51'-58"	3°-35'-00"	4°-18'-05"	5°-01'-11"	5°-44'-21"
50'-0"	2°-17'-33"	2°-51'-58"	3°-26'-23"	4°-00'-50"	4°-35'-19"
75'-0"	1°-31'-41"	1°-54'-37"	2°-17'-33"	2°-40'-29"	3°-03'-06"
100'-0"	1°-08'-46"	1°-25'-57"	1°-43'-09"	2°-00'-21"	2°-17'-33"
125'-0"	0°-55'-00"	1°-08'-46"	1°-22'-31"	1°-36'-16"	1°-50'-02"
150'-0"	0°-45'-50"	0°-57'-18"	1°-08'-46"	1°-20'-13"	1°-31'-41"
175'-0"	0°-39'-18"	0°-49'-07"	0°-58'-56"	1°-08'-46"	1°-18'-35"
200'-0"	0°-34'-23"	0°-42'-59"	0°-51'-34"	1°-00'-10"	1°-08'-46"

ANGLE OF SWITCHRAIL WITH STRAIGHT RAIL

Length of Switch Point	Switch Angle	Length of Switch Point	Switch Angle
1'-0"	16°-57'-35"	8'-0"	2°-14'-19"
1'-6"	11°-12'-50"	9'-0"	1°-59'-23"
2'-0"	8°-23'-15"	10'-0"	1°-47'-27"
2'-6"	7°-10'-51"	11'-0"	1°-37'-40"
3'-0"	5°-58'-45"	12'-0"	1°-29'-32"
3'-6"	5°-07'-21"	13'-0"	1°-22'-39"
4'-0"	4°-28'-50"	14'-0"	1°-16'-44"
4'-6"	3°-58'-55"	15'-0"	1°-11'-37"
5'-0"	3°-35'-00"	16'-0"	1°-07'-09"
5'-6"	3°-15'-26"	17'-0"	0°-58'-00"
6'-0"	2°-59'-08"	18'-0"	0°-55'-43"
6'-6"	2°-45'-20"	19'-0"	0°-51'-40"
7'-0"	2°-33'-30"	20'-0"	0°-50'-09"
7'-6"	2°-23'-17"		

SWITCH RADII AND CORRESPONDING SWITCH POINTS

Switch Radius	Length of Switch Points (feet)					
	24 In.	26 In.	30 In.	36 In.	42 In.	48 In.
10'-0"	1'-6"	1'-6"	1'-6"			
12'-6"	2'-0"	2'-0"	1'-6"			
15'-0"	2'-6"	2'-0"	1'-6"			
25'-0"	4'-0"	4'-0"	3'-6"	2'-6"		2'-0"
50'-0"	7'-6"	7'-6"	6'-6"	5'-6"	4'-6"	4'-0"
75'-0"	12'-0"	11'-0"	10'-6"	8'-0"	7'-0"	6'-0"
100'-0"	15'-6"	15'-0"	13'-0"	11'-0"	9'-0"	7'-6"
150'-0"			17'-0"	16'-0"	14'-0"	12'-0"
200'-0"			20'-0"	19'-0"	16'-6"	16'-0"

FIG. 4—SWITCH LENGTHS REQUIRED FOR CURVES

The point of the switch is taken as $\frac{1}{4}$ in. and the heel distance as 4 in. With a 36-in. wheelbase and radius of 200 ft. the angle subtended by the base of the truck is 51 min. and 34 sec., which corresponds to a switch point between 19 and 20 ft. long and therefore is recorded in the third table as 20 ft.

encountered or for each switch traversed, the power lost from this cause will be proportional to the number of accelerations.

It is clear that these factors all have an important bearing on the total drawbar pull of the locomotive and consequently on the total power required to move the train from one terminal to another; and it is evident that, if all things are duly considered, the drawbar pull can be greatly decreased by a proper design of trackwork.

In Fig. 1 it is seen that the equivalent grade due to curve resistance is a big item. In order to reduce this to a minimum the gage of the track on the curves must be properly widened. At this point, however, both the width of tires and the weight of rails must be taken into consideration. If we are to reduce the resistance to a minimum the gage must be properly widened (see Fig. 3).

It has been said already that to keep the resistance due to velocity at the minimum and the haulage power bills also, the train must be kept at the same velocity, or as nearly so as possible, from terminal to terminal. To accomplish this the switches over which the train operates, as well as the curves, must be so designed that the train may safely pass over them at its rated velocity.

In order that this may be done the frog, the switch radius and the switch points must have certain definite relations. An illustration of this is shown in Fig. 4. For example, the angle subtended at the center of the curve by the wheelbase of the truck should remain constant from the point of curvature to the point of tangency. In order that the truck shall be drawn around the curve with a uniform drawbar pull the angle which the switch rail makes with the straight rail must be maintained equal to the angle subtended at the center of the curve by the truck, thus maintain-

ing a uniform drawbar pull from the moment the truck is fully on the switch point until it has rounded the curve and is again on straight track. By designing switches with this point in view it is possible that the rolling stock will receive but one shock, due to impact, when the truck hits the switch rail, whereas if this angle is not kept constant, each change in it means an additional shock or impact.

EVERY TRACK DETAIL MUST MATCH EQUIPMENT

All the relations as above set forth may not be theoretically correct in the last analysis, but they are sufficiently accurate to indicate that if the best results are to be obtained relations between the switch radius, length of switch points, frogs, weight of rail, wheelbase and width of tires cannot be chosen arbitrarily but must be determined by the use of a series of data and tabulations which will guide the designer accurately in the proper choice of the various factors entering into the design.

The foregoing theory and method of carrying out these designs is meant only as an illustration of what is required. This is a long, complicated and very much involved subject, however, which requires not only theoretical formulas and data but also requires many empirical data which can be obtained only by making proper dynamometer and other tests on moving trains.

Provision for Keeping Shaft Sump Clean Of Fallen Coal at Minimum Cost

BY GEORGE BOWKER

West Frankfort, Ill.

AT ALL coal mines using self-dumping cages part of the coal falls down the shaft, some being caught at the ground landing and the rest going back down into the sump. The quantity thus falling varies from a few tons to several carloads per day, depending upon the tonnage and speed of hoisting. At a mine with which I am acquainted the quantity of coal falling back into the sump was so great that hoisting frequently had to be suspended until the cage seats could be cleaned in order to allow the cages to land.

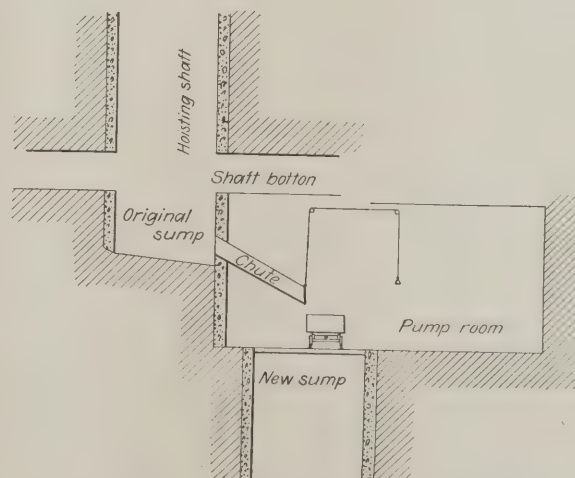
This was not the only trouble, for after the day's hoisting was completed a night shift of six to eight men would have to be employed to clean out the sump so as to be ready for the next day. It can be readily seen that this was very expensive. To avoid this expense the management devised a method that entirely eliminated the delay during the hoisting period and cut down the number of men required to clean the sump from eight to two. This saves the wages of six men at \$7.25 per day, which would aggregate a large sum of money at the end of a year.

DESCRIPTION OF PLAN ADOPTED

The method employed at this mine is as follows: A roadway was driven in the shaft pillar at right angles to the empty run-around. A slope into the bottom was started out of this roadway at right angles to the empty-car track and dipping as it progressed toward the shaft at a slope of 1 in 4. This was driven till the foot of the incline was in line with the end wall of the shaft. The slope was not driven directly under the shaft but a short distance to one side of it. A large sump was then dug about 12x18 ft. and 20 ft. deep.

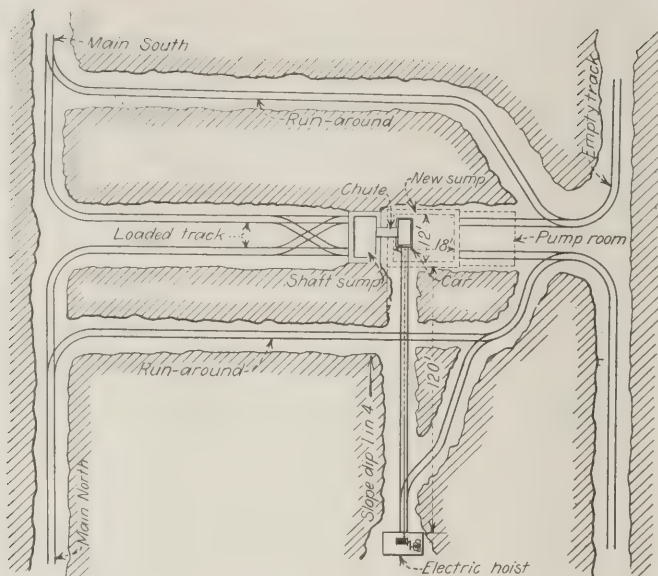
When the sump was finished it was lined with concrete, 30-lb. rails being placed across it upon which a floor was laid. Connection was then made between the original and the new sump and an iron chute built in the concrete wall that entirely separates the two sumps. A pumproom is built alongside the new sump. Here a 6x6½-in. triplex pump handles the water. All the coal falling back during the day is stored in the original sump and chute.

When the sump is to be cleaned a car is placed under the chute and the iron door that closes it is raised by pulling on a lever, allowing the coal to slide out into the car. At the head of the incline an electric hoist is installed to haul the cars up the incline. All the water made in the shaft is collected in a water ring and piped into the new sump, making the shaft bottom completely



SLOPE TO SUMP GIVES ACCESS TO FALLEN COAL

Much coal falls from self-acting shaft dump. Some falls on the tracks of the landing but more into the sump, where it can be reached only with difficulty. An incline has been driven low enough at one end for the coal to be passed through a chute into a car stationed at the track terminal.



TWO SUMPS ARE PROVIDED AT THIS MINE

One, the upper sump, is for coal, and the other, the lower, for water. The sump is, therefore, easily cleaned, and the water never fails to have adequate storage. This arrangement reduced the cleaning force to one-fourth of that formerly employed. The pumps at all times draw their water from a relatively clean sump.

dry. Though this may seem expensive, yet when we consider the quantity of coal falling back in a day's time from an output that runs around 5,000 tons and when we keep in mind the number of men required to clean the sump it will be seen that the improvement will soon pay for itself. By using the electric hoist the coal can be hauled up the incline during working hours and spotted in a convenient place so that the locomotive can take it to the bottom, from which it can be hoisted during the day.

Seam of Coal in Canada 200 Ft. Thick Yet Operation Was for a Time Abandoned

"AT COAL MOUNTAIN, where the Corbin Coal & Coke Co. is mining," said Robert Strachan, in a paper entitled "Coal Mining in British Columbia," presented to the Canadian Institute of Mining and Metallurgy and reported in the *Monthly Bulletin* of the society, "the seams are standing almost perpendicular and attain great thickness, which latter appears to be due to monoclinical folding of the measures. In a horizontal section of 2,604 ft. there is 814 ft. of coal. The whole mountain has not as yet been thoroughly inspected, and although over a million tons of coal have been extracted this tonnage does not represent more than a scratch on the surface of the mountain.

"The seams have been correlated only with difficulty. They are from 150 to 250 ft. in thickness and contain a thick band of shale running irregularly throughout. Great deposits or 'pockets' of coal have been discovered and conservative estimates of the reserves of coal are from 1,500,000 to over 4,000,000 tons. So far, only one of these pockets of coal, locally called the 'Big Showing,' has been attacked. The mine by which it is developed, known as No. 3, is situated about one mile south of and about 6,200 ft. above the town of Corbin. At this point a cut reveals a synclinal basin about 370 ft. in width at the center of which the coal is 200 ft. thick. This deposit is in a direct line with the mines at Corbin and although the geological relations have not as yet

been fully established, drillholes and open cuts have indicated that this 'pocket' is a continuation of the Corbin coal measures.

"The method of mining these large bodies of coal consists of first stripping the surface *débris* and coal blossom and then loading the coal directly by steam shovels into railroad cars. This system did not prove as economical as might have been expected, and much coal was lost in stripping. Little opportunity was afforded for picking out foreign matter or for selecting any portion of the coal being mined, and this mine or quarry later was temporarily abandoned. The operations might have been conducted on a less spectacular scale with more benches and employing either chutes or retarding conveyors to take the coal down the hill in small cars. Had this been done the expensive railway constructed might have been dispensed with. It also would have made it possible to eliminate the extremely fine coal found near the crop as well as the foreign matter, thus providing a more suitable coal for the market.

"In addition to No. 3 mine or the 'Big Showing,' three other mines, Nos. 4, 5 and 6, have been opened convenient to the railway at Corbin. All of these are underground workings. No. 4 mine is worked on a vertical seam of coal approximately 150 ft. thick. No. 5 mine is worked under similar conditions. The No. 6 seam, the most recently opened, was found to be 400 ft. thick at an elevation of 5,315 ft. A level driven on this seam 75 ft. higher proved the thickness of coal to be 375 ft., and another level yet 66 ft. higher proved 150 ft. of coal across the seam.

USE MODIFICATION OF ROOM AND PILLAR METHOD

"The methods followed in working the coal have been modifications of room and pillar adapted to vertical seams. The pillars were subdivided into portions so small that they were crushed. Thus the space formerly occupied by the pillars was filled by a lowering of the roof. The coal was drawn from the chutes until this rock or waste showed up, then the chute was closed and similar operations commenced on another series of pillars outbye.

"With the opening of the large seam at No. 6 mine a new method of working is to be followed. The seam will be blocked out in sections and mined by slicing. Planks or lagging will be laid down as a floor for the first slice, using this floor as a roof for the next slice and allowing the roof to cave. These floors will prevent foreign material from mixing with the slice, or lift, of coal being taken.

The coals mined at Corbin have been found to be much higher in fixed carbon and lower in volatile than the general run of coals in the district. They are more like the seams at Morrissey than like those at either Coal Creek or Michel. The following analysis is typical:

	Per Cent		Per Cent
Moisture.....	0.75	Fixed carbon.....	69.00
Volatile matter.....	22.75	Ash.....	7.50

The various seams which have been mined at Corbin at one time or another are:

Seam No.	Thickness in Feet	Seam No.	Thickness in Feet
1	170	4	200
2	12	5	12
3	200	6	400

The coal is dark, glossy and friable. The weakness of the coal is illustrated by the fact that the pillars will run of their own weight or when assisted by roof pressure.

Why Series Haulage Motors Flash And How to Cure That Fault

Conditions in Design, Commutators, Brushholders, Carbons, Windings and Operation May So Affect Commutation as to Cause It

FLASHING of haulage motors, also commonly known as bucking or blowing, is primarily caused by poor commutation, which results in a sudden breakdown of the insulation over the face of the commutator from the brushholder to the motor frame or ground. As a result there is a sudden rush of heavy current which will either open the circuit breaker, or hang on as an arc, and badly burn the parts short-circuited.

The results of flashing are varied. Sometimes the motor is so badly damaged that it is inoperative. In this case the motor must be overhauled, armature windings repaired, commutator cleaned up, brushholders and wiring-around-frame put in good condition. When the short-circuit is immediately cleared the motor generally can be continued in service to finish its run, but should be reported as defective and given a careful inspection for any damaged parts that need attention.

In Table I is given a detailed layout of the various conditions that affect commutation of a haulage motor which, in turn, influences its flashing.

TABLE I—CONDITIONS THAT TEND TO PRODUCE FLASHING

Design.....	Non-commutating pole type Sensitive neutral High voltage between commutator bars						
Commutators	<table> <tr> <td>Rough face.....</td><td>High bars Low bars Loose bars Flat spots</td></tr> <tr> <td>Poor surface condition...</td><td>Poor undercutting of mica Sharp edges on commutator bars Sharp corners on commutator bars Dirty commutators</td></tr> </table>	Rough face.....	High bars Low bars Loose bars Flat spots	Poor surface condition...	Poor undercutting of mica Sharp edges on commutator bars Sharp corners on commutator bars Dirty commutators		
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Design.—Questions of design are best handled by co-operating with reputable manufacturers. Nothing pleases a manufacturer more than to have the operator of electrical equipment take up questions of design with the designers. The manufacturer who can say that the user has given him many points of advantage which have been incorporated into his machine has a real argument for serving the industry.

(1) The design cannot be changed without practically rebuilding the motor or

(2) By replacing with a modern motor in which the objectionable features have been eliminated.

Commutators.—Care of the commutator is highly important. The commutator is what makes the direct-current machine. Commutator troubles soon develop into serious breakdowns, consequences which affect the operation of the whole machine. Important points are:

(1) The commutators should be tight and have a smooth, highly polished clean face.

(2) If loose, the commutator should be heated and the ringnut or clamping bolts drawn up tight.

(3) All high or low bars and flat spots should be ground smooth if possible; otherwise the armature should be put in a lathe and turned.

(4) The mica should be undercut to a depth of $\frac{3}{8}$ -in., and all particles of mica thoroughly cleaned out of the slot.

(5) If the sharp edges left on the copper segments when undercutting are rounded off, this will improve conditions.

(6) The corners at the outer edge of the commutator face should be rounded off with approximately $\frac{1}{8}$ -in. radius, and those at the inner edge of the commutator face with approximately $\frac{1}{16}$ -in. radius.

(7) The commutator face should be kept free from oil and dust.

Brushholders.—The brushholders may cause the best grade of brush to work poorly. Vibration, chattering, etc., frequently are caused by improper adjustment of the brushholders. The salient points on brushholders are:

(1) On the average, the tension on carbon brushes should be kept at approximately 5 to 7 lb. per square inch.

(2) Broken pressure springs should be replaced by new ones.

(3) When the spring pressure is weak, wind up the tension spring.

(4) If the mechanism tends to stick, a little signal oil on moving parts may relieve this; if not, take the brushholder apart, clean and machine parts that are tight.

(5) When parts are badly worn, allowing the contact tip to rest on top of the carbon box, replace the worn parts by new pieces.

(6) Brushholders should be set approximately $\frac{1}{8}$ -in. from the face of the commutator, and the sides of the box should line up parallel with the commutator segments.

(7) The distance between brushholders measured around the surface of the commutator should be one-fourth of the number of bars.

(8) With but few exceptions, the brushholder carbon box should line up with the center line of the pole.

(9) A carbon box which is worn wider than normal will allow the brush to swing off the neutral. In double-end operation due to uneven wear in running in different directions, the contact area also is considerably reduced. New brushholders will remedy trouble from this cause.

(10) Brushholders should have at least $\frac{1}{8}$ -in. to $\frac{1}{4}$ -in. clearance to ground. When clearance is less than $\frac{1}{8}$ -in., insulating arc shields, properly located, can be used to advantage.

(11) Lining the inside of the motor frames around the brushholders, and at the commutator front V-ring, with insulating material tends to reduce flashing at these points.

Carbon Brushes.—Low-grade carbons are expensive

at any price. Cases have been known where a good brush would last years while a poor brush would cause more damage to the commutator in a day than the proper brush would cause in two or three years. Due consideration must be given to the following points:

(1) Poor commutation can sometimes be greatly improved by changing to a higher grade of carbon brush.

(2) If the carbons are too long, the resultant pressure from the brushholder contact tip is not on the top of the carbons, and the effective force on top of the carbons is reduced. For the more recently designed brushholders, carbons when new, should be 2 in. long.

(3) When the carbons are too short, the pressure on top of carbon is reduced, due to the design of the spring, and sometimes when the carbon is very short it is entirely out of range of the spring, which strikes the side of the box. These carbons should be replaced by new ones.

(4) Loose carbons cause vibration and tend toward poor commutation. Use new carbons with 0.006 to 0.008 in. initial clearance.

(5) Tight carbons stick in the boxes and the contact at the surface of the commutator is broken. This condition can be remedied by rubbing the sides of the carbons on sandpaper.

(6) Broken carbons should be replaced.

Windings.—The windings should be kept clean of all kinds of dust, dirt and oil. This does not mean the mere cleaning of the other surfaces of the winding. The gradual accumulation of carbon dust in a winding is sure to cause trouble. Machines which have broken down because of insulation failure show a surprising accumulation of dust and dirt in the windings, this being the more surprising when the machine is known to have been operated under the best of conditions. The ventilating air currents passing through the winding are laden with small particles of carbon and copper dust.

Summarizing the important points on proper care of the winding they are:

(1) Wiring around frame leads to brushholders, if broken or loose, so as to swing against the frame, should be repaired and securely fastened.

(2) In connecting the leads to the commutator it sometimes happens that the throw of the lead is either too great or too short, which has the same effect as shifting the brushholders.

(3) Short-circuited main field coils produce a weak field and result in poor commutation; this condition further has a damping effect on the field that opposes sudden field changes with same results.

(4) A reversed main field coil produces a weak field and consequent poor commutation. Check the polarity and reconnect.

(5) Field control motors with coils that have a number of turns arranged to be cut out have been known to be so connected that the weak field is used in place of the strong one. Check connections.

(6) Where the field coil is encased in a metal box to make it water and fireproof, this box acts as a damper and opposes sudden field changes. Sometimes this is remedied by making a saw-cut in the box and filling the opening with a hard insulating material.

(7) A short-circuited commutating pole-coil produces a weaker commutating field, which results in poorer commutation.

(8) A reversed commutating pole-coil weakens the commutating field and results in poorer commutation. Check the polarity of the coils.

Operation.—Ignorance of the proper care and operation of electrical machinery sometimes is dangerous and always is uneconomical from a maintenance and power point of view. Several suggestions for bettering conditions may be grouped as follows:

(1) Faulty control operation that allows sudden voltage changes at motor terminals can be remedied by checking the control circuit.

(2) Rapid acceleration can be remedied by issuing instructions to the motor-men or by the use of an automotioneer or automatic control.

(3) Suddenly reversing the current through the motors to make a quick stop, commonly known as plugging the motors, tends to cause flashing. A campaign of education of the motormen is the best remedy.

(4) Heavy service with a number of cars pulling on the line at the same time, sometimes causes sudden voltage changes, resulting in flashing. This condition might be helped somewhat by a rearrangement of the schedule.

(5) Troubles caused by breaks in the trolley at cross-overs can best be reduced by passing over this special construction work with power off.

(6) Where high-speed running (ordinarily down-grade) causes flashing, the motorman should keep within a definite maximum speed.

(7) If high trolley voltage—600 to 650—is used on motors designed for 500 volts, motor details must be kept in good condition.

(8) When the motors are overworked and considerable heat and gas (from insulating compounds of newly repaired windings) are present inside the motors, these tend to prolong a flashover, and can be relieved by operating the motors with the commutator covers off.

(9) Loose or worn bearings allow considerable vibration, which tends to lift the carbons from the commutator, and cause flashing.

(10) Rough track has an effect like loose bearings.

(11) Cars with flat wheels produce the same result as running over a rough track. Defective wheels should be made round by turning or grinding or by the use of an emery insert brake-shoe.

U. M. W. Stubbornly Oppose Labor-Saving Machinery in Pennsylvania Mines

Opposition of the United Mine Workers to the introduction of labor-saving machinery in soft-coal mines is so stubborn that the operators of the central Pennsylvania field felt that they had to make a plea to the U. S. Coal Commission to devise means for safeguarding the union mines in their efforts to keep abreast of present day mining methods.

One glaring instance was cited where, after the operator had obtained a coal-cutting machine and offered to have it tried out, then came to an agreement with the men as to pay rates for those operating the machine, the men called a strike, flatly refusing to countenance the cutting machine in the mine, and forced the operator to remove it.

The central Pennsylvania operators pointed out to the Commission that machines have been allowed in the unionized mines of their district only after their introduction in open-shop mines made competition so severe that it would have been impossible to attempt to go on mining coal with only the old-fashioned pick method, which is far less efficient and economical than machine cutting of coal.

The operators frankly informed the Commission that in their opinion if the coal-mining industry was 100 per cent unionized—as the United Mine Workers have proposed as a panacea for all the ills of the coal industry—there never would be another machine introduced into a coal mine in the country. This would mean, of course, that it would cost much more to produce the coal, and it necessarily would sell for a higher price to the public.

Creosoting Experience at Two Small Mining Plants

Pressure-Treated Timber as Good as New After Thirteen Years—
Untreated Sets Replaced Three to Five Times — Brush-Coated
Timber Still Sound After Four Years — Now Using Dipped Timber

BY THOMAS R. CLARK
Clark Coal & Coke Co., Peoria, Ill.

OBTAINING the proper kind of timber for coal mines each year becomes an increasingly difficult problem for the operator. Only the strongest and best woods will perform the service demanded and, therefore, the buyer is limited in his search for timber. The conditions under which the timbers are used are the worst imaginable, and it is remarkable that they last as long as they do.

In this article reference will be made solely to treatment with creosote. In the Peoria district of Illinois practically no attempt has been made to apply preservatives to timber, and the company with which I am identified is a pioneer in this respect.

Back in 1910 a carload of 6- and 8-ft. pressure-treated crossbars and lags was purchased. They were used to timber a main haulage road; today practically every set is still standing and in good condition. The treated wood is still so hard that it is almost impossible to stick a knife blade into it. Several sets of timbers erected in 1910 have been discarded but practically in every instance in which the timber has been replaced the necessity for its replacement may be ascribed to excessive weight. The main haulage road was not timbered throughout its entire length with creosoted timbers because the supply was exhausted, and untreated timbers had to be used to finish the job.

CREOSOTING DOUBLED FIRST COST OF TIMBER

The untreated timbers have had to be renewed three and, in some cases, four and five times. At the time the creosoted timbers were put in the cost of creosoting amounted to just about what the untreated timbers cost, so it can readily be seen that if these timbers stood twice as long as an untreated set, they had paid for themselves in the material saving alone. However, the big expense in timbering is labor, not only of framing and putting up the timber but handling the dirt and rock that often falls when an old set of timbers is replaced with a new one; thus the economy is many times that of the actual material saved.

Four years ago the lasting qualities of these timbers were so apparent, and investigation proved the results to be so satisfying that it was decided to put in more creosoted timber. It was found that the pressure process was an expensive one; therefore we were forced to try other methods. A few barrels of creosote oil were bought and applied to about twenty sets of timbers that were going into a place where it was necessary to renew timber about every two or three years. A liberal two-coat brush treatment was given to timber that had been barked and seasoned.

Today these timbers are still standing and show no signs of decay; therefore it will be seen that even so slight a treatment as brushing pays. The brush treatment, however, does not always give the desired penetration, and it also is expensive to apply. It seemed to us that a dip of some kind would be the logical

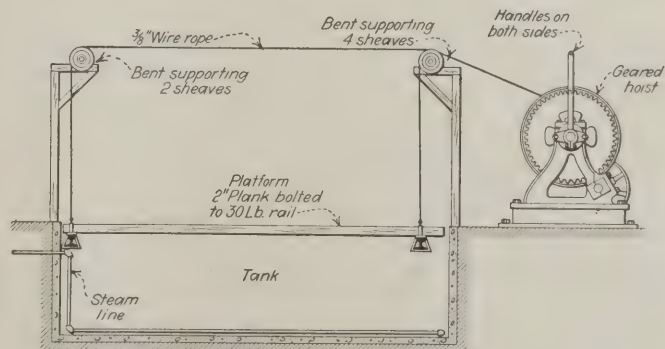
method of overcoming these difficulties, and, accordingly two years ago we built a dipping plant at our Logan mine, which is located at Hanna City. On account of a limited appropriation for this work Fred Waters, the superintendent at that mine, and I, decided that simplicity must be the first consideration.

We first built a cement tank 5x18 ft. in horizontal dimensions and 4 ft. deep; to this was connected a sloping drainage platform of concrete in which were embedded short pieces of upstanding $\frac{1}{2}$ -in. iron, so that the wet timber when placed on the drainage table would not roll back into the tank. In the bottom of the tank several lengths of 1-in. pipe were laid and connected together into one line by return elbows. This line was attached to an exhaust-steam line so that we could heat the creosote. This is all the equipment that was used except that an inexpensive building was put up over the tank to keep out the rain.

PUT TIMBER IN HOT CREOSOTE AND LET IT COOL

The expensive pressure process has as one of its fundamentals the theory that using first hot and then cold creosote will afford the maximum penetration. We decided that, on account of the small quantity of timber which we expected to creosote and the fact that we were not hurried in doing this work, we could raise the temperature of the creosote to a boiling point or near to it and allow the timber to stay immersed until the temperature had cooled down to that of the atmosphere or somewhere near it.

At the Logan mine there was a part of the day when coal was not being hoisted and top men were not busy, and therefore it cost us practically nothing for the labor of creosoting by doing a little of it every day. We kept a two weeks' supply of timber on hand. Consequently the creosote was given an opportunity to soak in thoroughly. This eliminated one of the objections to creosoting timber, namely, that timber men dislike



CONCRETE TANK FOR DIPPING TIMBER IN CREOSOTE

Timber sticks are lowered on a platform into creosote, heated by exhaust steam which is passed through pipes in the bottom of the tank. The creosote is allowed to cool. Thus the stick is given the advantage of both hot and cold treatment. The timber finally is lifted by the hoist and rolled on the draining table, where the free creosote runs off and the timber dries. This table is not shown in the illustration.

handling timber when it is still wet and slimy. The results at this mine were so gratifying that we decided last winter to install a similar plant at Empire No. 2 Mine.

This is a larger mine than that at Hanna City, and to meet those conditions the designs of the plant were changed somewhat and advantage was taken of experience at the Hanna Mine. The same kind of a tank was built, but drip platforms were placed on both sides so that timbers could be handled on either side and more than one run could be made per day. A platform was designed so that the timbers could be lowered into the creosote and lifted out again without having to resort to the laborious and time-consuming process of fishing out the timbers with a pair of hooked poles.

AVERTS BURNS FROM SPLASHING OF CREOSOTE

This also prevented the splashing of creosote on the men who were handling the timber. Creosote burns the skin and causes irritation for several days after the burn is received. The hoist which operates this platform is shown in the accompanying illustration. S. H. Dodd and Benjamin Wyss, superintendent and master mechanic, respectively, designed and built this hoist.

The plant at Hanna City cost less than \$500 to erect and that at Empire No. 2 cost about \$850. The cost of the creosote itself is about the only expense we have had to meet, for the work can be done at odd moments. We have found that once in a while we have to go to the expense of repiling the timber, but this is due to the fact that we have a limited amount of top space, and any mine with adequate timber storage room would not have all this trouble.

Undoubtedly the question will be asked, Do you creosote all the timbers? The answer is, No. We use creosoted timbers only on main entries and cross entries where the timber has to be maintained for four years or more. Good white-oak timber will stand for four years if properly placed, and it would not be of any advantage to put in the more expensive creosoted timbers for this length of time.

SOME WOODS TAKE MORE CREOSOTE THAN OTHERS

Creosote does not work equally well on all woods. White oak and other similarly close-grained woods do not absorb much creosote. Red oak and black oak, we have found soak up creosote successfully. To anyone who is interested in what woods will take creosote, let it be said that nearly all the manufacturers of wood preservatives have bulletins and literature on the subject.

We have made experiments also on the creosoting of the ties used on locomotive haulage roads. We have creosoted the bents supporting a belt conveyor and the linings and guides of shafts. However, we do not care to go on record as yet as to the advisability of this practice, as these timbers have not been in service long enough to prove whether it pays to preserve them with creosote. We believe, however, that the creosoting of these timbers will be highly successful. We have used "Carbosota" exclusively. Undoubtedly, there are other good preservatives on the market, but as we have had success with this brand from the start, we have not tried any other.

Though creosoted timbers are more expensive in first cost than untreated timbers, still they pay such big dividends that they ought to come into more general use. However, even if creosoting or any other method of preserving wood only "showed an even break" on

the ledger, it behooves all of us to make use of them because preservation conserves one of our greatest national resources and the conserving of national resources is one of the greatest patriotic services any good citizen can render.

Well-Placed Shots in Upraise Save Timber

BY J. W. POWELL
Charleston, W. Va.

IN THE issue of *Coal Age* of May 4, 1922, appeared an article entitled "Driving an Upraise Shaft." This article described the method in detail with the help of drawings which showed sectional elevations of the upraise shaft and also a general plan of the shaft and details of the raise.

Though this article was published in May it was not until Aug. 15, 1922, that the work of upraising was commenced. The job which was done by contract, was performed precisely in the manner described in the preceding article, with one exception, that an additional 2-in. pipe was carried up the manway compartment to serve as a speaking tube. This was found to work most satisfactorily. A 15-ft. length of discarded 2-in. steam hose was affixed to the upper end of the speaking tube, which was coiled up when first placed and then uncoiled as the face advanced until there was room for another 10-ft. length of steel pipe.

The main pipe line was then extended up to the platform, and an extension hose attached for the next 10 ft. of advance. This installation made it unnecessary for the workmen upraising the shaft to climb up and down to the platform when they wished to communicate with the men below, for the pipe was flexible and could be extended as needed. Thus much time was saved.

Herewith will be found sketches of the system of drilling and blasting which was employed, showing the number of holes and their position. From thirty-five

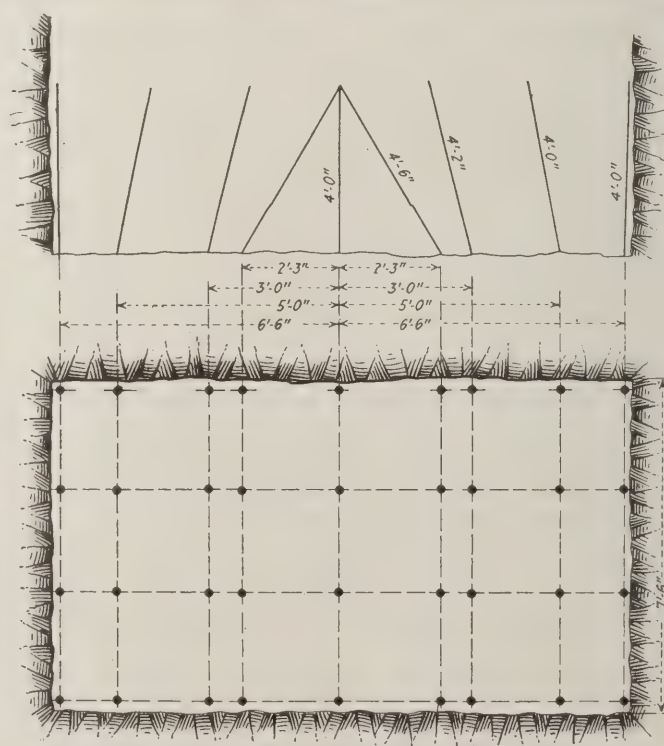


FIG. 1—BLASTING DIAGRAM, ORIGINAL SYSTEM
As performed at the start the first shot was placed in the center of the shaft. The others blew straight downward at the center, and the rock fell, as propelled by the explosive, onto the timbers, frequently displacing them.

to forty-four holes were drilled to a round, and the number of holes was governed by the nature of the rock being penetrated.

When the shaft raise was commenced the system used was that shown in Fig. 1, but this did not work quite satisfactorily, principally on account of the breaking holes blasting down on cribbing timbers and thus tending to knock them out of line. The system shown in Fig. 2 then was devised, and this worked well and, in consequence was used throughout the entire work.

It readily will be seen that by blasting the cut shots on the left rib, and then the other rows of holes in succession, all material was blasted away from the timber below and all the violence was exerted against the left-hand rib of the shaft. Thus was eliminated the trouble that had been previously experienced from shots knocking the cribbing timbers out of alignment.

These holes were blasted in order as follows: Nos. 1, 2 and 3, using from 4 to 6 sticks of $\frac{7}{8}$ -in. 60 per cent gelatine dynamite, were fired in succession with straight first- and second-delay fuses; then Nos. 4, 5 and 6, using from 5 to 7 sticks of $\frac{7}{8}$ -in. 60 per cent gelatine dynamite. The lift was then completed by firing all holes in rows Nos. 7, 8, 9 and 10; Nos. 7 and 8 being fired by straight fuses and Nos. 9 and 10 with first-delay fuses.

By this method the shots in each hole had a good chance to break the rock, as care always was taken to see that all holes of the previous round were broken completely to their far ends before the next round was charged. Sometimes it was necessary to charge some of the holes the second time to accomplish this.

It was necessary to drill this large number of holes in order to break up the rock into small pieces, so that they would not block in the rock compartment, which was kept full, only enough being drawn from time to time to clean the raise to a point about 7 ft. below the face. It was predicted by a number of mining men that the job would be troubled by the blocking of the rock compartment.

Although the shaft was raised a distance of 200-ft. vertically, however, the rock never once blocked. This was due to the fact that the rock was blasted into small pieces, far smaller than was expected. Poke holes had been provided every 30 ft. in the partition between the rock compartment and the manway, so that in case the rock should block, the flow of debris readily could be started. However, these poke holes never were used.

SHAFT READILY PLUMBED ON POINTS BELOW

The following method was used in plumbing the shaft: Four stations were placed in the bottom rock of the coal seam, 4 in. from each corner of the manway and hoistway compartments. These stations were located on plugs of hardwood, driven into $1\frac{1}{2}$ -in. holes drilled 10 in. into bottom rock with a jack hammer; points were located on these plugs and all plumbing was carried to these points. The alignment was such that the upraise met the main shaft sinking from above without error.

This raise shaft, 7x14-ft. in the clear, was raised a distance of 200 ft. in ten weeks, working two shifts of ten hours each. This arrangement of working time was found more satisfactory than three shifts of eight hours, as there was only one change of shifts instead of two. This effected quite a saving in the time lost in the changing of shifts and was entirely satisfactory to the men, who preferred it to working the usual three eight-hour shifts.

In order to reduce to a minimum the chances of

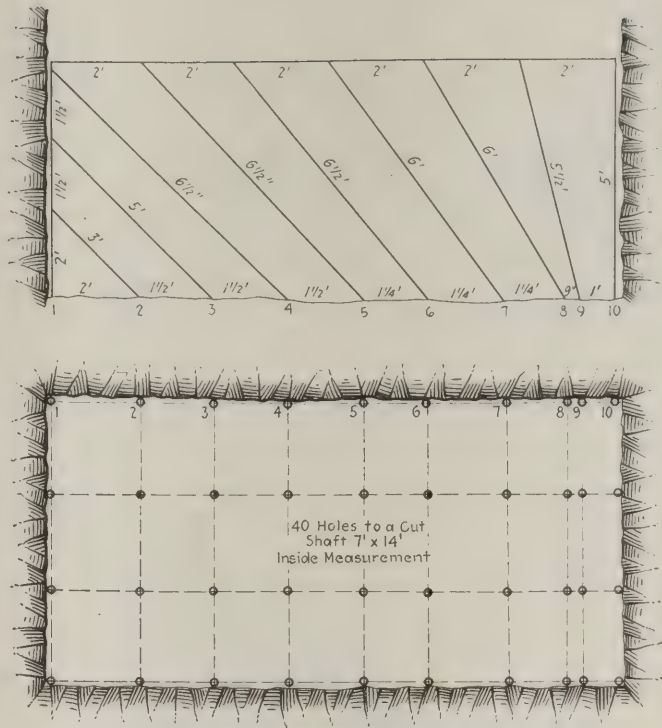


FIG. 2—BLASTING SYSTEM AS FINALLY ADOPTED

By starting the lift on the left and shooting toward one side the rock struck the side of the shaft and so did little damage to the timber beneath. At the same time it was broken so fine that it did not block in the battery.

accident from loose pieces of rock falling from above, which is one of the chief hazards in this class of work, the men were equipped with steel helmets which could be bought for 20c. each in the company store. This headgear was uncomfortable at first, but the men soon got used to it and would not attempt to go to the face of the upraise without it. It is necessary after each blast to climb the ladderway to the face and trim down all loose and hanging pieces of rock, and as this material is directly above the workman his head has to be safeguarded.

This was accomplished by the use of the helmet, and the men found they could trim down the loose rock with short and long scaling bars in comparative safety. Though the steel helmets showed numerous indentations, not a man was hurt when using one of them, the only accident occurring when one of the men undertook to go to the face without wearing his helmet. In this instance a small piece of rock fell, causing a slight scalp wound, which laid him off for the balance of the shift.

The shaft was raised from below to a point 23 ft. from the bottom of the shaft being sunk from above. After the distance between the main shaft and the upraise had been reduced the men were withdrawn from the upraise whenever the main shaft was blasted and in like manner the men in the main shaft were removed whenever the upraise shaft below was being blasted.

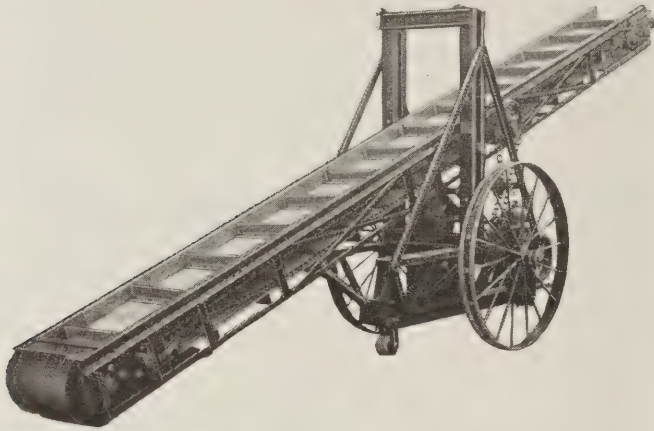
HERBERT HOOVER has been elected an honorary member of the Czechoslovak Engineers and Architects Association, it is announced by the Federated American Engineering Societies, of which Mr. Hoover was the first president. The honor was conferred at the annual conference of the association held recently at Kosice in recognition of "merit in engineering science and practice and good rendered to our people." Mr. Hoover was chairman of the Committee on Elimination of Waste in Industry, whose report has been translated by the Government of Czechoslovakia and distributed to industries and educational institutions there.

New Equipment

Portable Belt Conveyor

TIME and labor are saved by the use of a new portable belt conveyor which is especially suitable for coal handling. It also is generally applicable to the handling of construction materials and supplies such as stone, sand, gravel, earth, clay and for piling bagged or boxed materials.

The belt travels on a flat track. This flat track moves with the belt and at the same speed as the belt. This



MATERIAL HANDLING CONVEYOR

The track consists of a link-belt chain with crosspieces which may be adjusted to suitable intervals. Flights and belt move at the same speed and there is no friction under the belt.

prevents friction on the belt and insures a flat belt surface. Power-driven brushes prevent any accumulation of material on the belt surface.

This conveyor is manufactured by the Maroa Manufacturing Co., Maroa, Ill., and can be had with several different types of trucks. The equipment can be obtained with or without an electric-motor or gasoline-engine power drive.

New Development in Material Transporting

THE Chisholm-Moore Manufacturing Co., of Cleveland, Ohio, manufacturers of the Cyclone chain hoists, having recently become the sole distributors of the Atlas carryall truck system, have issued a new circular and complete book of instructions which describe the construction and installation of the system.

These new booklets bring out some interesting details with respect to this system of overhead conveying.

The labor of routing and transporting material in a shop, stockroom or warehouse was long ago recognized as one of the principal items of cost. Overhead conveying has done a great deal in cutting costs, speeding up transportation and doing away with the trucking congestion of floors. It also eliminates most of the ordinary accidents caused by factory transportation and prevents wear and replacements of floors necessitated by trucks.

The truck of the Atlas System is suspended from heavy steel hangers, spaced at intervals of 2 to 4 ft., depending upon the load to be carried. In some cases it does not require a superstructure, as it may be sus-

pended from timbers, ceilings, joists or steel trusses by brackets made especially for that purpose. It may readily be suspended from crossbeams in concrete ceilings.

The switching system permits the use of two- or three-way switches. The tongue is pivoted at one end and has steel rollers on the other end which move on a machined surface and drop into a groove, bringing the tongue into perfect alignment with the stationary track.

Trolleys are made in several sizes, ranging from one-half ton to two-ton capacity and are so constructed as to require a low head-room. The trolley frames are so designed that both ends act as bumpers and allow two or more trolleys to operate on the same track without the trolley wheels touching. Trolley wheels have chilled face surfaces and are equipped with Hyatt roller bearings in dustproof housings.

A most novel innovation is the automatic track gap filler used wherever the track passes through a doorway.

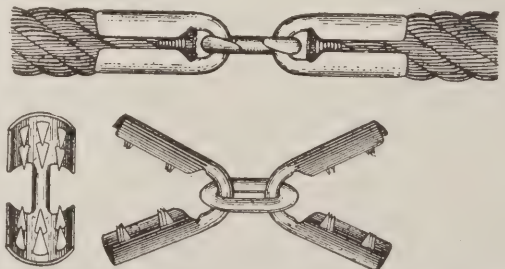
Eliminating the Time-Consuming Splice

TIME is a leading element in tonnage. A broken rope means time lost, and time lost means standing cars, an idle tippie and loss of morale. A quick repair and money is saved. To stop a slope for the splicing of a cable is to make a bad tonnage report and a high cost record. Charles N. Finton, of Lykens, Pa., has a splice that seems likely to cut out such delays.

It has no rivets or other devices requiring special tools, and it has no loose or detachable parts to get lost, or be forgotten. It is said to hold the ends of the rope firmly without mutilating the strands or weakening the rope, and anyone can install it. It is so simple that a description will help but little to make its method of operation any plainer. The free end of the rope is bound with butcher twine or other suitable binder.

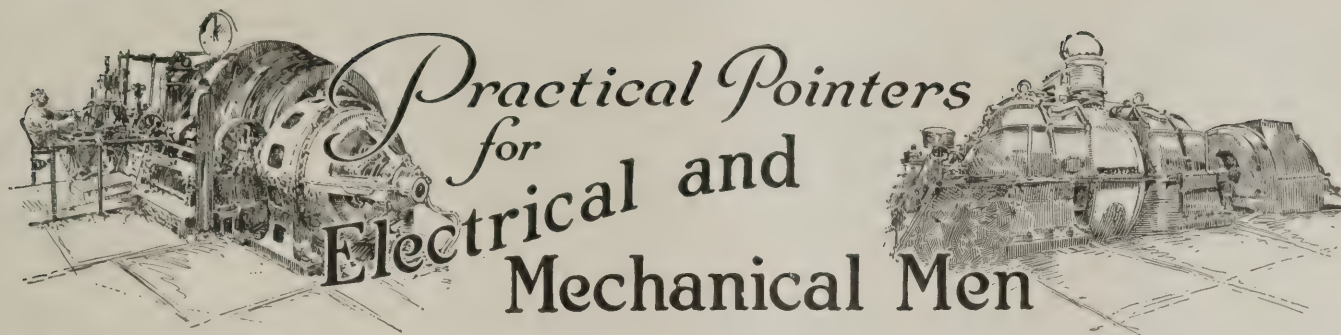
A socket of suitable size is kept on hand, and the rope is inserted in the open jaws with the wrapped end close to the shank. The jaws are forced together closing about the rope, the coniform teeth penetrating without severing or breaking the strands or fibers, which merely part and entwine the teeth. When using a solid link it is slipped over the shank before closing.

The diameter of the socket when closed decreases as it extends away from the shank, the tapering of the jaws being such that its diameter when closed about the rope is equal to, or less than, the diameter of the rope, thus assuring an easy passage over the pulleys. No tool is needed except a hammer. No dies or swages are necessary. When the rope breaks the socket is taken off by burning out the old rope strands and prying the socket loose.



SOCKET WHICH COUPLES UP A BROKEN ROPE

The socketed portion is of smaller diameter than the rope. A piece of twine and a hammer are all the equipment needed to make the rope ready for use. Only a few men can splice a rope. Any rope rider or roadman can fix this socket and do the work alone and in far less time than any man, however expert, would take to splice it.



Renewing and Lubricating Trolley Wheels

IT MAY be valuable to some of the readers of *Coal Age* to know that the common practice around the mines to replace a worn-out trolley wheel with a new one without renewing the pin or axle of the same is poor practice, because the old pin usually possesses a few flat spots or sharp edges which act as a reamer, thus reducing the life of the bushing to a minimum.

The use of oil on trolley wheels with graphite bushings also should be avoided, as graphite is more or less soluble in all lubricating oils—that is, most if not all lubricating oils possess a sufficient amount of solvent to destroy the graphite bushing. Therefore nothing but a good grade of grease should be used on these bushings, and the best grease usually will be that recommended by the manufacturer of the graphite bushings.

ROYCE L. GRIMES,

Electrical and Chemical Engineer.

Cleveland, Ohio.

Building Up the Commutator and Core On Mine-Locomotive Armatures

THERE are four general methods of mounting the commutator and core on a locomotive motor-armature shaft. On the more modern motors, especially of the smaller sizes, the iron is built directly on the shaft and held in place by a nut at the commutator end; this arrangement is used mostly on the ventilated type motors having longitudinal ventilating ducts through the core and a fan at the rear end. Where space is available the spider type of construction also is used. The other two types mentioned below have been superseded, as it is necessary to disconnect the armature leads from the commutator when a shaft is to be replaced. Some of these older type shafts have wiper rings screwed on the shaft, but this practice has been changed to a shrunk-on type of wiper on the more modern motors.

Iron Built on Shaft, Nut at Commutator End.—In Fig. 1 is shown the construction in which the armature iron and commutator bushing are mounted directly on the shaft and depend upon the press fit, the key, and

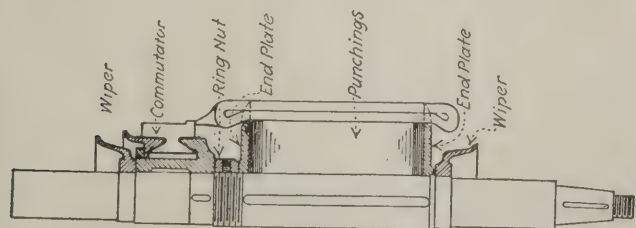


FIG. 1—IRON BUILT ON SHAFT NUT ON COMMUTATOR END
The iron is placed directly on the shaft. This is the usual construction for armatures of small diameter.

the locknut at the commutator end to keep them in place. The fan and commutator-end wiper ring, which have been shrunk on, are removed by heating them with one or more blow torches (keeping the shaft cool by wrapping it with wet asbestos) and driving them off with a hammer and chisel.

After the fan and wiper are removed, clamp the core and commutator together by placing over the shaft two pieces of iron pipe, one on each end, large enough to clear the armature nut and long enough so that the plates placed over the shaft and against the pipes will clear the end of the commutator and the end of the coils at the pinion end, as shown in Fig. 5. Bolt the plates together, using four or more bolts just clearing the outside of the armature. Take special care to cut the pipes off square and to pull the bolts up evenly to prevent warping the core when the shaft is removed.

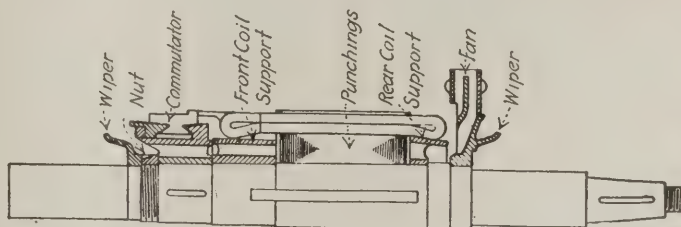


FIG. 2—IRON BUILT ON A SPIDER

This is the construction commonly used on mine locomotives and is claimed to afford better ventilation.

Allow clearance enough at the pinion end between the plate and the shaft so that the key will clear.

Another form of clamp has rings machined to fit the commutator and rear coil support, with bolts through the longitudinal vent ducts. When the clamp is in place, back off the locknut at the commutator end, press out the shaft by applying pressure at its commutator end, and replace with a new one. With the new shaft in the core, apply and tighten the armature nut, remove the clamp and shrink on the fan and wiper ring.

Spider Construction.—In Fig. 2 is shown the construction where the armature iron and commutator bushing are mounted on a spider, which is, in turn, mounted on the shaft. The commutator end wiper and the fan are shrunk on. To remove the shaft, take off the pinion end wiper ring (or fan, if a fan is used) by heating as described above. With this type it is not necessary to remove the commutator end wiper, as it comes off with the core. Pressure is applied at the commutator end of the shaft in removing. The new shaft is pressed in, and after it is in place the commutator end and pinion end wiper or fan are shrunk on. This method applies both to spiders with separate rear-end bells and to spiders with rear-end bells cast integral.

Iron Built on Shaft, Nut Between Commutator and

Core.—In Fig. 3 the commutator spider and core are shown mounted directly on the shaft with a ring nut between the commutator and the core. With this type of construction, it is necessary to lift the armature leads out of the commutator neck, remove the wiper rings and pull the commutator first. The commutator is provided with tapped holes for bolts to aid in this operation. After the commutator is removed, clamp the core together, using a modification of the clamping device shown in Fig. 5, back off the ring nut, and press out the shaft, applying pressure at the commutator end. After the new shaft is in place, apply the ring nut to secure the core, press on the commutator, shrink on the wiper rings and reconnect the windings.

Iron Built on Shaft, Not at Pinion End.—In Fig. 4 is shown a type in which there is a shoulder on the shaft between the commutator and the core. In this case it is necessary to disconnect the windings the same as described in connection with Fig. 3. Remove the wiper rings and pull the commutator as described above. Clamp the core together, back off the ring nut at the pinion end and press out the shaft, applying pressure at its pinion end. Press in the new shaft and apply the ring nut, which should be drawn up tight before the clamp is removed. Replace the commutator and reconnect, then shrink on the wiper rings.

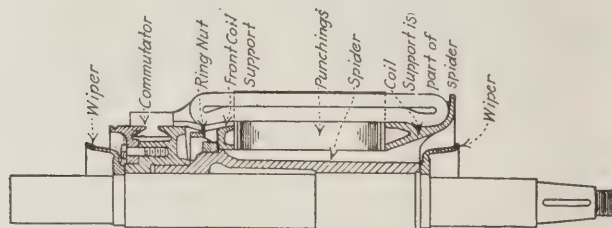


FIG. 3—IRON BUILT ON SHAFT NUT BETWEEN COMMUTATOR AND CORE

It is important to lock the nut properly to retain the core in position and prevent any vibration.

Precautions.—In connection with the replacing of shafts of locomotive motor armatures, the following points should be kept in mind:

- (1) A little white lead on the shaft at the fit before pressure is applied acts as a lubricant and prevents rust.
- (2) New shafts should have fillets at all changes in diameter, as they tend to prevent breaking of the shaft.
- (3) New shafts should be made about 0.004 in. larger than the original shaft at the press fit, to insure the proper tonnage in pressing them in.
- (4) Check the clearances between the top of the key and the keyseat in the core to prevent binding at this point.
- (5) Chamfer the start of the commutator bore to allow the shaft to enter straight and get an even start.
- (6) Shafts should be pressed in at approximately

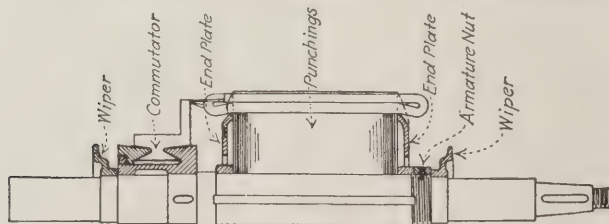


FIG. 4—IRON BUILT ON SHAFT SHOULDER BETWEEN COMMUTATOR AND CORE

In repairing the armature shaft it is necessary to avoid sharp changes in diameters, as these points usually develop into flaws.

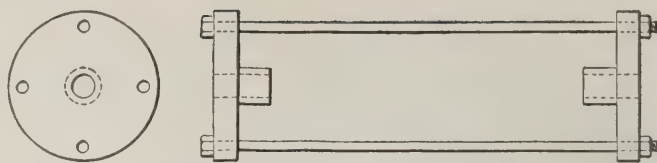


FIG. 5—CLAMP FOR HOLDING ARMATURE WHILE SHAFT IS REMOVED

This device will facilitate the work when the shaft is to be replaced.

20 to 25 tons on motors from 25 to 50 hp. and about 40 to 50 tons for sizes above 50 hp.

(7) Wherever possible, the armature nut should be removed and replaced while the clamps are in place.

(8) Shafts will press out approximately 1.5 to 2 times the tonnage used when they are pressed in, because of slight rusting and flowing of metal.

(9) The press fit will vary, depending upon the material of the core. Steel or malleable iron can safely stand a higher tonnage than cast iron.

An Accomplished Feat of Drying Out an Electric Mine Locomotive

DURING the second week of March, 1922, a heavy downfall of rain flooded the lower levels of our Hazleton No. 1 slope and completely submerged one of the 7½-ton Baldwin-Westinghouse electric locomotives for a period of 34 hours.

As there was great demand for coal at that time and a large portion of the production of this colliery depended upon this locomotive, it was necessary to have it put back into operation with the least possible delay.

To accomplish this, it was decided to apply power to the normal motor circuits and set up enough heat to dry out the equipment without dismantling the locomotive. It was accordingly taken to a place of safety where men and material were in readiness to start the drying process. The water was first drained from both motors and the brakes were applied to prevent the locomotive from moving. Power was then obtained from the 275-volt trolley line through 12 frames of resistance grids. By turning the reverse drum to a series position to connect both motors in series and turning the controller on one notch, the current was maintained at 65 individual parts.

This method proved very successful as it required only 16 hours to dry out the locomotive completely and place it in operation.

Up to date, no bad effects have resulted from the amperes. This arrangement furnished sufficient current to raise the temperature in the windings and also the motor circuits enough to drive out the moisture very quickly, instead of the more lengthy process of taking the equipment apart and applying external heat to the submersion and drying.

GEORGE BRIESEL,
Electrician, Hazleton No. 1 Colliery,
Lehigh Valley Coal Co.

F. E. CASH, MINING ENGINEER, attached to the Pittsburgh experiment station of the U. S. Bureau of Mines, recently visited and inspected thirteen coal-stripping operations in Harrison and Jefferson counties, Ohio, in connection with a detailed study of methods employed in the various coal-stripping operations in the United States which is being made by the Bureau of Mines.



Problems of Operating Men

Edited by
James T. Beard



Supporting Roof Over Roadway to Avoid Accidents

Method Much Used in England—Cross-bars Supported on Eyebeam Stringers Resting on Steel Bars Set in Rib

REFERENCE has frequently been made in *Coal Age*, regarding the necessity of avoiding the use of posts for supporting the roof on roadways. It is readily recognized that many fatal accidents have occurred by reason of a derailed car knocking out one or more posts at the side of the road and causing a roof fall. To prevent this, it is necessary to find other means of supporting the crossbars than resting them on full-length posts standing on the bottom.

The most common form of timbering adopted for that purpose is the use of short legs set in hitches cut in the rib. This method has given good satisfaction where the coal is hard. Again, the plan is adopted of cutting hitches in the coal at the roof, or in the formation just above the coal and slipping the ends of the crossbars into these hitches, and wedging them tightly



FIG. 1—TWO WAYS OF SUPPORTING CROSSBARS

in place. These two methods are shown in Fig. 1, the one on the left and the other on the right of the figure.

As has been pointed out in *Coal Age*, the success or failure of these methods depends on the nature of the coal and its ability to support the pressure thrown on it by the timbers. I have known of instances where the coal had very pronounced cleats that were well developed and when the timbers took the weight these cleavages running parallel to the entry opened up and slabs of coal fell into the road, bringing down the timbers and great quantities of loose slate.

METHOD OF ROOF SUPPORT USED IN ENGLAND

In this connection, permit me to describe what to my mind is an ideal method of timbering a main haulage road. As far as my knowledge goes, the plan has not been adopted in this country, but it is one that is frequently employed in England where it has given success. Briefly described, the method is as follows:

At a certain uniform height above the rail, chosen to conform to the conditions of haulage in the mine, holes are drilled in the ribs on each side of the road. Jackhammer drills are used for the purpose. These are operated by compressed air, the compressor being mounted on a truck running on the mine track, so that

it can be moved from place to place as may be necessary.

The depth of the holes and the distance apart will, of course, depend on the hardness of the coal and the character of the roof, respectively. As shown in Fig. 2, short lengths of steel bars are driven into these

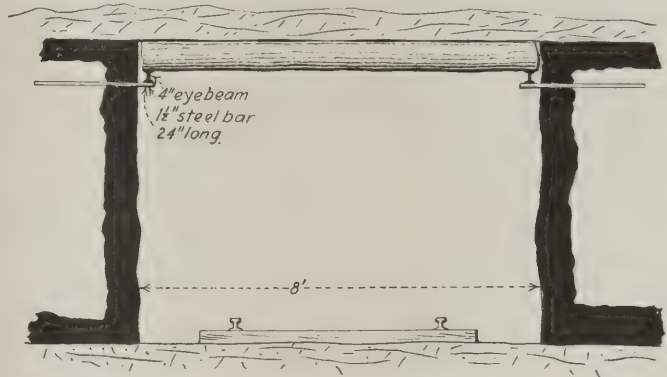


FIG. 2—CROSSBAR RESTING ON EYEBEAM STRINGERS

holes and allowed to project several inches into the entry; and on the bars are placed the iron rails or stringers, which are to form the supports for the crossbars spaced at equal distances apart.

To my mind, the entire plan is simple and effective. When the work is once complete there is little additional expense to keep the road in good condition. Where the roof is frail or tender, lagging must be used over the crossbars. Where cavities occur in the roof, the space must be filled with lagging that is built up crosswise, in successive layers, after the usual log-cabin style of timbering such places.

West Frankfort, Ill.

GEORGE BOWKER.

Relation of Mine Supplies to Favorable Working Conditions

Ordering unneeded supplies is waste of material—System in care of supplies—Effect on working conditions and successful operation of the mine.

THERE is a vast distinction between getting what one needs and what one wants and just here lies a problem for the man who pays the bills. The waste at the average coal mine is very large and, in respect to at least one class of supplies, observation shows that more is wasted than is actually used.

There is a tendency among foremen of large mines to make out or sign a requisition for material without giving special thought to what is really needed. Trackbosses, timbermen and others in charge of particular work, usually make out a list of supplies for their own use. The list is given to the assistant foreman and turned over by him to the foreman, who then makes out and signs a requisition for the material and hands it to the superintendent or to his office clerk.

The chief thought of the man on the job who makes out the original list is to have plenty of material at hand with which to work; and if these supplies are given proper care it cannot be said there is any special waste in so doing. There is always a greater loss to the company when there is delay in waiting for needed material and, in many instances, the situation results in some makeshift construction that is highly unsatisfactory and means an increased cost of production.

CARING FOR ALL TOOLS AND SUPPLIES IN USE

In order to overcome this condition and lessen the waste of material, many mines now require that all tools and supplies shall be taken to the assistant foreman's shanty, each evening. All small articles such as spikes, bolts and nails must be kept in buckets provided for that purpose. The buckets are made by the blacksmith, who cuts off the tops of empty powder kegs and puts a handle on each. The kegs are free to all the workers in the mine who are expected to use them.

This system has a good effect in more ways than one. Where no special plan is followed, workmen will always be found wandering about the mine searching for one thing or another that they require. The time wasted in this manner increases the cost of labor and, in the end, the operator pays for what is needed whether he buys it or not.

Another phase of the question that I wish to mention before closing is the indirect effect on the men when compelled to work under such conditions. It develops a lassitude and fatigue in every worker. They become listless and much of their work is performed in an aimless manner. A man in this condition does not possess an active mind. His memory is poor and his work becomes monotonous even to drudgery.

In my rounds I have carefully observed men working under favorable conditions and others at a disadvantage. The low-coal regions offer the greatest number of adverse conditions; and, I might say, it is rare to find a really efficient low-coal operation.

In a low-coal mine the first consideration should be to develop sufficient entry area to enable the circulation of an ample air current and facilitate the transportation of men and material. Efficient operation requires the brushing of roads and travelingways to give good headroom. The mine, including all working places, must be well drained and ventilated to insure favorable working conditions and successful operation.

Pikeville, Ky.

GEORGE EDWARDS.

Disposal of Waste Mining Twin Coal Seams

Drive double rooms 30 ft. wide with two tracks—Take out both seams in first working—Build waste between tracks for support of roof.

ALLOW me to offer a suggestion on the proposition presented by a Kentucky superintendent and answered in *Coal Age*, May 10, p. 762, regarding the safe and economical working of a twin coal seam, consisting of a bottom bench of coal 52 in. thick and a 30-in. top bench, the two benches being separated by 30 in. of slate parting which he terms "middleman." The seam is said to be overlaid with a strong sandrock roof, while the slate parting, is weak and cannot be supported for any length of time.

To attain the maximum recovery of coal from this seam with due regard for safety and efficiency, I would suggest driving double rooms 30 ft. wide, with track

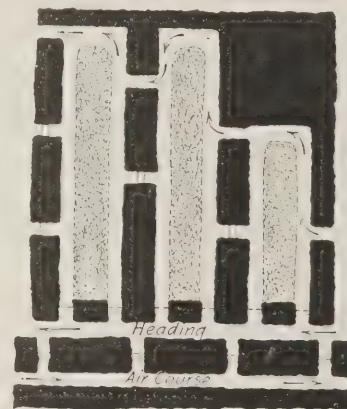
laid on each side of the room close to the rib. My plan would be to take out both the top and bottom seam in the first working, dropping the slate as the face is advanced and building this refuse in the shape of a solid packwall between the tracks.

The center slate or parting, which is 30 in. thick in the solid will occupy 50 per cent more space when broken and represent a thickness of $1.5 \times 30 = 45$ in., over the entire area of the room. But, allowing for two tracks each 8 ft. wide, in this 30-ft. room, leaves but 14 ft. for the width of the packwall between the tracks. The corresponding thickness of the slate refuse will therefore be $45 \times 30/14 = 96$ in., say 8 ft.

The total thickness of the seam, including the two benches of coal and the slate parting, is 9 ft. 4 in. I estimate that the broken slate, together with the other refuse generally produced in mining, will practically fill this space between the tracks and, with such timbering as may be needed will form ample support for the roof, in turning 30-ft. rooms.

PACKWALL ASSISTS VENTILATION

The packwall will also materially assist in conducting the ventilating air current to the working face. For



DRIVING DOUBLE ROOMS

the support of the gangway, as shown in the accompanying figure, a small pillar or entry stump should be left in the mouth of each room.

If found practicable, the work of extraction should be started by mining the center slate for a distance sufficient to free the coal, so that it can be more easily blasted and gotten out in better shape for the market. This will, of course, necessitate the setting of temporary sprags to support the top coal until that is taken out. Also, if desired, the room tracks may be turned and extended along the face of the room and advanced from time to time as the work proceeds.

TRACKS AVAILABLE FOR DRAWING PILLARS

When the rooms have been driven the required distance the position of the tracks will greatly facilitate the extraction of the pillars. Here also, if roof conditions permit, the tracks in adjacent rooms can be turned and extended along the face of the pillar. Having the cars available along the face line not only lessens the breakage of the coal, but reduces unnecessary labor to a minimum by decreasing the distance the miner must handle his coal.

The depth of the seam is not given in the inquiry, but this factor would have to receive the fullest consideration in determining the relative width of rooms and pillars. Allow me to say in closing that the method of working suggested in the reply to this inquiry does not appeal to me as the most efficient. The plan there suggested was to mine the bottom seam of coal and take down the slate parting in the first working.

It was claimed that the top coal would make a good roof in driving the room its distance. The upper seam would then be taken down when drawing back the pillars. To my mind, when the necessary space is

allowed for the road, there is not sufficient available space remaining in the room for the stowage of the waste, which would have to be loaded out in cars or stored in some other part of the mine, either of which would be expensive. In addition to this, there would be a considerable loss of coal resulting when the top bench is dropped on to the fallen slate, and there would be difficulty in setting the necessary timbers.

Victoria, B. C.

JAMES DICKSON.

[In answer to the suggestion of there not being sufficient space available for storing the refuse, let us assume a 24-ft. room with an 8-ft. roadway, leaving 16 ft. of available space at the side of the track. Then, allowing as before, an increase of 50 per cent in the volume of the broken material, the 45 in. corresponding to the 30 in. of slate parting would, in this case, give a thickness of $45 \times 24/16 = 67\frac{1}{2}$ in. for the height of the

packwall at the side of the track. But the available height when the 52 in. bottom coal and 30 in. parting is taken out, is 82 in.

Again, it was stated, in our reply to the inquiry, that the fallen slate would be gobbled at the side of the track, which should, of course, be done before the top seam is taken down.

Once more, when drawing back the pillars and taking down the top seam, it would only be necessary to handle over the slate, which is loosely piled, and throw it back in the waste behind. It would not need to be "loaded out in cars or stored elsewhere in the mine." At least one advantage of the plan first suggested is a saving of timber and trackage. There is not the need of building solid packwalls out of the waste, which is loosely piled. Also, the props for the support of the roof are 6 ft. 10 in. instead of 9 ft. 4 in.—EDITOR.]

Inquiries Of General Interest

Exhaust vs. Blowing Ventilation, Slope Mine

Elevation at Top of Shaft Higher Than Mouth
of Slope—Natural Air Column in Shaft Assists
Ventilation in Winter but Retards It in Summer

THERE is a question that has puzzled me for some time past and I have not, as yet, been able to get a satisfactory explanation of it from others. May I, therefore, ask the privilege of submitting it to *Coal Age* and readers.

I am employed at a slope mine that is ventilated by a large reversible fan located at the top of an air shaft. The mouth of the slope is in the valley, while the air shaft has been sunk on the mesa, at a point a considerable distance back from the mouth of the mine. The elevation of the top of the shaft is about 500 ft. above the entrance to the slope. The depth of the air shaft is 900 ft.

The fan was installed to run ordinarily as a blowing fan; but, on certain occasions, we have operated it as an exhaust fan. At such times, I have been surprised at the large volume of air in circulation in the mine, although the fan was running at the same speed as before.

Kindly explain the reason for this observed difference; and state if it would not be an advantage to operate the fan continually on the exhaust principle of ventilation.

FIREBOSS.

_____, Colo.

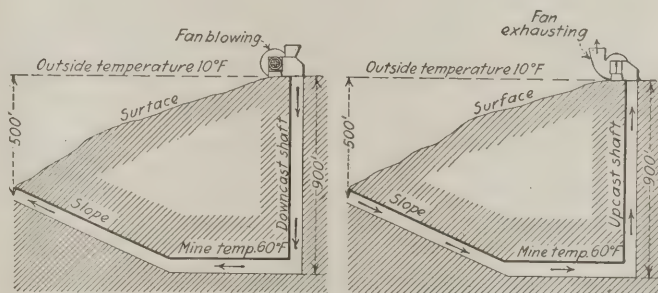
The arrangement described by this correspondent is clearly illustrated in the two diagrams shown, side by side, in the accompanying figure. On the left, the fan is shown as blowing the air into the mine, the air shaft being the downcast, while the slope is the upcast. This is said to be the ordinary arrangement of the circulation in the mine.

On the right of the figure, the fan is shown as exhausting the air from the mine, the air shaft then

being the upcast, while the slope is the downcast for the entire mine.

We will assume that it is winter and the temperature of the outside air is, say 10 deg. F., while the average temperature in the mine is 60 deg. F. When the fan is blowing air into the mine, in this case, the shaft is filled with the cold outside air having practically the same temperature as exists on the surface. But, in its passage through the mine, the air current is warmed and the temperature of the air filling the slope is the same as that given for the mine (60 deg. F.).

Now, observe that the upper 500 ft. of the shaft column is balanced by the corresponding 500 ft. of outside air above the mouth of the slope. Below this level,



ILLUSTRATING EFFECT OF NATURAL AIR COLUMN

the remaining 400 ft. in the shaft column is partly counterbalanced by the same vertical height of slope column. Therefore, the effective head of air, in this case, is only 400 ft. and the motive column, in terms of the outside air, is therefore

$$400 \frac{60 - 10}{460 + 60} = \frac{400 \times 50}{520} = 38.46 \text{ ft.}$$

But, the weight of a cubic foot of the outside air, for a temperature of 10 deg. F., assuming a barometric pressure of 30 in., is $(1.3273 \times 30)/(460 + 10) = 0.0874$ lb.; and the pressure due to the motive column just found is $38.46 \times 0.0874 = 3.26$ lb. per sq.ft., nearly.

On the other hand, when the fan is exhausting air from the mine, the entire depth of the shaft is filled with the warm air from the mine, while the slope is filled with the cold outside air. In such case, the effective head of air column is the full depth of the shaft, 900 ft., since this warm shaft column is now in balance with the slope column and the 500 ft. of outside air column extending upward to the level of the top of the shaft.

Hence, again computing the motive column, in terms of outside air gives, in this case,

$$900 \frac{60 - 10}{460 + 60} = \frac{900 \times 50}{520} = 86.54 \text{ ft.}$$

The pressure corresponding to this motive column is, then, $86.54 \times 0.0874 = 7.33$ lb. per sq.ft.

Finally, since the quantity of air in circulation varies as the square root of the pressure, the quantity ratio will be equal to the square root of the pressure ratio. In the present case, the ratio in which the circulation would be increased when the fan is exhausting air from the mine would be $\sqrt{7.33/3.26} = 1.5$. In other words,

the circulation would be increased 50 per cent, by reason of the greater effective air column when the fan is exhausting.

In the summer season, the conditions are generally reversed, the mine temperature being usually lower than that of the outside air; and, in that case, the effect would be to retard the circulation produced by the fan in about the same ratio. That is to say, the fan exhausting, in summer, would produce about two-thirds of what it would produce when blowing, for about the same difference in temperature between the mine air and the outside atmosphere.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 3-7 incl., 1923

(Selected Questions)

QUESTION—How many cubic feet of air will pass per minute along an airway 7 ft. high and 12 ft. wide, the velocity of the air current being 350 ft. per min.?

ANSWER—The sectional area of this airway is $7 \times 12 = 84$ sq.ft. Then, assuming an average velocity, at this point, of 350 ft. per min., the volume of air passing is $350 \times 84 = 29,400$ cu.ft. per min.

QUESTION—In making your rounds of the working faces, what instructions would you give to the miners in order to prevent accidents from blasts?

ANSWER—Where the miners are permitted to charge and fire their own shots no hole should be charged or fired until it has been examined by the mine foreman, assistant foreman or other competent person authorized to perform that duty and permission is given to fire the shot. Careful instructions should be given to each miner in regard to the weight of powder to be used and the manner of charging and tamping the hole. The miner should also be instructed not to use too short a fuse, or bite off the match of a squib, or dip it in oil to hasten the firing of the shot. His tools should be examined to see that his bits conform to the proper gage and are not worn down so that the bore of the hole will be too small to allow the cartridge to be pushed into the hole without jamming; and to see that he is using a wooden tamping bar, or a bar that is copper-tipped. He must be instructed never to use two kinds or grades of powder in the same hole, or to fire two shots in the same place, at the same time, when one is a dependent shot. It is important to see that the miner is supplied with and uses proper tamping material. He must be instructed never to use coal dust or slack for that purpose.

QUESTION—Under what conditions in a mine does the anthracite law require the mine foreman to withdraw the men under his charge?

ANSWER—The law requires (Art. 12, Rule 8) that when a mine is found to be in a dangerous condition by reason of gas or other cause whatsoever, every precaution must be taken to insure the safety of the

men; and all persons shall be withdrawn from the mine or section of the mine where such danger exists and not permitted to return, until the danger has been removed and the mine examined and found to be safe for work.

QUESTION—What particular dangers are there in pillar drawing in a mine giving off explosive gas?

ANSWER—The drawing of pillars in a mine generating gas will often be accompanied with an increased outflow of gas, owing to the settlement of the roof opening new fissures or breaks that permit the gas to escape into the workings. The danger is more imminent where the gas is contained in the roof strata or an overlying seam. If the gas comes from the floor, some increase in the outflow will be caused, at times, by the excessive pressure brought on the ends of the pillars.

QUESTION—In a mine where 600 persons are employed, (a) what would be the minimum quantity of air required? (b) How many separate splits of the air current will be required to comply with the anthracite mine law?

ANSWER—(a) The anthracite law (Art. 10, Sec. 3) requires a minimum quantity of 200 cu.ft. of air in circulation, per minute, for each person employed in the mine, and as much more as the conditions may require. For a mine employing 600 persons, this will mean a minimum air volume of $600 \times 200 = 120,000$ cu.ft. per minute.

(b) The law also requires (Sec. 6) the ventilation to be so arranged that not more than 75 persons will be employed at the same time on the same current. The number of splits necessary in the employment of 600 men in a mine is, therefore, $600 \div 75 = 8$ splits.

QUESTION—What are the provisions of the anthracite law relative to the examination of old and new workings of a mine?

ANSWER—The anthracite law (Art. 12, Rule 4) requires the examination, by the mine foreman or assistant foreman, at least once a week, of all accessible parts of abandoned portions of the mine, and the removal of any dangers found existing therein. A report of the examination must be entered in a book kept for the purpose and signed by the person making the examination.

Rule 5 of the same section of the law requires the mine foreman or assistant foreman to carefully examine all working places, traveling roads and other places where danger might exist, each morning, before the men enter the mine for work. The examination must be made within three hours of that time, using a safety lamp for the purpose. A report of the examination must be entered in a book kept for that purpose and signed by the person making the examination.

Annual First-Aid and Mine-Rescue Meet at Salt Lake City Is Largest Ever Held

"The safest men in America"—nearly 500 of them—demonstrated in Salt Lake City, Aug. 27-29, the skill that coal-mining men have learned in the vital art of rescuing and treating mine-disaster victims. It was the sixth annual International First-Aid and Mine-Rescue Meet. No larger meet has ever been held. In all, 54 first-aid teams from coal and metal mines in 14 states and Mexico and 21 mine-rescue teams—almost every one chosen by state and district elimination contests during the early summer—were there doing their best, and of them all the team which the Benton district of Illinois sent took highest honors with a team from the Anaconda Copper Co. ranking second.

The meet was noteworthy for several reasons. It was the first in which a team from Mexico took part, though Mexican teams have been spectators before. This time the Real Del Monte y Pachuca Co., of Pachuca, Hidalgo, Mex., sent a team which won much attention and third prize in the mine-rescue contest among 21 teams. Interpreters were used in order to translate the written problems to contestants. The Mexican score was 83. Also the meet was the first in which a negro team was entered. The one this year was sent by Local 1228 of the United Mine Workers at Dewmaine, Ill. The team was disqualified in mine-rescue because it grew panicky when a piece of apparatus went wrong in the outdoor gas gallery.

NO ACCIDENT OF CONSEQUENCE TO MAR MEET

Also it was noteworthy that the whole meet was engineered by the Bureau of Mines without a single accident of any consequence and with much more dispatch than most previous contests of the sort. Speed in the mine-rescue contest of the last day was gained by permitting, at times, as many as three teams to be in the wooden gas gallery at once. A team would enter while another was half way through its problem and a third was emerging at the end of its 12- or 15-minute trip. No team was rushed, however. Plenty of time was allowed and there were no interferences. The ten judges of the rescue contest, working in pairs, were stationed along the route through the gallery, so that every team worked at various stages of its problem under the eyes of every judge. This tended to produce fairer average scores.

The meeting opened on Monday morning, Aug. 27, in the big pavilion at Bonneville Park with inspection of equipment. For the rescue teams this consisted of an examination of each team member by ten judges working in pairs. This plan was intended to raise the factor of fairness in scoring by drawing in many judges' reports on each team instead of assigning only two or three judges to each team. All afternoon Monday and Tuesday the fifty-four first-aid teams worked out their problems on the floor of the pavilion. Wednesday morning the rescue teams began working in the outdoor gallery in the morning. The last one reported out at 1 p.m. and the meet was over except for the tabulation of judges' scores and the announcement of awards at the banquet that night.

Governor Charles R. Mabey, of Utah, speaking at the banquet, told the first-aid and rescue teams that no greater work for mankind can be done than that of training men as the Bureau of Mines and other agencies are now doing. He said that about 60,000 men in this country have already received training in first-aid work and 20,000 in mine rescue.

"It behooves every mine owner to thoroughly equip his mine with the best safety appliances known," said the Governor, "and it behooves every miner to obey safety rules and laws as completely as a soldier obeys army regulations."

In high tribute to the trained safety men of the country's mines, the Governor said they, above most mortals, are displaying in their work that spirit of which the Bible says, "No greater love hath any man than that he give his life for his friend."

Ross Beason, president of the Salt Lake City Commercial Club, presided. The other speakers were Mayor C. C. Neslen, of Salt Lake City, James H. Ball, representing the mining committee of the Chamber of Commerce, and W. Mont Ferry, who spoke for the operators of Utah.

D. J. Parker, of the Bureau of Mines, made the awards at the close of the banquet speaking. The awards follow:

First Prize, with honors, in combination mine-rescue and first-aid work (cup donated by Boyd Park Jewelers of Salt Lake City and silver cup from National Safety Council)—First-Aid Team 41 and Mine Rescue Team 1, Benton District, Benton, Ill.; Captain, Mungo Marshall; rating, 94.

Second Prize in Combination—First-Aid Team 33 and Rescue Team 13, Independent Coal & Coke Co., Kenilworth, Utah; Captain, J. R. Roaf; rating, 92.66½.

Third Prize in Combination—First-Aid Team 18 and Mine Rescue Team 3, Pacific Coast Coal Co., Black Diamond, Wash.; Captain, R. F. Snook; rating, 88.83.

Joseph A. Holmes special trophy for the company whose first-aid team and separate mine-rescue team get highest average rating in both first aid and rescue—Union Pacific Coal Co. First-Aid Team from Cumberland, Wyo., under Captain Lyman Fearn; rating, 94.08½, and Rescue Team from Hanna, Wyo., under Captain Thomas Meekin; rating, 76.

Mine Rescue.—First prize, Team 1; Captain, Mungo Marshall, Benton district, Illinois; rating, 95½. Second, Team 13; Captain, J. R. Roaf, Independent Coal & Coke Co., Kenilworth, Utah, rating 91½. Third, Team 6; Captain, Manuel Ramirez, Real del Monte y Pachuca Co., Pachuca, Hidalgo, Mexico; rating, 83.

ANACONDA COPPER TEAM WINS FIRST-AID CONTEST

First Aid.—First prize, Team 8; Captain, L. J. Deranleau, Anaconda Copper Mining Co., Great Falls, Mont.; rating, 97.91½. Second, Team 14; Captain, W. E. Wolfe, Clinchfield Coal Corp., Wilder, Va.; rating, 97.41½. Third, Team 24; Captain, Claude Alley, Clinchfield Coal Corp., Dante, Va.; rating 97.16.

Special prize of a cup for first aid winner of Rocky Mountain region.—Team 8; Captain, L. J. Deranleau, Anaconda Copper Mining Co., Great Falls, Mont.

State First-Aid Championships:

Alabama—Won by Team 40 representing the Woodward Iron Co., Mulga; Captain, W. L. Beaveret.

Colorado—Team 32, Colorado Fuel & Iron Co., Walsen; Captain, Dave Davis.

Illinois—Team 27, Southern Coal, Coke & Mining Co., Belleville; Captain, Frank Westwood.

Indiana—Team 59, Indiana Coal Operators' Association, Terre Haute; Captain, James Harkis.

Idaho—Team 49, Federal Mining & Smelting Co., Mulden; Captain, Axel Johnson.

Iowa—Team 21, Red Rock Coal Co., U. M. W. A., District 13, Melcher; Captain, R. E. Price.

Kansas—Team 10, Western Coal & Mining Co., Pittsburg; Captain, Louis Trego.

Louisiana—Team 54, Standard Oil Co. of Louisiana, Baton Rouge; Captain, R. C. Thorgeson.

Mexico—Team 12, Real Del Monte y Pachuca Co., Pachuca, Hidalgo; Captain, Sr. Manuel Ramirez.

Missouri—Team 19, Pierce Hess Coal Co., Bevier; Captain, Thomas A. Munn.

Montana—Team 8, Anaconda Copper Mining Co., Great Falls; Captain, L. J. Deranleau.

New Mexico—Team 53, Phelps Dodge Corp., Dawson; Captain James English.

Oklahoma—Team 5, Oklahoma Coal Operators and U. M. W. A., District 21, McAlester; Captain, L. Thompson.

Pennsylvania—Team 13, Bertha Consumers Co., Johnetta; Captain, T. L. Holsing.

South Dakota—Team 45, Homestake Mining Co., Lead; Captain, E. E. English.

Utah—Team 33, Independent Coal & Coke Co., Kenilworth; Captain, J. Richardson Roaf.

Virginia—Team 14, Clinchfield Coal Corp., Wilder; Captain, W. E. Wolfe.

West Virginia—Team 31, Davis Coal & Coke Co., Thomas; Captain, M. J. Brennan.

Washington—Team 18, Pacific Coast Coal Co., Black Diamond; Captain, B. F. Snook.

Wyoming—Team 42, Union Pacific Coal Co., Cumberland; Captain, Lyman Fearne.

Mine Rescue State Champions:

Illinois—Team 1, Captain, Mungo Marshall, Benton District.

Idaho—Team 9, Hercules Mining Co., Burke; Captain, Joe Revelli.

Mexico—Team 6, Real del Monte y Pachuca Co., Pachuca, Hidalgo; Captain, Manuel Ramirez.

South Dakota—Team 20, Homestake Mining Co., Lead; Captain, Orville E. Dunn.

Utah—Team 13, Independent Coal & Coke Co., Kenilworth; Captain, J. R. Roaf.

Wyoming—Team 4, Union Pacific Coal Co., Hanna; Captain, Thomas Meekin.

Washington—Team 3, Pacific Coast Coal Co., Black Diamond; Captain, B. F. Snook.

Washington Views Strike Calmly; Brief Suspension Expected

Thinks Actual Tonnage Loss Will Be Small—
Coolidge to Give "Co-operation" and "Support"
—Commission Confers on Bituminous Report

Despite suspension of operations in the anthracite field, official Washington faces the situation with equanimity, feeling that a distinct advance toward bringing the operators and miners into agreement has been accomplished by Governor Pinchot and optimistic that the suspension will be of brief duration. Federal officials evidently were mentally prepared for news that the Pennsylvania executive's offer had not been accepted wholly immediately. They had recognized that Saturday, the first day of the agreement-expiration period, is a half holiday in the collieries and that Monday was a holiday, thus giving time for developments without actual loss of much tonnage in those days.

Action toward putting into effect the machinery by which bituminous coal and coke might be sent into the anthracite-consuming regions was delayed. It was pointed out that even should the suspension in the anthracite field continue there would be no shortage of fuel for some time due to accumulated stocks. The desire evidently was to do nothing which might interfere with a successful conclusion of negotiations by Governor Pinchot remained.

Nevertheless, a White House spokesman represented President Coolidge as determined to use "all the resources" of the federal government to supply fuel to any section of the country needing it should the suspension of anthracite mining be prolonged. The President was represented as still hopeful of a settlement but as viewing the alternative calmly. The chief executive has given Governor Pinchot "full co-operation" in his efforts to harmonize the contending groups, it was said, and it was further asserted that President Coolidge will continue to give the Governor "full support," these two terms, "co-operation" and "support" being said to describe fully the President's attitude toward the negotiations initiated by the Pennsylvania Governor.

The members of the Coal Commission devoted several days during the week to consideration of their report on bituminous coal, which is to be submitted on or before Sept. 22, the date on which the Commission will expire by limitation. Reports from the staff on various phases of the soft-coal question were studied.

As a step in preparation for eventualities, the Bureau of Mines issued a statement by O. P. Hood, chief mechanical engineer, on the use of substitutes for anthracite.

Rocky Mountain Coal Institute Holds Annual Meeting

Seventeenth Gathering, at Salt Lake City, Featured by Discussions on Track Bonding, Mine Safety and Low-Temperature Distillation

The scope of the Rocky Mountain Coal Mining Institute is broad. It proved broad enough at the seventeenth meeting of the Institute in Salt Lake City, Utah, Aug. 27 to 29, to include subjects ranging from discussions of safety in mines and the technicality of track bonding and of low-temperature distillation of coal along the lines now followed by Henry Ford, clear out to swimming in the Great Salt Lake and banqueting with the first-aid and mine-rescue teams of the continent that were also meeting at Salt Lake City. The Institute had a large attendance.

The sessions of the Institute were fitted into the program of the International First-Aid and Mine-Rescue Meet so that the members could watch the miner teams in the afternoons and hold their own sessions in the mornings. Little business was transacted at the meeting but the Institute, under President George B. Pryde, decided to work out a plan for organizing Institute chapters in each Rocky Mountain mining district which would try to draw all sorts of coal-mining men, right down to miners working at the faces, into the organization.



GEORGE B. PRYDE

President Rocky Mountain Coal Mining Institute

The Institute closed its meeting on the night of Aug. 29 with a banquet for members and their ladies. For this festivity a hall was used adjoining the great banquet hall in the Hotel Utah in which the first-aid and rescue teams were banqueting.

The Institute adopted resolutions of sympathy for P. J. Quealy, president of the Kemmerer Coal Co., and for the suffering towns of Kemmerer and Frontier, recently stricken by the explosion in Frontier mine. The grief of the Institute over the death of Carl Allen and of Prof. R. C. Hills was expressed in other resolutions.

Rail bonding in coal mines of this country is uniformly and inexcusably bad, according to D. C. McKeenhan, chief electrical engineer of the Union Pacific Coal Co. In his paper, which was read to the Institute at its opening session by F. A. Rank, he recited some of the experiences of his company with various kinds of bonds until it standardized on electric welded bonds in 1919.

The first arc-weld bonds were placed on the outside of the rail ball but were too often knocked off by grooved wheels. Rails and splice plates were welded with some success until vibration and truck movement began to break such joints. At one time, in order to use up scrap copper wire a channel pin was placed over each end of an annealed copper wire about 20 in. long. Pin and wire were welded to the base of the rail. Some good joints were made but they were exceptional. Where these bonds were welded to the rail web the rail almost always broke, but these are the only cases of breakage of rails with arc-welded bonds.

For a time the company bonded with No. 2 bare iron wire, using two or three strands. This was cheap and successful on light rails or temporary track. The length



ROCKY MOUNTAIN COAL MINING INSTITUTE, SALT LAKE CITY, AUG. 27-29, 1923

Front row, left to right: F. W. Whiteside, former secretary-treasurer; W. D. Brennan, vice-president; George B. Pryde, president; Benedict Shubart, secretary-treasurer.

of iron was so small in the circuit that it added very little resistance.

The most successful plan the Union Pacific Company has ever tried is to use a flexible, copper arc-welded bond of sufficient length to span the splice plate attached to the inside of the rail base. On some occasions such as bonding in entries on idle days the welding resistance is connected into the circuit at the entry parting so that a welder need carry only the electrode holder, a short piece of cable to hook the trolley wire, the necessary bonds and welding wire.

"The results we have obtained," said Mr. McKeehan's paper, "are so gratifying that the matter of cost is considered irrelevant and no data has been kept."

A line in the paper to the effect that modern practice does not require bonding both rails brought objections in the succeeding discussion. Benedict Shubart, Mr. Rank and J. S. Veatch all declared both rails should be bonded. H. I. Smith said he thought bonds should be on the outside, not inside, of heavy rails because even badly grooved wheels cannot reach them. Bonds are more easily inspected when they are outside, away from piles of dirt and ballast.

A. C. Watts asked how far apart crossbonds should be spaced. George Murphy said bonding both rails with a 22-in. weld and with crossbonds every 100 ft. had reduced his locomotive repair bill 50 per cent. President Pryde said Mr. McKeehan favors crossbonding every 200 ft. Mr. Brewster favored spacing between 200 and 300 ft.

It was suggested that the rail ball is a bad place for bonds because of the danger of breakage, but that bell welds are far cheaper because they take less copper, and also that they are always easier to inspect.

Harking back to Mr. McKeehan's reference to bonding with iron wire Mr. Rank said iron's resistance is ten to fourteen times that of copper, so many men using it lay the old cables along the track so that they may help rails maintain the circuit. F. C. Miller remarked that iron oxidizes too quickly at the point of contact where electrolysis is highest.

William Littlejohn, general superintendent of the Utah division of the Utah Fuel Co., suggested that something ought to be done to correct the failure of employers and employees to work heartily together for safety. Rules are too carelessly made and entirely too carelessly carried out.

P. F. Patterson and G. A. Knox both signed a safety letter to the Institute contending for closer supervision at the mine faces, where at least 60 per cent of accidents occur from falls of roof and coal. Roadways should have

30 in. clearance and rooms at least 24 in. between rib or timber and the track, they believe. Props should be put under loose roof regardless of whether any established system calls for it. Stronger gloves and shoes on miners would prevent many hand and foot injuries. Fiber or metal helmets were advocated to reduce head injuries. Temporary cloth or rubber covering for trolley wires near repair jobs was another safety suggestion.

A long list of safety suggestions were made in the report of Dan Harrington, of the U. S. Bureau of Mines, and James Dalrymple, Colorado's chief mine inspector. Mr. Dalrymple was not present. They survey the chief causes of explosions and suggest that all ventilation systems have auxiliary power, that fans should run 24 hours a day, that every good-sized mine should have more than one air split, each able to deliver enough air to remove all methane as fast as it is liberated, and that ventilation should be under an up-to-the-minute active young man well educated in safety matters.

One per cent or more of methane in the air makes dust more explosive, they said, and the finer the dust the more dangerous it is, especially that finer than 20-mesh. Formation of dust can be reduced by using longwall mining exclusively and by using more holes and less powder in shooting, and the hazard is greatly reduced by washing down sides and roof as well as floor. Rock dusting often is preferable where water is short. Such dust should be used to keep down the percentage of combustible matter in roadway dust to 40 or less. Mr. Harrington and Mr. Dalrymple also favor electric safety cap lamps in all mines of whatever character, and the concealing of all underground cables in conduits. Solid shooting is inexcusable in any mine where the pitch is less than 30 deg., for coal can readily be undercut at any angle up to that. They think shotfirers should be required to have a certificate of competency to be reissued after an examination every five years. In their opinion half the explosions are traceable to defective or out-of-date equipment or practice. Coal-mine superintendents, foremen and firebosses should be required to pass a safety examination at least one in five years.

F. C. Miller, of the Colorado Fuel & Iron Co., read a paper tracing the history of briquetting and reported the progress that has been made in low-temperature distillation of coal. The mention of Henry Ford's interest in coal distillation roused a lively discussion, some of which will appear in a later issue of *Coal Age*.

Commission Publishes Cost of Anthracite To Dealers in Nine States

The U. S. Coal Commission published Aug. 29 figures showing the cost of stove anthracite at the mines and the freight to town, as reported by the dealers in New York, New Jersey, Michigan, Delaware, Maryland, Washington, D. C., Pennsylvania, Wisconsin, Indiana and Ohio. Some time ago these figures were given out for New England.

The commission makes this note with respect to these figures: "In using this cost-to-dealer information, allowance must be made on the one hand for the dealer's losses by degradation and his cost items and a fair margin of profit, and on the other for the 240 lb. difference in the ton used (the long ton). The allowance for the 240 lb. difference is necessary because New York dealers buy at the mines on the basis of gross tons (2,240 lb.) and sell at retail on the basis of the net ton (2,000 lb.)."

It is particularly notable that most of the quotations given by the dealers for stove coal are Company prices—from \$8 to \$8.30. In fact of the 1,791 quotations in these states, 1,288, or 72 per cent, were Company prices, and the remainder, or 513, were \$9 or above.

The Commission announced some time ago that it would not attempt to show consumers in every town the retail price of their coal and the margins and profits made by the dealers, proceeding on the theory that if the townspeople know what the coal costs their retail dealers, and the individual knows what he has to pay the dealer for that coal, the public can make up its own mind as to whether the local dealer is doing the business on a reasonable margin or is exacting an undue profit.

Railroads Consume Less Coal in June

Class I railroads of the United States consumed 8,296,000 net tons of coal during June, 1923, as charged to account 394, compared with 9,034,000 tons during the preceding month and 6,804,000 tons in June, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During

the first six months of 1923 these roads consumed 56,882,000 tons as compared with 45,123,000 tons during the corresponding period of 1922. The delivered cost per ton in June last was \$3.42 compared with \$3.83 for the corresponding month of last year.

Consumption of fuel oil during June totaled 151,732,000 gallons compared with 147,694,000 gallons in May, 155,062,000 and 119,598,000 gallons in June, 1922. The totals for the first six months of 1923 and 1922 were 896,625,000 and 713,097,000 gallons respectively.

190 Coal-Mine Fatalities in July

Fatal accidents to employees at coal mines in the United States during July, 1923, numbered 190, according to reports received from state mine inspectors by the U. S. Bureau of Mines. The fatality rate was 3.55 per million tons, based upon 53,446,000 tons of coal produced during the month, as compared with a rate of 3.18 in the previous month and of 5.27 for July last year. For bituminous mines alone the July rate was 3.28 as against 4.96 for the same month a year ago. For anthracite mines alone the July rate was 5.05 per million tons; there is no corresponding figure for July last year because the mines were closed on account of the miners' suspension of work. The average fatality rate for July during the past ten years is 3.82 per million tons for bituminous mines, 6.41 for anthracite mines, and 4.22 for the entire coal-mining industry. It will thus be seen that the accident rates for July, 1923, were lower than those for July last year and also lower than the ten-year average rates for the same month.

The record for 1923 to the end of July shows 1,424 fatalities indicating a rate of 3.77 per million tons, as compared with 4.21 per million tons for the corresponding months last year. The bituminous rate for seven months of 1923 is 3.49 as against 3.92 for the same period last year; the seven-months anthracite rate is 5.28, as against 6.75. The accident record for 1923 to date shows a reduction of 11 per cent in the fatality rate for bituminous mines, 22 per cent for anthracite mines, and 10 per cent for all mines combined.

COAL-MINE FATALITIES DURING JULY, 1923, BY CAUSES AND STATES
(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground												Shaft					Surface						Total by States			
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	4												4													4	7
Alaska.....																										0	0
Arkansas.....																										0	3
Colorado.....		5											6													6	1
Illinois.....	4		4					1					9													9	2
Indiana.....	2		3										5	1			1		2							7	0
Iowa.....																										0	2
Kansas.....													1													1	2
Kentucky.....	6		3					1					10													10	12
Maryland.....																										0	0
Michigan.....	1		1										2				1		1							3	0
Missouri.....	1												1													2	0
Montana.....	2												2													2	0
New Mexico.....																										0	0
North Dakota.....																										0	0
Ohio.....	11		1										12													12	4
Oklahoma.....																										0	0
Pennsylvania (bituminous).....	18	4	11			2		3				3	41						1				1	2	4	45	23
South Dakota.....																										0	0
Tennessee.....																										0	2
Texas.....																										0	0
Utah.....																										0	3
Virginia.....																										0	4
Washington.....			1										1						1							1	0
West Virginia.....	22		14			1		3					40												1	41	22
Wyoming.....	3		2										5													5	0
Total (bituminous).....	75	9	40			4		8				3	139	1			3		4	1	1		1	2	5	148	85
Pennsylvania (anthracite).....	13	7	3	1	1	4		1					35	2		1		3			1		1	2	4	42	6
Total, July, 1923.....	88	16	43	1	1	8		9				8	174	3		4		7	1	1			2	4	9	190	91
Total, July, 1922.....	48	3	8	1		6		8		1			75	2		1		3	3	1				9	13		

Salient Points in Governor Pinchot's Proposal to End Wage Controversy

Upon the basis of the information assembled, with the profound belief that it affords a basis of settlement which is reasonable and just, which miners and operators alike may accept with credit and honor, and with the firm conviction that fairness to the anthracite-using people of America requires that it shall be accepted, I recommend the following basis of settlement, with the understanding that all questions concerning it or not covered by it shall be referred to the Joint Conference of Scale Committees, and that the Anthracite Conciliation Board shall determine any questions upon which the Joint Conference cannot agree:

(1)—Recognition of the basic eight-hour day for all

employees. If longer hours are necessary at certain times, or in certain occupations, the overtime to be paid for at the eight-hour rate.

(2)—A uniform increase of 10 per cent to all employees, this increase to take effect Sept. 1.

(3)—Full recognition of the union by the operators, without the check-off, but with the right to have a union representative present when the men are paid. I do not regard the question of the open or closed shop as an issue in this controversy.

(4)—Complete recognition of the principle of collective bargaining.

Anthracite Mine Workers Walk Out September 1; Pinchot Hopeful of Early Settlement

Although Governor Pinchot was not successful in averting the anthracite strike, which started at midnight Aug. 31, his peace plans have not yet been utterly rejected and he again renewed his efforts to bring about a settlement on Wednesday afternoon at 2 o'clock, when the conferees resumed their parleys at Harrisburg. All of the mine workers are out except the maintenance men, numbering between three and four thousand.

The conference started Aug. 27, when the Governor presented his reasons for prompt action, suggesting separate meetings with the operators and with the miners, a plan that was readily agreed to. The miners met with him Monday afternoon, Aug. 27, and the following day he met the operators and then held conferences later with the miners and the operators, concluding two meetings with each within a day after calling the general conference.

On Wednesday the Governor presented his peace proposal, consisting of four points and several supplemental matters, these latter including his modified plan of arbitration for the settling of disputes before the Anthracite Conciliation Board—a fifth point, really, that has concerned the miners greatly during the conference. The four points were recognition of the basic eight-hour day for all employees, a uniform increase of 10 per cent in wages, full recognition of the union by the operators without the check-off and complete recognition of the principles of collective bargaining.

OPERATORS SEEK FOUR-YEAR AGREEMENT

The two sides to the controversy gave their answers to the Governor on Friday, Aug. 31, Thursday having been devoted to a study of the Governor's recommendations. The operators accepted three of the four points, and on the fourth, that of an increase in wages, said that while they were opposed to any increase at this time, if there is to be an "uneconomic wage" the new contract should cover a four-year term. The miners accepted the eight-hour day proposal and that relating to collective bargaining, but contended that while the wage increase proposed is a "step in the right direction" it does not adequately provide for the day workers. They rejected the check-off arrangement of the Governor, which would permit a union collector at the pay window on pay days.

The operators and miners met in joint conference at the Capitol on Friday and remained with the Governor for five hours. The Governor separated the two sides soon after they reconvened and acted as intermediary during the long discussion, once calling them together when he believed he could convince them that a settlement could be effected. At this joint meeting John L. Lewis, president of the United Mine Workers, and Samuel D. Warriner, spokesman for the operators, spoke. It is said that the Governor at that time suggested that he act as arbitrator, but that the operators bluntly told him that he was not

sufficiently qualified in mining matters to assume such a position. Again on Saturday there was a joint session and this lasted but 35 minutes. It was then agreed to take a recess until Wednesday, Sept. 5.

At the conclusion of the meeting on Saturday, Sept. 1, Governor Pinchot said he felt encouraged but he would not say upon what he based this feeling. Neither operators nor miners would discuss the situation in any way. The Governor issued the following statement in which he stressed the public's side of the matter and pointed out that a winter with little anthracite in Pennsylvania means many additional deaths. Here is the statement:

"The essential and encouraging fact is that the negotiations, which yesterday were lagging, are still going on. Both committees have suggested an adjournment for the purpose of more carefully considering the whole situation, including the four points of my recommendations. But since each committee will do so from the point of view of the interests of its own side, this seems to me like a good time for the people to consider their own interests also and to make their will known through the fullest public discussion.

"In these negotiations I have been representing the public and its necessity to get coal. To get coal we must find a common ground upon which miners and operators may meet and settle their differences with some regard for the public right. That common ground, in my opinion, properly covers a wage increase and a slight temporary rise in the price of coal. The choice lies between that and the threatened shortage.

"The public is the most numerous and the most important party to this controversy. Its rights are paramount. Its welfare is the first consideration. The health and welfare of the people are directly and most seriously threatened by the closing down of the mines. . . .

"Both committees have agreed to meet me again in Harrisburg on Wednesday, Sept. 5, at 2 p.m. I welcome this breathing space for the hard-pressed leaders on both sides, and I urge them to use it in acquiring a realizing sense of the public point of view. This is not a private quarrel. Neither miners nor operators have any right to disregard or overlook the public suffering which would follow a prolonged strike. The patience of the people is very near its end. We have seen it pushed beyond endurance before, and we have seen the results."

The Governor's presentation on Aug. 29 of his idea of a way to avert the strike was, like his statement read at the opening of the parley, Aug. 27, clear and to the point, and both sides seemed gratified with the way in which he had handled a knotty problem, if not satisfied with his conclusions.

The 10 per cent increase in wages, one half of what the miners asked, would mean, he said, 60c. per ton additional

to the cost of domestic sizes at the mine. Ten cents of this should be absorbed, he suggested, by the operators and the remaining 50c. eventually should be taken out of the cost of transportation and distribution.

The statement follows in part:

'My justification for proposing a basis upon which I believe this strike can be prevented with justice to all parties is threefold:

"First, that this controversy has continued until all chance of agreement by direct negotiations between the miners and operators has been lost."

"Second, that the interest of the miners, the operators and the public all require that this controversy shall be settled without a strike.

"Third, that the public is entitled to a voice in the discussion and the rights of the people generally deserve consideration at least as much as those of the miners and the operators.

"Under such circumstances, and in a case where the public welfare so urgently requires protection, the people have the clear and unquestionable right to demand a settlement.

"I suggest as a means of avoiding or settling differences that if in the course of collective bargaining the scale committees of the miners and operators are unable to agree they shall select a man agreeable to both sides to attend and take part in their discussions, but without a vote, and not as umpire or referee. If they are still unable to agree, their differences shall be referred to the Conciliation Board, which shall be provided with whatever equipment is necessary for the rendering of prompt decisions.

"I am strongly of opinion that an agreement signed on the foregoing basis should cover not less than one year.

"The whole body of wage rates in the anthracite field is antiquated, haphazard and honeycombed with inequality. It needs revision. I suggest that the Anthracite Conciliation Board be authorized by the Joint Wage Scale Committees to undertake and complete within a year a thorough revision, and for that purpose be supplied with the necessary help.

"The proposed increase of 10 per cent is recommended in view of the high degree of skill required among the miners and the extra hazardous nature of the occupation. Five hundred workers are killed and 20,000 are injured each year.

WAGE INCREASE TO RAISE COST 60c. PER TON

"The 10 per cent wage increase, according to the best figures available to me, will add 60c. a ton to the cost of domestic sizes of anthracite coal at the mine. Of this amount not less than 10c. can be and ought to be absorbed by the operators without any increase of price. In the last three months of 1922 and the first three months of 1923 their profits have been greater than ever before in their history. But the extent to which these producing conditions will continue no one can now predict with confidence.

"The remaining 50c. per ton should not in the end be taken from the consumer. The whole of it can easily and properly be taken out of the cost of transportation and distribution.

"Anthracite mines vary in the cost of producing coal. A very considerable percentage of the mines could bear at least half of the probable increase of 60c. per ton and still run at a fair profit. Others, operating on a smaller margin, might be forced to close down if their cost of production were raised even by a much smaller amount. To decrease the margins at the mines more than 10c. per ton now might unduly reduce production. It is to the public interest that bins be filled for the winter and that factories continue to operate. When production is assured I intend to recommend construction plans that will, I am confident, prevent any part of this increase of 50c. a ton going to the consumer.

"I believe the proposed settlement to be fair to all three parties to this controversy. It is fair to the miners, for it will notably improve their condition as to wages, hours and recognition of the union. It is fair to the operators, for it leaves them in position to continue running their mines, and to do so at a reasonable profit. It is fair to the

public, for the public can better afford to get anthracite at a slight increase in price, if that cannot be avoided, than not get anthracite at all. In particular, it leaves both miners and operators far better off than either would be if the contention of the other had been accepted.

"I call the attention pointedly of both sides to the fact that neither miners nor operators, whether the strike goes on or whether it does not, can hope to have their own way fully in the end. Whether now or later, a compromise is inevitable. It is immensely to the advantage of each of the three parties in interest that the compromise shall be made before the enormous loss and suffering of a strike is undergone, rather than afterward."

The general policies committee of the anthracite operators held a long session in Philadelphia Aug. 30 considering Governor Pinchot's proposal for settlement of the wage controversy and reached a decision, to be presented to the Governor at Harrisburg Friday. In keeping with the suggestion of the Governor that he be first informed of the response to be made by both miners and operators, the coal company representatives withheld all information on the subject.

Virtually the entire anthracite industry was represented at the meeting, which was held in the office of the Lehigh Coal & Navigation Co., of which Mr. Warriner is president. Besides Mr. Warriner, among those who attended the meeting were: W. J. Richards, Philadelphia; W. W. Inglis, Scranton, and A. B. Jessup, Hazleton, of the subcommittee which is directly negotiating with the miners; J. M. Humphrey, Wilkes-Barre; W. L. Allen, Scranton; A. C. Dodson, Bethlehem, Pa.; Percy C. Madeira, Philadelphia; E. H. Suender, Frickville, Pa.; A. M. Fine, Scranton; A. Morris, Scranton; S. B. Thorne, New York; J. F. Birmingham, New York; J. B. Warriner, Lansford, Pa.; Thomas Dickson, New York, and C. D. Goldsborough, New York.

Reports Differ on Who Beat Pascoe

In a communication to the U. S. Coal Commission Aug. 29 Ellis Searles, John Moore and Thomas Kennedy, representing the miners' union, charge that Samuel Pascoe, of Ashland, Ky., president of District 30, on Aug. 3, was attacked and badly beaten "by hired emissaries of coal companies." Pascoe is head of a district taking in the northeastern Kentucky field, and on Aug. 3 was in Paintsville, "on business," when he received a beating which appears to have been the result of a quarrel.

The committee which is acting in the matter for the union, according to information received from Washington, alleges that the attack on Pascoe is but one of many instances of intimidation employed against union miners in the non-union fields of West Virginia, eastern Kentucky, Alabama and Colorado.

A report of the affair from Paintsville, Ky., differed considerably from the union story from Washington. The Paintsville report stated that Pascoe was not attacked by "hired emissaries" of any coal company, as far as the authorities know. According to the police who investigated the affair, witnesses and others familiar with the circumstances, Pascoe was the loser in a fistic encounter with Link Castle, of Paintsville, in a restaurant. The fight resulted from a quarrel, the nature of which seems not to be known to others. Castle's friends say he is in no way connected with any coal company.

THE ANNUAL CONVENTION of the New York State Coal Merchants Association, to be held at Sacandaga, Sept. 10, 11 and 12, will be addressed by W. H. Williams, vice-president, Hudson Coal Co.; Alan C. Dodson, president, Weston Dodson & Co., Bethlehem, Pa.; Franklin Bache, Philadelphia; G. H. Ingalls, vice-president, New York Central Lines, New York; Walter Gordon Merritt, general counsel, Anthracite Operators Committee, New York, and the following officers of the National Retail Coal Merchants Association: Samuel B. Crowell, president, Philadelphia; Roderick Stephens, former president, New York; R. J. Wulff, treasurer, Brooklyn, and Joseph E. O'Toole, resident vice-president, of Washington.

Operators and Miners Reply to Governor Pinchot

The operators' reply to Governor Pinchot's proposal for settlement of the controversy that has resulted in a strike of anthracite miners was as follows:

"With respect to your proposal No. 1:

"Recognition of the basic eight-hour day for all employees. If longer hours are necessary at certain times, or in certain occupations, the overtime to be paid for at the eight-hour rate."

"We agree to this proposal. It will add some \$2,250,000 to the annual wage bill of the industry, or 5c. per ton to the cost of the domestic sizes."

"With respect to your proposal No. 2:

"A uniform increase of 10 per cent to all employees. This increase to take effect Sept. 1."

"This would add about \$30,000,000 to the wage bill. We are still firmly of the opinion that no general increase in the wages of anthracite mine workers at this time is justified and are supported in this belief by the findings of the U. S. Coal Commission, as follows:

"The earnings of full-time workers certainly permit the essentials of a reasonable standard of living. Those who take full advantage of their opportunities to earn in the various occupations connected with the industry, and are not handicapped by serious misfortune, need not suffer for shelter, food, clothing or other decencies and comforts of life, even without supplementary earnings of wife and children."

"Since you justify your proposed increase as a recompense for skill and hazard, we invite your attention to the fact that these factors have no application to a large part of the workers. As to those to whom they do apply, they have been stressed and considered in every negotiation and arbitration in the last twenty years and already find expression in the wage structure."

"The present wages were fixed by the award of the Wilson Arbitration Commission in 1920, when they were increased 17 per cent in recognition of the high cost of living then prevailing. In spite of the decreased cost of living and decreased wage rates in other industries, the anthracite wages have been maintained at this peak. These rates afford earnings over 150 per cent above prewar earnings, as compared with an increased cost of living of about 62 per cent."

"Considering the foregoing, any favorable consideration by us of your proposal for a 10-per cent increase must be conditioned upon a durable agreement covering a period of years, with provision for the annual revision of wages on a sound economic basis. If the parties cannot agree upon the revision such determination of wages shall be referred to such a commission as may be specified in the agreement, no suspension to take place pending such determination."

OPERATORS SAY PRICE INCREASE WOULD BE 75c.

"You recognized that your proposed increase in wages will add 60c. per ton to the cost of domestic coal. We estimate it would be a minimum of 75c., excluding the pea size. You acknowledge that most of this increase must be added to the price of coal at the mines. The amount of the increased price to the ultimate consumer will be determined by the ordinary course of economic laws, as statute laws forbid the operators or dealers from entering into any agreement as to prices."

"You state that of an estimated increase production cost of 60c. per ton, 50c. 'can easily and properly be taken out of the cost of transportation and distribution.' The cost of transportation can only be reduced through the unpredictable action of the Interstate Commerce Commission; the cost of distribution can only be reduced through voluntary action of distributors. We do not see how such reduction can be assured by any private person or public official and until these reductions are assured the public will have to pay the cost of increased wages."

"With respect of your proposal No. 3: 'Full recognition of the union by the operators without the check-off, but with the right to have a union representative present when the

men are paid. I do not regard the question of the open or closed shop as at issue in this controversy.' This proposal, as we understand it, involves merely a continuance of existing practices, to which we assent."

"There is already full recognition of the United Mine Workers of America, as evidenced by the existing agreement between us. From your statement that you 'do not regard the question of the open or closed shop as at issue,' we assume that you have no intention of suggesting that the award of the Roosevelt Coal Commission of 1902, bearing upon this matter, should in any wise be changed. That award provides:

"That no person shall be refused employment, or in any way discriminated against, on account of membership or non-membership in any labor organization; and that there shall be no discrimination against or interference with any employee who is not a member of any labor organization by members of such organization."

"In reply to your suggestion that the union have 'the right to have a union representative present when the men are paid,' we beg to state that this is an existing practice and there is no objection to continuing the provision of the existing contract in this respect."

"With respect to your proposal No. 4: 'Complete recognition of the principle of collective bargaining.'"

"Complete collective bargaining, as we understand it, now exists throughout the industry whereby agreements are made periodically with the union. These agreements cover wages and working conditions and further provide that all differences arising during the term of the agreement not otherwise adjusted shall be settled by the Board of Conciliation and Umpire. We agree that this practice of collective bargaining shall continue."

"In making this response to your proposals we do so upon the understanding that the other demands of the miners presented at the Atlantic City conferences, not heretofore agreed upon, shall be deemed abandoned."

"In closing, permit us to repeat the thought that the public is now entitled to a complete and durable settlement. If at this time it is to be asked, even temporarily, to bear the burden of an uneconomic wage, it must be safeguarded against an early recurrence of this unfortunate situation, and must be assured that the principle of orderly adjudication is now receiving some recognition."

MINERS' RESPONSE TO PINCHOT PROPOSAL

The miners' replied to Governor Pinchot's proposed plan of settlement in relation to wages is as follows:

"The principle of the eight-hour work day as applying to all employees in the anthracite industry has already been agreed upon by the operators and miners in joint conference. The details of the hourly and daily rates affected by this change have also been worked out as affecting the maintenance men, and it may be logically assumed that similar satisfaction may be achieved in the adjustment of the rates of all other men affected."

"Your suggestion for an increase of 10 per cent as affecting the contract miners is a step in the right direction, although not compensatory for the distinct service rendered by such men and being insufficient to meet their needs. We also desire to call your attention to the fact that 65 per cent of the men employed in the anthracite industry are paid by the day, and the application of a percentage increase to the multiplicity of rates in this classification is wholly unsatisfactory for two substantial reasons:

"A percentage increase would widen the existing differentials between the various classifications of labor and thus accentuate the existing inequalities in rates, which constitute a source of bitter complaint among the men affected."

"A percentage increase also has the effect of giving to the lowest paid worker a lesser increase in actual wages than is given to those who enjoy a higher rate."

"Experience has taught the necessity of translating percentage increase into an equivalent number of cents per day for application to the rates of those who are thus

employed. The representatives of the mine workers therefore desire to impress you with the importance of this matter."

MINERS' REPLY IN REGARD TO CHECK-OFF

The text of the miners' response on the check-off follows:

"The mine workers regret your refusal to incorporate the check-off arrangement in your recommendations. The fact that your refusal is not amplified by any explanation leads us to assume that you did not, perhaps, have full information available on this subject. We desire consideration of the check-off for two reasons, viz.: as a matter of convenience and economy in the maintenance of the organization and the administration of its affairs; to give greater stability to the joint wage agreement and to insure the punctilious observance of all contractual obligations in harmony with the recommendations of the U. S. Coal Commission. Such a provision in the agreement would not in any manner add to the cost of the anthracite commodity. No valid objection can be made to the check-off unless one persuades himself to believe that the extension of a courtesy constituting a convenience to the United Mine Workers of America can be construed as a reprehensible act.

"The mine workers' representatives do not request that the check-off apply to any individual other than those who file a voluntary written order, constituting a legal assignment, for the exercise of the privilege.

"We call your attention to the fact in the bituminous mining fields of central and western Pennsylvania, that approximately 100,000 mine workers enjoy this privilege through their wage agreements with the bituminous operators. For a quarter of a century this arrangement has existed in the bituminous districts where collective bargaining is recognized and the anthracite mine workers are only requesting that equal recognition be accorded them as is given by other coal operators.

"May we not point out that important producers of anthracite having operations in the bituminous districts freely admit the virtue and permit the existence of the check-off arrangement in their soft-coal mines while issuing fulminations against it in the anthracite territory? This is particularly true as affecting the Susquehanna Collieries Co., the Madeira-Hill interests, the Glen Alden Coal Co. and others, the Delaware & Hudson and others.

"The Delaware & Hudson Railroad Co., which is one of the most important of the railroads producing anthracite, has organized its own company union among its shop employees. Membership in the company union is compulsory upon those accepting employment and the monthly membership dues are deducted from the employees' pay envelopes. Paradoxical as it may seem, the representatives of the Delaware & Hudson Railroad Co. are among the most virulent in their opposition to the mine workers' request for a check-off arrangement. They pursue a 'Dr. Jekyll and Mr. Hyde' labor policy in this respect, which engenders unrest and breeds discontent.

"It is also true that practically all of the railroad systems of the country who are still resisting the shopmen's legitimate trade unions have organized company labor unions among their shop employees. These unions are organized and conducted solely in the interests of the railroad companies, and membership in them is made compulsory, and through the instrumentality of the check-off the railroad companies collect the monthly dues.

"It will thus be recognized that the corporate foes of the United Mine Workers of America do not hesitate to utilize the check-off arrangement when it serves their particular ends, while at the same time they fulminate against the mine workers' request for consideration upon this point.

"As representatives of the United Mine Workers of America we feel that in the absence of any reasonable or valid objection to the check-off by the anthracite operators we are entitled to recognition on this point.

"We understand that your fourth recommendation, affecting the principle of collective bargaining, means that the anthracite operators would forego their practice of contracting with individual employees for service at less than

the prescribed rates. We further understand that it means that the workers have an inherent right to exercise their voice and judgment, through representatives of their own choosing, upon matters affecting wages, hours of labor and conditions of employment. With this recommendation we find ourselves in entire accord.

"In consideration of these several matters, including the remaining number of eleven demands of the United Mine Workers, we feel that your action has paved the way to a reopening of joint wage negotiations between the anthracite operators and the representatives of the mine workers. Such a conference could take your wage suggestions for contract miners as a basis, and by diligent application could probably make substantial progress in working out a new agreement. We accordingly advise Your Excellency that the representatives of the mine workers will hold themselves in readiness to enter such joint conference at any time such a meeting can be arranged.

"We note your further suggestion that in the process of collective bargaining both sides should select an individual to attend meetings and take part in discussions without a vote, and that in the event of failure to agree all differences should be referred to the Anthracite Board of Conciliation, which would result in ultimate decision by the Umpire attached thereto.

"Whether or not it was so intended, the language of your suggestion would imply that the mine workers should accept for the future permanent arbitration of the major provisions of wage agreements. We believe that such an expression is in conflict with the principle enunciated in your fourth recommendation, which grants the complete recognition of collective bargaining. We scarcely feel that it is necessary, in any detailed form, to analyze our publicly recognized opposition to arbitration of the basic principles of wages, hours, working conditions and human relationship in the anthracite industry. Our position on this matter has been made known to the President of the United States, and from time to time has been restated to governmental agencies, including the U. S. Coal Commission. The anthracite operators, upon repeated occasions, have been formally advised of our attitude on this question.

"We find ourselves in harmony with your further suggestion that the Anthracite Board of Conciliation be authorized to undertake and complete a further revision of the whole body of the wage rates in the anthracite region which you so aptly describe. The representatives of the United Mine Workers will diligently co-operate in effectuating a revision which will eliminate the existing inequities."

Tentative Agreement with Maintenance Men

As a safeguard against any serious damage resulting in the event of trouble between the union and the operators, an agreement was signed Aug. 30, by which the maintenance workers, numbering about 3,000, would be exempted from the strike order and permitted to continue at their work of protecting the mines against flood or other damage. By this agreement the men who were working ten to twelve hours a day were put on an eight-hour basis, receiving their old daily wage for eight hours with pro-rata pay for time worked in excess of eight hours.

This means an increase of \$1.10 to \$1.15 a day for 975 of the men who will remain at work, an increase which the operators conceded in the early days of the Atlantic City conferences when they agreed to abandon the twelve-hour day.

Notice that the operators had agreed to the miners' terms for these men was the first intimation to be made public that they were convinced the men would quit work. On receipt of it the scale committee sent out orders to the local unions specifying the number of men who were to remain at work and the class of work they are to do.

SECRETARY DAVIS of the Department of Labor hopes to see the day when there will be no strikes. The consumers of hard coal would be satisfied with a year in which there was no strike of anthracite miners.—*New York Herald.*

51,000,000 Tons of Bituminous Coal in Storage Aug. 1, 44 Days' Supply; 5,000,000 Tons Gain in Month

Soft coal continued to flow into storage during July and on Aug. 1, 1923, commercial consumers had on hand approximately 51,000,000 net tons, according to a survey by the Bureau of the Census and the Geological Survey, under authority of the Federal Fuel Distributor. In comparison with the revised figure for July 1, 1923, this was an increase of 5,000,000 tons. Progress in the building up of stocks from the low point reached on Sept. 1, 1922, owing to drafts on reserves during the strike last summer, has been practically uninterrupted, and in the eleven months that have elapsed there has been a net gain of 29,000,000 tons. Stocks on Aug. 1, 1923, were 10,000,000 tons larger than on Aug. 1, 1921. On the dates for which stock records are available the supply on Aug. 1, 1923, has been exceeded only during the periods at the close of the war and just prior to the miners' strike of 1922.

Measured in terms of tons, stocks increased 10.9 per cent during July; in terms of days' supply, the increase was 18.9 per cent. The larger increase in days' supply was due to the fact that the rate of consumption decreased in July, thereby increasing the length of time the tonnage on hand would last. At the rate of consumption in July the stocks on Aug. 1 were sufficient to last 44 days on the average, assuming that stocks were evenly divided.

Total stocks on the Lake docks at Duluth-Superior, Ashland-Washburn, and at Lake Michigan ports on Aug. 1, 1923, were about 5,361,000 tons. Compared with the 3,991,000 tons on the docks on July 1, this was an increase of approximately 34 per cent. A group of producers who store coal at the mines or at some intermediate point had 672,000 tons in storage on Aug. 1.

Anthracite.—Retail dealers in anthracite received more of that coal than they delivered in July, and their total stocks on Aug. 1 were 4 per cent larger than on July 1. Practically complete reports on the quantity of anthracite on the docks of Lakes Superior and Michigan indicate that the total on hand on Aug. 1 was 609,000 net tons, against 448,000 tons on July 1.

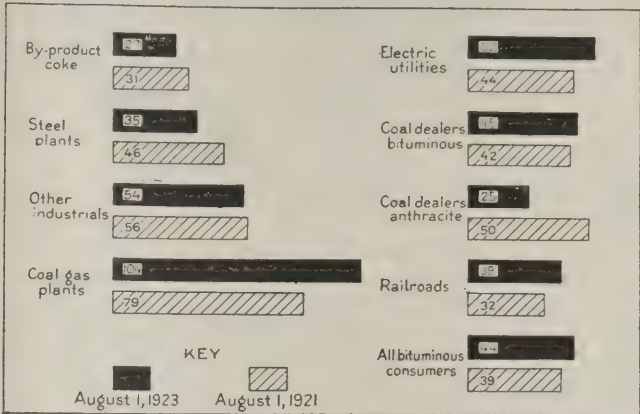


FIG. 2.—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON AUG. 1, 1923, AND AUG. 1, 1921

At the rate soft coal was burned during July, 1923, the total stocks on Aug. 1 were sufficient to last 44 days, an increase of 7 days over the supply on July 1. The stocks on Aug. 1, 1921, were sufficient to last 39 days at the low rate of consumption then prevailing. An important factor in the increase in days' supply on Aug. 1 was an appreciable decline in the rate of consumption in July.

The total quantity of soft coal in the hands of commercial consumers on Aug. 1, 1923, was between 49,000,000 and 53,000,000 net tons—probably 51,000,000 tons. This estimate does not take into consideration coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which item is classed as coal in transit.

Fig. 1 shows that reserves were added to more rapidly during July than in any other month during the present period of accumulation. Stocks have been built up to the point where they exceed by a large margin those on any preceding summer date, and in fact they compare favorably with those on any date for which records exist. The quantity in storage piles on Aug. 1, 1923, was 25 per cent larger than on Aug. 1, 1921; 5 per cent larger than on Nov. 1, 1921, and but 12 per cent behind Jan. 1, 1919, when exceptionally large supplies were on hand.

Estimates based on the reports from consumers and supplemented by other available information indicate that the total quantity consumed in July, including exports, was in the neighborhood of 42,000,000 tons, or at the rate of about 9,250,000 tons per 7-day week.

Consumers' Stocks in Terms of Days' Supply.—Fig. 2, which is based upon the data in the table below, offers a comparison of the days' supply held by the seven principal classes of consumers on Aug. 1, 1923, with that on Aug. 1, 1921. In using that date for comparative purposes it should be carefully noted that in actual tonnage stocks were less than now, but owing to the low rate of consumption in the summer of 1921, due to the severe industrial depression, the days' supply for certain types of consumers was larger. The average stocks on Aug. 1 were sufficient to last 44 days at the rate of consumption in July, whereas those on Aug. 1, 1921, were sufficient to last 39 days at the rate of consumption from Aug. 1 to Nov. 1 of that dull year.

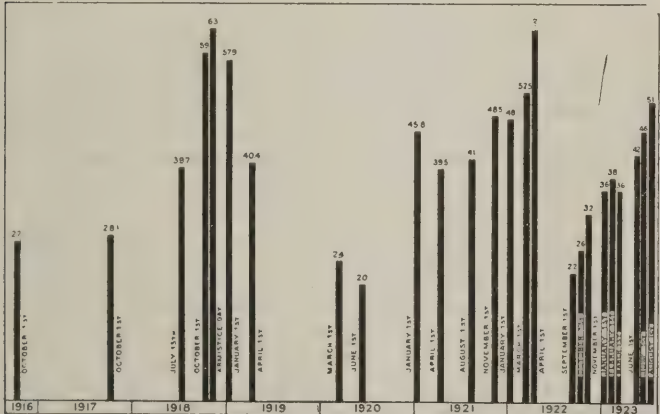


FIG. 1.—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO AUG. 1, 1923

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities, and retail dealers. Coal for steamship fuel, Lake docks, in transit, and in the bins of householders is not included. The figures for 1923 are subject to revision.

DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS, JAN. 1, 1919, TO AUG. 1, 1923 (a)												
(Figures represent number of days supply would last at current rate of consumption at time of stock-taking.)												
	Jan. 1, 1919	June 1, 1920	Apr. 1, 1921	Aug. 1, 1921	Nov. 1, 1921	Sept. 1, 1922	Nov. 1, 1922	Jan. 1, 1923	Mar. 1, 1923	June 1, 1923	July 1, 1923	Aug. 1, 1923 (b)
Byproduct coke plants.....	32	8	28	31	38	11	18	19	19	23	26	27
Steel plants.....	42	11	38	46	46	12	21	27	26	29	35	35
Other industrials.....	65	24	47	56	67	32	39	40	34	39	46	54
Coal-gas plants.....	81	22	66	79	87	34	55	60	58	75	89	104
Electric utilities.....	49	22	48	44	54	26	32	33	34	45	48	52
Coal dealers, bituminous...	39	10	26	42	46	11	21	16	11	27	39	45
Railroads.....	32	10	24	32	31	13	13	16	16	21	28	39
Total bituminous.....	42	15	36	39	43	17	23	26c	22c	30c	37c	44c

(a) The figures in this table are estimates based on incomplete data.
(b) The rate of consumption used in calculating the days' supply on Aug. 1, 1923, was the quantity consumed in July.
(c) Subject to revision.

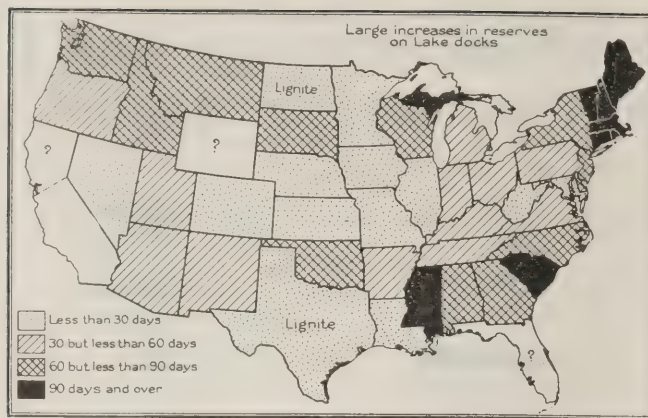


FIG. 3.—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON AUG. 1, 1923

At the average rate of consumption that prevailed during July, 1923, reserve stocks at industrial plants other than steel and byproduct coke would last on the average 54 days. The map shows how the supply varied from state to state. Changes in business activity which affected coal consumption are quickly reflected in the days' supply. Based on reports from 2,229 plants.

Stocks, by Localities.—Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments, excluding steel and byproduct coke plants.

Over the country as a whole the stocks held by general industrials on Aug. 1 were sufficient to last 54 days on the average, an increase of 8 days over the supply on July 1.

The distribution of stocks as shown by the map does not vary greatly from the customary condition. New England, the most eastern of the Middle Atlantic States, the South Atlantic Coastal Plain, certain of the Gulf States, the Northern Peninsula of Michigan, Wisconsin, and the Northwest were particularly well supplied, and as usual had heavier supplies than the states included in a broad belt through the center of the country from the Atlantic to the Pacific, the lignite-burning states, and those in the upper valley of the Mississippi.

Electric Utilities.—Reports from the electric-utility plants indicated that stocks increased and that the supply on hand on Aug. 1 was sufficient for 52 days, against 48 days' supply on July 1. On Aug. 1, 1921, such plants had enough coal to last 44 days.

Coal-Gas Plants.—The stocks at coal-gas plants increased in July and a new record of stocks at such plants was established, both from the viewpoint of days' supply and tonnage involved. The supply was sufficient to last 104 days, and exceeded stocks on Aug. 1, 1921, by 25 days.

Byproduct Coke and Steel Plants.—Complete returns from the byproduct coke and steel plants showed the following reserves on Aug. 1, 1923, at the rate of consumption in July, and on Aug. 1, 1921:

BYPRODUCT PLANTS

	Days' Supply	
	Aug. 1, 1923	Aug. 1, 1921
Low-volatile....	27	Separation not possible
High-volatile....	27	not possible
Average.....	27	31

STEEL WORKS

	Days' Supply	
	Aug. 1, 1923	Aug. 1, 1921
Steam coal.....	31	36
Gas coal.....	42	61
Average.....	35	46

Railroad Fuel.—Estimates of railroad-fuel stocks, based on reports submitted by the American Railway Association, place the total quantity held by the railroads in stockpiles, cars and chutes, on Aug. 1, at 13,800,000 tons, a supply sufficient for 39 days. In comparison with July 1 this was an increase in days' supply of 39 per cent.

Retail Dealers, Bituminous.—Deliveries of soft coal by retail dealers decreased in July, the average rate being 9 per cent less than that during June. Receipts somewhat exceeded deliveries and on Aug. 1, 1923, retailers had a supply sufficient to last 45 days, against a 39 days' supply on July 1. On Aug. 1, 1921, they had enough for 42 days. The actual tonnage held by retailers on Aug. 1, 1923, was 12 per cent less than on Aug. 1, 1921, and 20 per cent less than on Nov. 1 of that year.

All available information indicates that during July there was a comparatively small decrease in the quantity of bituminous coal in transit, which probably did not exceed 4,000,000 tons.

Coal on Upper Lake Docks.—Practically complete reports show that stocks on the docks of Lakes Superior and Michigan increased from 3,991,000 tons on July 1 to 5,361,000 tons on Aug. 1, 1923. On Aug. 1, 1921, the total was 8,139,000 tons.

Unbilled Loads at Mines.—The quantity of unbilled coal in cars standing at the mines and the tonnage at junction points and terminals changed but little in July, and on Aug. 1 stood at 560,000 and 27,000 tons, respectively.

Bituminous Coal Stored by Producers.—Reports from an incomplete list of producers show that on Aug. 1 672,000 tons of bituminous coal were on hand at the mines or at some intermediate point between the mines and centers of consumption. On July 1 690,000 tons were so held.

Stocks of Coke at Byproduct Coke Plants.—Byproduct coke plants continued to accumulate stocks during July and the total surplus coke on hand on Aug. 1 was 430,000 tons. This was an increase over the supply on July 1 of 122,000 tons, or nearly 40 per cent. In spite of the increase, however, stocks on Aug. 1 were not quite half those on March 1, 1922.

Anthracite.—Although somewhat lessened by the observance of Independence Day as a holiday, the production of anthracite in July was maintained at a level that has been exceeded in the corresponding month but 3 times in the past 10 years. Little, if any, of the sizes suitable for household purposes were burned, and it seems quite probable that practically the entire quantity of such sizes was added to stocks, either by consumers or retail dealers.

Householders' Stocks.—Examination of production figures and stocks held by retailers indicate that householders remember their inability to procure a full supply of anthracite during the past winter and under the stimulus of another possible interruption in the supply this fall, are laying in more than the usual quantity at this season of the year. Although householders' bins had been nearly stripped of anthracite at the end of the past winter, the available production has been taken by them so rapidly, it seems likely that many homes are now well stocked.

Retail Dealers' Stocks.—The stocks of anthracite in retail coal yards on Aug. 1, 1923, though 10 per cent larger than on July 1, were much lower than during the summer of preceding years, largely because of the rapidity with which coal has been taken by the consumers. It has not been possible for the government to make a complete count, but a selected list of 424 dealers from whom reports have been received since 1919 shows total stocks of 827,711 tons on Aug. 1, against 793,841 tons on July 1, 1923. These dealers had 47 per cent less anthracite on hand than on Aug. 1, 1921, and 13 per cent less than on Jan. 1, 1919.

Anthracite in Transit.—According to reports from the dock operators, there were 608,726 net tons of anthracite on the Upper Lake Docks on Aug. 1, 1923, compared with 1,090,258 tons on Aug. 1, 1921; 1,316,070 tons on Nov. 1, 1921, and 447,610 tons on July 1, 1923.

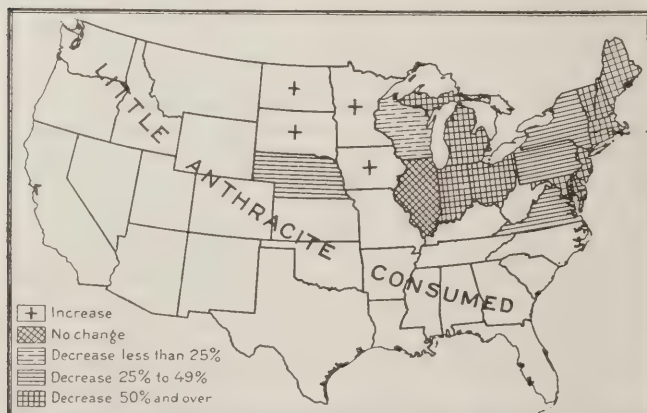
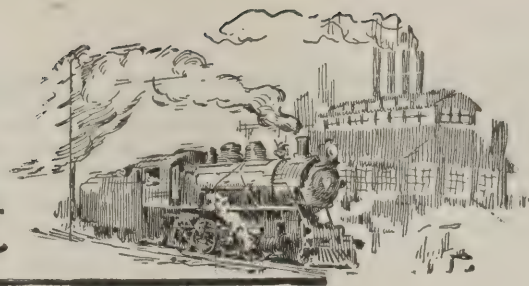


FIG. 4.—HOW RETAILERS' STOCKS OF ANTHRACITE ON AUG. 1, 1923, COMPARED WITH THOSE ON AUG. 1, 1921

Stocks of anthracite in retail yards increased 4 per cent during July. The supply on Aug. 1 was sufficient to last on the average 25 days at the rate of delivery in July. The map shows how stocks on Aug. 1, 1923, compared with those on the corresponding date 2 years ago. Only in a portion of the territory served by the Lake docks did the supply on Aug. 1, 1923, exceed that on the earlier date.



Production and the Market



Weekly Review

Stoppage of work in the hard-coal fields has caused no marked change in the market. Inquiries have increased, but prices in the East have not gained. Up to the last day before the strike began anthracite was produced at a record rate. In the week before the strike the output was the highest recorded this year for both hard and soft coal. There will be no active demand for soft-coal substitutes until cooler weather and if the railroads continue to perform as well as they have for the past eight months there is little likelihood of price inflation.

Production of anthracite to date for the present coal year is estimated at approximately 41,400,000 net tons, 2,824,000 tons more than during the corresponding period of 1921 and 2,380,000 tons more than during the same period of 1920. During the week ended Aug. 25 hard-coal miners produced 2,165,000 net tons, an increase of 207,000 tons over the preceding week.

The government's stock report on Sept. 1, shows 51,000,000 tons of bituminous coal in the hands of consumers as of Aug. 1, a gain in July of 5,000,000 tons. Production of soft coal in July was 45,000,000 tons. Consumption and exports were 40,000,000 tons. Production in August was around 48,500,000 tons, which indicates a further gain of stocks in August of between six and eight million tons, bringing the total on Sept. 1 to around 57,000,000 tons.

PRICE INDEX ADVANCES SLIGHTLY

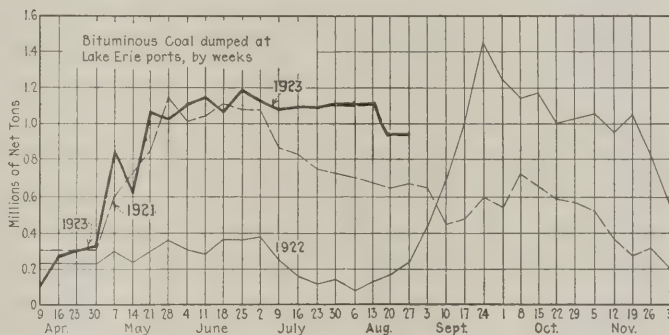
There was another slight advance in soft coal last week, *Coal Age Index* registering 204 on Sept. 4, a gain of two points, with an average price of \$2.47. Prices throughout the West showed slight increases, while in the East they remained practically unchanged.

In the Chicago market domestic coals are in better demand due in part possibly to the anthracite suspension and on account of recent slow buying, while the busiest market marked by the heaviest buying since the first of the year, due to a few days of cool weather,

is reported in the steam-coal market. In New England buyers showed no interest, practically all industries having heavy reserves.

The market for substitutes gained strength during the week, particularly coke. Inquiries were more numerous and considerable business was reported as having been placed. Prices were stronger. While some producers of bituminous screened coals reported active business and claimed to be sold up at present, others asserted that while inquiries were numerous actual business was slow.

Lake shipments of bituminous coal continues at about 1,000,000 net tons weekly. Congestion at the upper lake

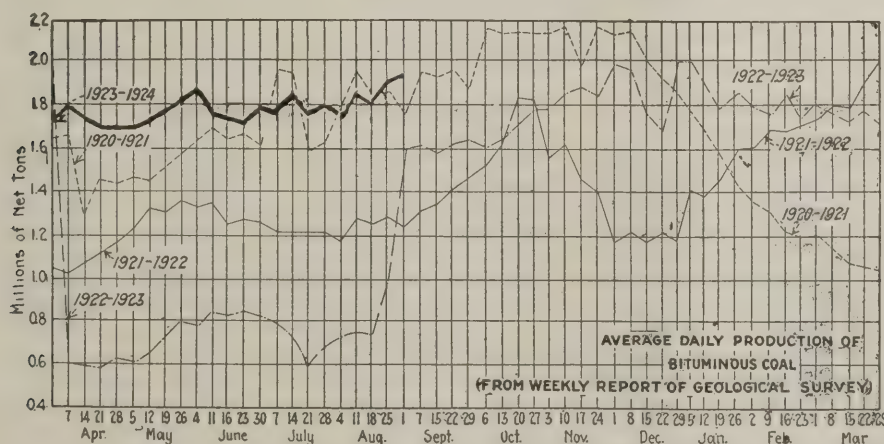


LAKE COAL DUMPED
(Net Tons)

	Week Ended Aug. 27	Season to Aug. 27
Cargo	927,382	17,882,549
Fuel	59,024	918,852
Totals	986,406	18,801,401

ports continues. Shipments of anthracite from Buffalo during the present season to Aug. 28 amount to 1,903,170 net tons, as compared with 2,637,463 tons in the corresponding period of 1922.

The export demand is quiet, although it is expected that increased buying will soon follow as the result of the Italo-Greek trouble.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Aug. 11 (a)	4,606,000	9,851,000
Aug. 18 (a)	4,609,000	10,843,000
Aug. 25 (b)	6,736,000	11,346,000
Daily average	768,000	1,807,000
Calendar year	223,559,000	357,036,000
Daily av. cal. year	1,109,000	1,891,000

ANTHRACITE

Aug. 11	40,000	1,735,000
Aug. 18	38,000	1,858,000
Aug. 25	37,000	2,165,000

COKE

Aug. 18 (b)	120,000	334,000
Aug. 25 (a)	116,000	318,000
Calendar year	4,086,000	12,843,000

a) Subject to revision. (b) Revised from last report.

Demand Increases Slightly in Chicago

The suspension of operations of anthracite mines caused only a slight increase of demand in the Chicago market. Domestic sizes of coal are somewhat in greater demand, possibly due to the anthracite mines not operating or on account of slow buying during the past few months. The little excitement that prevails is more on the part of the wholesale companies. There is a noticeable demand for coke, which is selling at \$10.75 per ton f.o.b. ovens in Chicago, which is readily supplied.

The busiest market marked by heaviest buying since the first of the year is the situation as regards bituminous coal in Chicago and the surrounding district last week. A few days of low temperature brought realization that winter is approaching and made all interests, domestic and industrial, look to their coal supply. The promptitude with which the market absorbed all offerings practically eliminated bargain coal and prices from all fields held firmly, with many indications of an upward trend.

A heavy demand for screenings is being experienced by southern Illinois producers. Circular prices are being ad-

hered to rigidly and many concerns report their production as sold for some time to come. There is still maintained a large volume of unbilled lump coal at the mines loaded on cars. Orders and inquiries for domestic sizes are becoming much more frequent, particularly from the country districts and the circular price of \$4.35 is being held strongly, except on the smaller sizes. Central Illinois felt the general improvement in market conditions to that extent that prices advanced from ten to twenty-five cents on the various grades of coal.

In the DuQuoin and Jackson County fields price range from \$3.25 to \$3.50 on domestic lump and egg, domestic nut being offered at \$2.75@3 and screenings at \$1.30@ \$1.40. In the Mt. Olive field demand increased and as a consequence prices have advanced 25c. per ton on domestic sizes. Conditions in the Standard field have improved materially and most operators have advanced their prices over those of the previous week.

Retail Market at St. Louis Improves

An improvement in retail conditions has been noted during the past week in St. Louis. The early demand for

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

		Sept. 5 1922	Aug. 20 1923	Aug. 27 1923	Sept. 1 1923†			Sept. 5 1922	Aug. 20 1923	Aug. 27 1923	Sept. 1 1923†
Low-Volatile, Eastern						Midwest					
	Market Quoted						Market Quoted				
Smokeless lump.....	Columbus....	\$6.10	\$5.85	\$5.85	\$5.75@ \$6.15	Franklin, Ill. lump.....	Chicago.....	\$5.05	\$3.90	\$4.20	\$4.00@ \$4.35
Smokeless mine run.....	Columbus....	5.50	3.00	3.00	2.75@ 3.25	Franklin, Ill. mine run.....	Chicago.....	4.65	2.85	3.00	2.75@ 3.25
Smokeless screenings.....	Columbus....	5.35	2.35	2.35	2.25@ 2.50	Franklin, Ill. screenings.....	Chicago.....	4.25	1.65	1.65	1.75@ 1.85
Smokeless lump.....	Chicago.....	6.40	5.75	6.35	6.25@ 6.50	Central, Ill. lump.....	Chicago.....	4.95	2.60	2.60	3.00@ 3.25
Smokeless mine run.....	Chicago.....	6.25	3.00	3.35	3.25@ 3.50	Central, Ill. mine run.....	Chicago.....	4.50	2.10	2.20	2.10@ 2.35
Smokeless lump.....	Cincinnati.....	5.60	6.10	6.10	6.00@ 6.50	Central, Ill. screenings.....	Chicago.....	4.30	1.35	1.40	1.35@ 1.50
Smokeless mine run.....	Cincinnati.....	4.75	3.00	3.25	3.00@ 3.50	Ind. 4th Vein lump.....	Chicago.....	5.25	3.35	3.35	3.25@ 3.50
Smokeless screenings.....	Cincinnati.....	4.40	2.75	2.75	2.25@ 2.75	Ind. 4th Vein mine run.....	Chicago.....	4.85	2.60	2.60	2.50@ 2.75
*Smokeless mine run.....	Boston.....	9.00	5.30	5.05	5.00@ 5.25	Ind. 4th Vein screenings.....	Chicago.....	4.75	1.55	1.55	1.50@ 1.75
Clearfield mine run.....	Boston.....	5.00	2.35	2.20	1.90@ 2.50	Ind. 5th Vein lump.....	Chicago.....	5.10	2.75	2.75	2.50@ 3.00
Cambria mine run.....	Boston.....	6.00	2.85	2.85	2.50@ 3.25	Ind. 5th Vein mine run.....	Chicago.....	4.65	2.10	2.10	2.00@ 2.25
Somerset mine run.....	Boston.....	5.25	2.60	2.50	2.25@ 2.75	Ind. 5th Vein screenings.....	Chicago.....	4.40	1.40	1.40	1.30@ 1.50
Pool 1 (Navy Standard).....	New York.....	.....	3.05	3.25	3.00@ 3.50	Mt. Olive lump.....	St. Louis.....	.....	3.00	3.00	3.00@ 3.25
Pool 1 (Navy Standard).....	Philadelphia.....	.....	3.40	3.10	2.95@ 3.25	Mt. Olive mine run.....	St. Louis.....	.....	2.00	2.00	2.00@ 2.30
Pool 1 (Navy Standard).....	Baltimore.....	.....	.....	.....	.....	Mt. Olive screenings.....	St. Louis.....	.....	1.50	1.50	1.35
Pool 9 (Super. Low Vol.).....	New York.....	5.75	2.55	2.50	2.35@ 2.75	Standard lump.....	St. Louis.....	4.65	2.40	2.50	2.50@ 2.75
Pool 9 (Super. Low Vol.).....	Philadelphia.....	5.85	2.75	2.55	2.45@ 2.75	Standard mine run.....	St. Louis.....	3.90	1.85	1.85	1.80@ 2.30
Pool 9 (Super. Low Vol.).....	Baltimore.....	6.25	2.50	2.50	2.40@ 2.60	Standard screenings.....	St. Louis.....	3.75	1.00	1.00	1.00
Pool 10 (H.Gr. Low Vol.).....	New York.....	5.35	2.20	2.25	2.00@ 2.50	West Ky. lump.....	Louisville.....	4.25	2.20	2.40	2.40@ 2.75
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	5.60	2.30	2.15	2.00@ 2.35	West Ky. mine run.....	Louisville.....	4.25	1.75	2.10	1.85@ 2.00
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	5.85	2.25	2.25	2.25@ 2.30	West Ky. screenings.....	Louisville.....	4.25	0.90	1.05	0.80@ 1.00
Pool 11 (Low Vol.).....	New York.....	5.10	1.85	2.00	1.80@ 2.00	West Ky. lump.....	Chicago.....	4.25	2.10	2.75	2.50@ 3.00
Pool 11 (Low Vol.).....	Philadelphia.....	5.10	1.85	1.80	1.75@ 2.00	West Ky. mine run.....	Chicago.....	4.25	1.30	1.60	1.50@ 2.00
Pool 11 (Low Vol.).....	Baltimore.....	5.35	1.90	1.90	1.90						
High-Volatile, Eastern						South and Southwest					
Pool 54-64 (Gas and St.).....	New York.....	5.15	1.75	1.75	1.60@ 1.85	Big Seam lump.....	Birmingham.....	4.75	3.50	3.50	3.65@ 3.90
Pool 54-64 (Gas and St.).....	Philadelphia.....	4.75	1.75	1.80	1.70@ 2.00	Big Seam mine run.....	Birmingham.....	4.00	1.95	1.95	1.75@ 2.15
Pool 54-64 (Gas and St.).....	Baltimore.....	5.25	1.85	1.85	1.85	Big Seam (washed).....	Birmingham.....	4.00	2.35	2.35	2.25@ 2.50
Pittsburgh se'd gas.....	Pittsburgh.....	.....	2.80	2.90	2.90@ 3.10	S. E. Ky. lump.....	Chicago.....	4.25	3.10	3.10	2.75@ 3.00
Pittsburgh gas mine run.....	Pittsburgh.....	.....	.....	2.45	2.45@ 2.60	S. E. Ky. mine run.....	Chicago.....	4.25	1.80	1.80	1.60@ 2.00
Pittsburgh mine run (St.).....	Pittsburgh.....	.....	2.05	2.20	2.25@ 2.35	S. E. Ky. lump.....	Louisville.....	5.00	2.85	3.00	2.75@ 3.50
Pittsburgh slack (Gas).....	Pittsburgh.....	.....	1.55	1.55	1.50@ 1.60	S. E. Ky. mine run.....	Louisville.....	5.00	1.85	1.85	1.75@ 2.25
Kanawha lump.....	Columbus.....	5.85	3.00	3.05	2.85@ 3.25	S. E. Ky. screenings.....	Louisville.....	4.90	1.00	1.10	1.00@ 1.40
Kanawha mine run.....	Columbus.....	5.60	1.85	1.85	1.75@ 2.10	S. E. Ky. lump.....	Cincinnati.....	5.50	3.25	3.25	3.50@ 4.00
Kanawha screenings.....	Columbus.....	5.35	1.05	1.05	1.10@ 1.25	S. E. Ky. mine run.....	Cincinnati.....	5.25	1.60	1.70	1.50@ 2.10
W. Va. lump.....	Cincinnati.....	5.35	3.25	3.50	3.50@ 3.75	S. E. Ky. screenings.....	Cincinnati.....	4.85	1.05	1.15	1.10@ 1.85
W. Va. Gas mine run.....	Cincinnati.....	5.35	1.70	1.75	1.65@ 2.00	Kansas lump.....	Kansas City.....	6.00	4.00	4.50	4.50
W. Va. Steam mine run.....	Cincinnati.....	5.35	1.70	1.75	1.65@ 2.00	Kansas mine run.....	Kansas City.....	5.00	3.25	3.50	3.50
W. Va. screenings.....	Cincinnati.....	4.85	1.05	1.20	1.25@ 1.50	Kansas screenings.....	Kansas City.....	2.60	2.60	2.60	2.50@ 2.75
Hooking lump.....	Columbus.....	6.25	2.75	2.75	2.50@ 3.00						
Hooking mine run.....	Columbus.....	5.25	1.85	1.85	1.75@ 2.00						
Hooking screenings.....	Columbus.....	5.25	1.10	1.10	1.00@ 1.20						
Pitts. No. 8 lump.....	Cleveland.....	5.50	2.60	2.65	2.35@ 3.00						
Pitts. No. 8 mine run.....	Cleveland.....	5.25	2.05	2.10	2.10@ 2.15						
Pitts. No. 8 screenings.....	Cleveland.....	5.25	1.20	1.35	1.30@ 1.45						

* Gross tons, f.o.b. vessel, Hampton Roads.

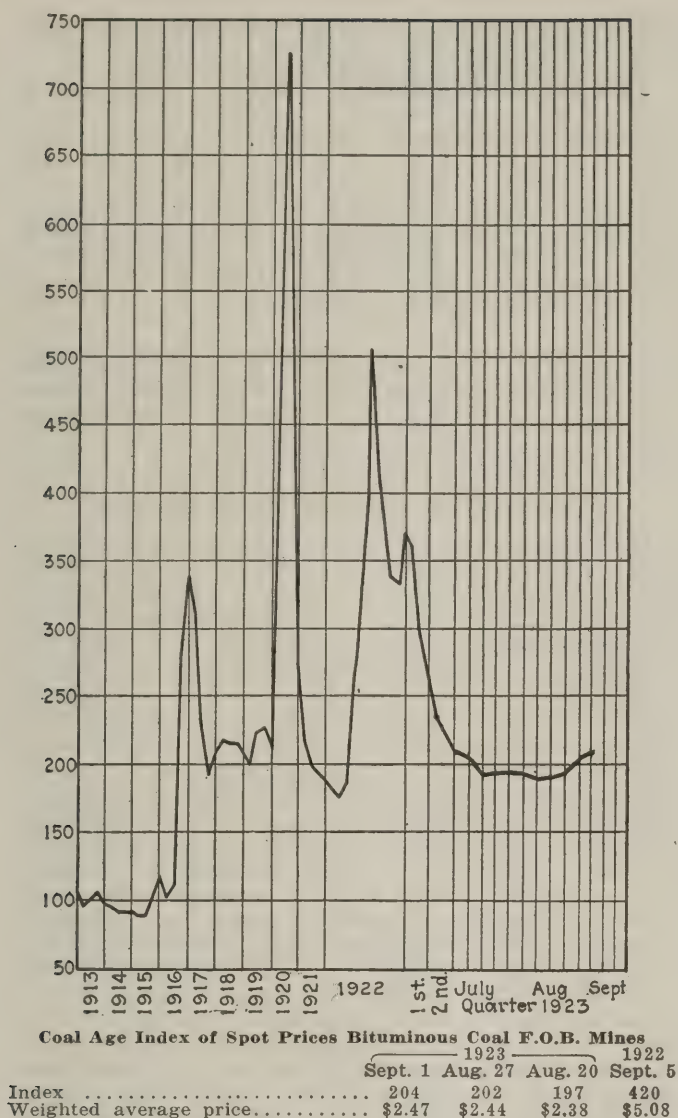
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Freight Rates	Dec. 26, 1922		Aug. 27, 1923		Sept. 1, 1923†	
	Market Quoted		Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25		\$7.75@ \$8.35		\$7.75@ \$8.35
Broken.....	Philadelphia.....	2.39		7.90@ 8.10		7.90@ 8.10		7.90@ 8.10
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	\$8.50@ 13.00	8.00@ 8.35	\$8.50@ 14.00	8.00@ 8.35
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.30@ 13.50	8.00@ 8.35	8.50@ 14.50	8.00@ 8.35
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 13.00	8.00@ 8.35	8.50@ 14.00	8.00@ 8.35
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	8.50@ 12.00	7.25@ 7.45	8.50@ 12.00	7.25@ 7.45
Range.....	New York.....	2.34		8.25		8.30		8.30
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.50	6.00@ 6.30	7.50@ 9.00	6.00@ 6.30
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	3.50	3.50@ 4.15	3.50	3.50@ 4.15
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	3.50	3.50	3.50	3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	2.50	2.50	2.50	2.50
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	2.50	2.50	2.50	2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.50	1.50	1.50	1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye.....	New York.....	2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

anthracite seems to have been taken care of and since the dealers have ample stocks of this grade of fuel on hand, the probability of a strike is not causing consumers any worry. There is a fair demand for coke, but smokeless is not moving in any quantity.

Quotations in western Kentucky have advanced 10c. to 25c. a ton on prepared sizes over the past ten days, but actual sales are not much higher if any than they have been. Operators are very anxious to obtain higher prices and believe that September will bring better levels.

Prices Higher at Louisville

Prices quoted on the Louisville market on both eastern and western Kentucky coal are higher, but there is still plenty of coal to be had at about the old levels. Steam coal shows very little change, except some fluctuation in screenings. Domestic coal is generally in fair movement. The Lake movement is still good, while there has been scattered demand from various sections.

Anthracite has been moving readily at Minneapolis. There is always a pickup in the hard-coal movement at this time, and it has been increased by the suspension. Retail dealers have been receiving as many orders as they could comfortably handle, but apparently there has been no serious alarm. Consumers feel assured that they will

be able to get fuel. The docks have received something like 800,000 tons of hard coal this season, about 300,000 tons more than last year. While this is not a full winter's supply, it is around 70 or 75 per cent of a winter's needs.

The soft-coal situation is steady. Dock Hocking is selling at \$6 and occasionally \$5.75. Youghiogheny is about \$6@\$.25. Screenings are around \$3, all prices being at the dock.

Market Stiffens at Duluth

Possibility of a strike had a stiffening effect upon all markets at Duluth. Bituminous advanced generally over last week's quotations and hard coal is the same as before quoted only because of the fact that dock men have announced their intention of maintaining prices "strike or no strike."

Hard-coal prices follow: Stove, \$12.80; nut, \$12.85; egg, \$12.50; pea, \$11; buckwheat, \$8.50.

It is estimated that there is about 4,000,000 tons of bituminous on the docks at Duluth. Railroads, industrial concerns and manufacturing plants are all placing orders.

Prices of bituminous are as follows: Youghiogheny, lump, \$6.50; run of pile, \$5.50; screenings, \$4.25; Hocking, lump, \$6.25; run of pile, \$5.25; screenings, \$3.75; Splint, lump, \$6.75; run of pile, \$5.75; screenings, \$4.75; Pocahontas, lump, \$10.00; run of pile, \$6.75; screenings, \$6.25; Kentucky, lump, \$8.00; run of pile, \$7.25; screenings, \$4.75. Three docks here have stopped shipping anthracite to points outside of Duluth.

The coal market at Milwaukee is active, as far as the domestic field is concerned, but there is not much doing in industrial circles. Consumers of anthracite and the domestic grades of bituminous coal are inclined to be panicky, in view of the uncertainty of future anthracite mine operations, and dealers are pressed with orders. Up to the present time Milwaukee has received only about 50 per cent of a normal supply of anthracite, and the greater part of this is now in the bins of consumers.

The demand for Kansas, Oklahoma and Missouri coal took a pronounced spurt the last week of August. While no new mines were reported opening, those in operation worked almost full time. Mine tracks have been almost cleared of "no bills." Some operators in the Arkansas field advanced the price of semi-anthracite lump 50c. a ton, to \$7, Sept. 1.

Both operators and dealers in Utah report a gain in business. Buyers from Pacific Coast, Northwest and Midwest points are in Salt Lake City making inquiries for coal. Railroads running through the state are storing coal and local industries are buying again, though not heavily. The increase in the domestic trade is marked.

Dealers throughout the Rocky Mountain region have their yards and bins full and consumers are commencing to put in their winter supply. September prices for bituminous are \$6 for lump and \$5.50 for nut, an increase of 25c. per ton over August prices. Mine run is selling at \$4.25@\$.45, slack \$2.25@\$.25 for Walsen and \$3.25@\$.35 for Trinidad. Semi-anthracite in the egg and nut sizes is quoted at \$7.50, chestnut at \$3. Bee-hive foundry coke is selling at \$9.50 and byproduct at \$9 per ton. Lignite prices are now quoted at \$4, \$3 and \$2.25. Mine-run is selling at \$2.50 and slack at \$1.50.

Ohio Dealers Show Anxiety

Retail dealers in central Ohio showed more anxiety about stocks of domestic coal and householders exhibited some concern about their winter's coal. Contracting for domestic lump is active although sellers are loath to engage fuel for any great length of time in the future, believing that the suspension in the anthracite fields will mean advanced quotations on domestic sizes. The hard-coal situation has not reflected so far on the steam coal conditions. Buyers are playing a waiting game. Reserves are sufficient for from sixty to ninety days, while railroad demands are not as large as formerly.

Quotations stiffened in the Cincinnati market as a result of the anthracite situation. The September circular on the low-volatile coals shows little of a startling nature after all the talk that has been made regarding this coal being

sent to New England to take the place of anthracite. However, brokers are asking an advance of 25 to 50c. over the circular and most of the producers say they have plenty of orders or contracts to take their entire output from Sept. 15 to Oct. 15 at the present rate of production, which is about three days a week in the Pocahontas field.

Demand is showing marked improvement at Cleveland. The anthracite situation has not only stimulated steam buying but domestic as well. While the railroads have not increased the quantity of coal they are taking the proportion of eastern Ohio coal going to them is estimated at between 40 and 50 per cent. Operators and jobbers say inquiries are more numerous.

Pittsburgh Prices Move Upward

The Pittsburgh district coal market moved up an average of about 10c. a ton in the last week. The advance occurred without there being any particular change in either production or demand. Of late there has been a close balance, and apart from the fact of many small mines are closed the operation of the district has been very close to capacity. On this account it does not take much to move the market upward.

In the trade the advance is commonly attributed to the anthracite situation.

Buyers in New England Show No Interest

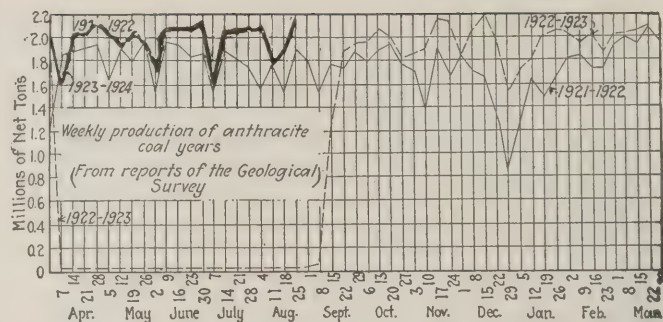
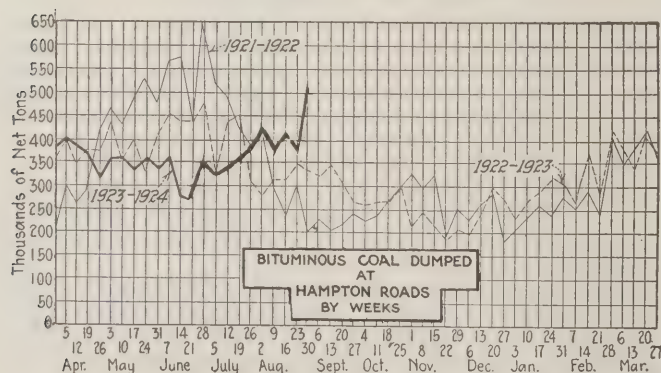
Not even the anthracite controversy in giving the slightest impetus to steam trade in New England. Buyers show no interest whatever and if possible there have been fewer purchases the past week than the week previous. Practically all the industries have coal accumulated for the fall and winter and it would take a very material increase in consumption to justify more than scattering inquiry.

The central Pennsylvania mines are under heavy curtailment, and aside from their tonnage on season contracts there is relatively little coal moving. The railroads are shutting off a percentage of their supply and in no direction is there improvement looked for until well into the autumn. Even miners of the more favorably known grades are pressed to keep in operation and in a few cases where there have been large accumulations at tidewater piers concessions have been made to dispose of the coal.

Prices f.o.b. vessel at Hampton Roads range about the same as a week ago. No. 1 Navy standard grades have been quoted freely at \$5@5.20, and No. 2 coals have been offered down to \$4.80. For inland delivery from points like Providence and Boston the asking price is around \$6.75 per gross ton on cars, although in certain instances sales have been made at as low as \$6.35. At certain of the Hampton Roads terminals there is more coal on wheels than market conditions justify, but at this end there is almost no distress coal, shippers having taken pains to provide alternative disposition before boats were loaded.

In the East the suspension of the hard-coal mines had no material effect on the bituminous-coal situation. There were a few more inquiries, but prices remained on the same level. The market for screened or prepared bituminous coal at New York and Philadelphia is flat, but there is a better inquiry for coke. There is, however, no rush to place orders, although shippers of coke report having received considerable business.

Consumers of soft coal have for the most part anticipated



any possible rush due to a suspension in the hard-coal mines and have taken in heavy supplies. At Baltimore the soft-coal market has failed to react as a result of the hard-coal conditions. With the market spotty keen competition in selling has prevented any change in prices.

Anthracite Suspension Lacks Interest

The stopping of mining in the anthracite regions failed to create any excitement in New York. Many producers stopped taking new orders for coal early last week, pending the outcome of the wage negotiations and some of the smaller independent operators advanced their quotations to meet the demand of some retail dealers, but comparatively little of the high-priced coal found its way into the New York market. Retail yards are comparatively empty of the domestic sizes of coal. Dealers are receiving many inquiries regarding the use of substitutes and some orders have already been placed for either the bituminous screened coals or coke. Similar conditions prevail at Philadelphia. The amount of coal reaching that city during the last week in August would under ordinary conditions be considered large. There is very little hard coal in storage in Baltimore.

Although the retail anthracite market at Toronto is characterized by a steady demand, no great changes have taken place during the past two weeks. The School Finance Committee of Toronto has taken steps to obtain an additional 1,000 tons of coal to prepare for any possible scarcity which might result from a strike. It is expected that a quantity of Welsh coal will be imported by various firms during the coming winter. Prices remain unchanged, anthracite selling at \$15.50, Pennsylvania smokeless at \$6.75, and steam lump at \$6.90.

Coke Market Improves

The Connellsville coke market presented a mixed movement in the past week as to prices. There is a better feeling as to heating coke, on account of the anthracite situation, and a lessened interest on the part of blast furnaces on account of the continued light demand for pig iron and the uncertain prospects in steel.

Heating coke is very strong, ranging from \$4.50 to \$4.65. There has been buying by Eastern dealers, and while the total tonnage taken in the week is very moderate the buying, being coupled in the minds of operators with the anthracite situation, has made the operators very firm.

Spot and prompt furnace coke is quoted firm this week at \$5. September coke, furthermore, has shown a little weakening, since a week ago it was quoted generally at \$5, and one contract, for a particularly good brand, had been made at \$5.15. Now, however, a contract for standard coke for September has gone through at \$4.75.

At New York egg, stove and nut sizes of coke was quoted at \$6.75 to \$8 and run of oven \$4.75 to \$5.25. There was considerable inquiry and some orders placed.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars		
Week ended Aug. 18, 1923.....	1,035,741	189,073		
Previous week	973,162	177,259		
Same week in 1922	846,266	81,451		
	Surplus Cars			
	All Cars	Coal Cars		
Aug. 22, 1923	74,917	5,498	7,690	3,674
Same date in 1922	120,961	96,405		
Aug. 14, 1923	78,404	6,293	8,315	4,193

Foreign Market And Export News

Anthracite Suspension Excites Cardiff Market; Foreign Business Slow

The effect of the suspension in the anthracite mines in the United States has been felt at Cardiff, says a newspaper dispatch. The market on Saturday was excited, although no definite orders for coal, as the result of the suspension, had been received. Otherwise, the Welsh coal trade is more or less unsettled, and business on the whole is quiet. Much of this slackness is due to the European exchanges, which means that many of the most regular of the customers in the Welsh markets are forced to hold back contracts on account of the unfavorable state of their currency. Belgium is at present the most active of the Continental buyers, and several orders are coming through. Both business and inquiry with France and Italy is unusually quiet. The German business continues to be fairly low, but a certain amount is coming through Holland, probably on German account. There is no sign of despondency among the Welsh operators, many of whom have sold out their September outputs.

Prices in Newcastle have declined without any corresponding increase in the volume of business. Coal prices are falling and the European business is slow. The one bright spot in the Newcastle market is in the coke sections, especially in gas coke, where inquiries from home and abroad are numerous, and prices are very firm. On the whole the North of England market is stagnant.

Output of coal during the week ended Aug. 18 was 5,124,000 tons, an increase of 1,588,000 tons as compared with the previous week, which was broken by a holiday, and 130,000 tons less than the week ended Aug. 4.

Hampton Roads Market Firmer

The market at Hampton Roads was firmer last week, with dumpings at normal. Coal movement generally showed a slight increase. The trade appeared somewhat uneasy over developments in the coal strike situation.

Domestic dealers were making every effort to stock up against emergency and reported about 40 per cent of the winter's supply of fuel already delivered to consumers, or contracted to be delivered. Export business was holding its own, with coastwise trade slightly better.

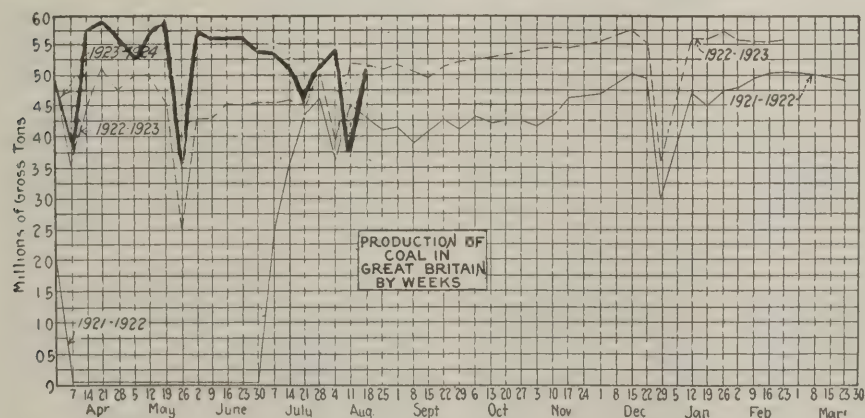
The outlook was bright for increased business in the event the miners' difficulties are settled satisfactorily. The trade was optimistic over the winter's business, preparing for increased export trade and making preparations for heavy coastwise movements.

French Output, Imports and Exports

Statistics showing that France produced, exported and imported more coal during the first six months of 1923, than during the corresponding period of 1922 have recently been made public. They follow in metric tons:

COALS			
	1923	1922	
Output.....	18,093,100	15,560,400	
Imports.....	12,353,000	11,335,000	
Exports.....	30,446,100	26,895,400	
	1,198,000	621,000	
	29,248,100	26,274,400	
COKE			
Output.....	882,100	464,300	
Imports.....	1,700,000	1,429,000	
Exports.....	2,582,100	2,893,300	
	190,000	222,000	
	2,392,100	2,671,300	
PATENT-FUEL			
Output.....	1,465,800	1,295,200	
Imports.....	388,000	750,000	
Exports.....	1,853,800	2,045,200	
	135,000	49,000	
	1,718,800	2,605,000	

The production of independent coke-ries, it was pointed out, are not included in the figures showing the amount of coke produced, nor is the production of works independent of collieries included in the figures showing the amount of patent fuel produced.



French Coal Trade Quiet

Business was quiet in France last week on account of the Assumption holiday, however, there was better demand; the retailers wishing to replenish their stocks before winter, and the industrialists endeavoring to secure French coals to avoid the high rates of British fuels.

Production of coal in France is not now equal to consumption, due to far greater needs for coal than can at present be met by the country's mines. Since the war, the developing of central heating process, gas and electricity, industries have been extended and agriculture and several other branches of business have also increased their requirements for coal.

The demand for consumption in house coal is very quiet, and consequently the Paris market prices remain unchanged.

Export Clearances, Week Ended Sept. 1, 1923

FROM BALTIMORE

	Tons
For Italy:	
Ital. SS. San Pietro	8,354
For Argentina:	
Br. SS. Illingworth	8,631
For France:	
Belg. SS. Chilier	8,199

FROM HAMPTON ROADS

	Tons
For England:	
Nor. SS. Strinda, for Land's End ...	10,179
For Porto Rico:	
Br. SS. Carron Park, for Manati ..	3,276
For Holland:	
Belg. SS. Taxandrier, for Amsterdam	7,253
For Canada:	
Ital. SS. Campania, for Montreal	6,916
For West Indies:	
Nor. SS. Munorway, for Fort de	5,516
For France:	
Fr. SS. Wesserling, for Nantes	6,914

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Aug. 23	Aug. 30
Cars on hand.....	1,476	1,259
Tons on hand.....	85,715	73,967
Tons dumped for week.....	114,392	145,847
Tonnage waiting.....	12,000	11,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	2,024	1,791
Tons on hand.....	115,140	104,350
Tons dumped for week.....	103,708	121,460
Tonnage waiting.....	14,963	4,000
C. & O. piers, Newport News:		
Cars on hand.....	1,515	2,047
Tons on hand.....	80,355	107,265
Tons dumped for week.....	129,590	188,714
Tonnage waiting.....	17,710	

Pier and Bunker Prices, Gross Tons

PIERS			
	Aug. 25		Sept. 1†
Pool 9, New York.....	\$5.25@	\$5.75	\$5.35@ \$5.75
Pool 10, New York.....	4.75@	5.00	4.75@ 5.25
Pool 11, New York.....	4.50@	4.75	4.50@ 4.75
Pool 9, Philadelphia....	5.25@	5.65	5.20@ 5.65
Pool 10, Philadelphia....	4.60@	5.20	4.60@ 5.10
Pool 11, Philadelphia....	4.15@	4.75	4.15@ 4.50
Pool 1, Hamp. Roads....	5.25		5.25
Pools 5-6-7, Hamp. Rds.	5.00		4.60@ 4.75
Pool 2, Hamp. Roads....	5.15		5.00

BUNKERS

Pool 9, New York.....	5.55@ 6.05	5.65@ 6.05
Pool 10, New York.....	5.05@ 5.30	5.05@ 5.55
Pool 11, New York.....	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia....	5.60@ 6.00	5.60@ 6.00
Pool 10, Philadelphia....	5.00@ 5.60	5.00@ 5.50
Pool 11, Philadelphia....	4.50@ 5.00	4.50@ 4.95
Pool 1, Hamp. Roads....	5.25	5.25
Pool 2, Hamp. Roads....	5.15	5.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Aug. 25	Sept. 1†
Admiralty, large.....	29s. @ 30s.	29s.
Steam smalls.....	19s. @ 21s.	20s. @ 21s.
Newcastle:		
Best steams.....	22s. @ 23s.	23s. @ 24s.
Best gas.....	23s. @ 24s.	23s. 6d. @ 24s.
Best bunkers.....	20s. @ 22s.	22s. @ 23s.

News Items From Field and Trade

ALABAMA

Ray Coal Co. has been incorporated in Montgomery, with a capital of \$9,000, by F. V. Brahan, R. Crisman and others.

Goodwin Coal Co. has been incorporated in Dora, with a capital of \$100,000, by Olin Goodwin, M. E. Moore and C. L. Jones.

Moss & McCormick, Birmingham, have leased 1840 acres of government mineral land in Fayette county, Ala., for coal mining, at a cost of \$85,000.

The Riley & Kincaid Coal Co. has been incorporated in Henryeklen by Bush Riley, J. B. Kincaid and W. N. Lee.

The Goodwin Coal Co., of Montgomery, proposes to build a railroad in Jefferson and Walker counties to reach its coal properties.

R. A. O'Rear and Ed O'Rear, of Jasper, have leased their Pratt Warrior coal mine, on the Warrior River, for a period of five years, to the Gulf States Portland Cement Co., of Demopolis. The company agrees to mine and pay royalty on a minimum of 25,000 tons of coal annually.

Alabama coal men recently drew important assignments on the standing committees of the National Coal Association, as announced by President Brydon. S. L. Yerkes, vice-president of the Grider Coal Sales Company and also the owner and operator of several commercial mines, was named as one of twenty-five members of the policy committee and also is a member of the committees on government relations and railroad relations; J. W. Whately, now with the Tennessee Coal Iron & R.R. Co., but who will assume charge of the sales department of DeBardleben Coal Corporation in September, was designated as a member of the committee on foreign trade, and M. B. Lanier, of the Empire Coal Co., is a member of the publicity committee.

The Galloway Coal Co., of Memphis, Tenn., has let the contract for a brick commissary building at its plant at Carbon Hill.

One of the largest cash bonuses ever received by the government for the lease of a tract of public coal land was paid at the recent public auction at Montgomery by the Department of the Interior, when \$85,000 was offered and accepted for 1,840 acres. Moss & McCormick, coal operators of Birmingham, made the bid. The tract is located in Fayette County, near Carbon Hill. It is estimated to contain 7,000,000 tons of high-grade bituminous coal. In addition to the \$85,000 bonus the successful bidder must expend \$75,000 for improvements on the property within three years and must guarantee the government a royalty of 10c. per ton annually on a minimum production of 20,000 tons of coal. The Department of the Interior previously disposed of the surface rights of practically all the 1,840 acres of land to homesteaders, having reserved the coal deposits and the right to mine them, to the government. Many coal operators of Southern states appeared at the public auction at Montgomery and there was lively and spirited bidding to obtain the lease on the public coal lands offered.

ILLINOIS

The mine of the Bissell Coal Co., five miles northeast of Springfield, has resumed operations after having been closed down since May 1. A new airshaft has been installed, new locomotive haulage and track scales opened and other minor improvements made. The mine employs 274 men.

Charging that the Liberty Coal & Mining Co., Belleville, has exceeded the boundaries of the coal lands it owns and has mined approximately 500 tons belonging to others, a bill in trespass has been filed in the Circuit Court at Belleville. Plaintiffs in the action are Anna Maria Seibert; Robert Henry C., Oscar, John F. and Theodore Seibert; Lena Helms, Hilda Dickhaut, Anita Lautenschlaeger, Ella Mueller, Meta Walters and Edna Seibert.

The mine of the Southern Coal & Mining Co., at Shiloh, near Belleville, is undergoing extensive repairs. Work was started three weeks ago on retimbering the main shaft and later the airshaft will undergo a similar improvement. The work is

progressing somewhat slower than under ordinary conditions due to the fact that the shaft is being enlarged 5 in. on the sides to permit better handling of the boxes. It will take several weeks to complete the work. Meantime, the miners are not at work.

A verdict awarding \$1,000 damages has been returned by a jury in the St. Clair County, Circuit Court in the suit of Samuel Richards against the Gundlach Bros. Co. Richards asked \$1,250 for damages done to a 12-acre tract of land near Edgemont, caused by the roof of a mine below collapsing and the surface of the ground sinking about 1½ ft. in trenches having a total area of one-third of an acre. It was said at the trial that the coal company was willing to fill the depressions but the Richards maintained that the value of their property had depreciated and that possible purchasers would not buy because of a fear of further settling of the ground.

Members of the United Mine Workers will not be allowed to return to work in mine No. 2 of the Sangamon Coal Co., Springfield, it was announced by Superintendent John Vose, Sr. The 400 men are barred on the ground that their contract was violated when they started a walkout two weeks ago, and their organization has been sued for \$16,800. The men will be given back their places when the sum is paid the operators for damages said to have been caused by the shutdown. The strike was called Aug. 2 by J. J. Young, district board member of the union, because the company refused to pay wages of Jacob Reinhardt, a locomotive engineer at the mine and a member of the miners' union, for the six months between the time he was discharged because of defective sight and the time he was reinstated at the instigation of a committee of the union which investigated the case. The amount of the company's claim for compensation for damages caused by the walkout is determined, Mr. Vose said, by figuring \$3 a day for each miner.

The Babbitt mine, at Maquon, has been leased to H. F. Echor, of Rich Hill, Mo. A new shaft will be sunk about 300 feet north of the old shaft and the latter will be used as an airshaft. It is expected that the mine will be in operation for the autumn and winter trade.

Suit for the appointment of a receiver to take over the properties of the Beatty Coal Co., Mascoutahs, has been filed in the Circuit Court at Belleville. The suit, which is entitled a bill in chancery, relates that 240 shares of the stock of the company are held by Howard Kerchner, Anna Kerchner and Richard S. Wangelin, while thirty shares are held by the Beatty brothers. Kerchner is president of the company, Nephi Beatty, vice-president and Wangelin, secretary. Last month the mine was closed down by the state authorities on the ground that it was unsafe. It was stated that the shaft needed retimbering. At that time there were outstanding claims against the company of \$2,109.88, most of which was due miners. The bill states that \$3,000 is required to repair the mine to meet state requirements.

INDIANA

The Ogle Coal Co., of Indianapolis, has increased its capital stock from \$100,000 to \$150,000.

The Indiana Hocking Coal Co., of Terre Haute, has filed certificate of final dissolution.

The Wilfred mine, northeast of Sullivan, which has been shut down for several months, is being cleared up, preparatory to resuming operations. The mine employs 200 men.

Work on the E. & I. division of the Big Four R.R. is progressing rapidly. Samuel D. McLesh, of Evansville, an officer of the company, is authority for the information that the work of replacing rails will extend as far as Elberfeld during this month. Curves in the road at Petersburg and Washington are being straightened. The company hopes to make the E. & I. division the heaviest coal carrier in the state as a result of the completion of the \$1,000,000 improvements now under way. The road will be able to handle 1,000 cars of coal daily during the rush season when the improvements are completed.

The Southwestern Indiana Coal Corporation has been incorporated to mine and deal in coal, with offices at Evansville. The capital is \$200,000. William F. Tuarrie, Frederick W. Reeve, Tom J. Phillips, Lorin G. Julian and L. C. Oliver are the incorporators.

The Enterprise Coal & Mining Co., of Sullivan, has filed a preliminary certificate of dissolution.

IOWA

The Peoples Fuel Co., Cedar Rapids, has been incorporated with capital of \$20,000 by Frank J. Chramosta, president; W. F. Kubig, vice-president; George J. Naxers, secretary; and Frank O. Kanak, treasurer.

Leases are being obtained and drilling is expected to start soon on land in the vicinity of Decatur for coal and oil. Some delay has been experienced in getting the leases but this trouble is expected to be overcome and work is to start soon.

KENTUCKY

The North Star Coal Co. has been incorporated in Madisonville with a capital of \$100,000, by L. C. Oliver, L. P. Sisk and others.

Walter Waltrip, formerly manager of the Grapevine Coal Co., at Madisonville, who recently took charge of a new buying office at Madisonville, for the Phoenix Fuel Co., Louisville, has joined the Louisville office of the company, where he will be actively engaged in the future.

Val Bittner, organizer for the United Mine Workers, has called a meeting of the Straight Creek and other organized mining districts in southeastern Kentucky for the first week in September. These miners are working under what is known as the "Knoxville agreement" and in event of a strike in the hard coal field it is apparent that Bittner intends to rekindle the trouble that there was in southeastern Kentucky three years ago.

MARYLAND

Five were shot in rioting and clashes between union and non-union miners at Frostburg on the night of August 26 as a result of intense feeling which developed over the slaying of George Porter, a union miner of Zihlman.

With the purchase of 800 acres of coal land by the Stanley Coal Co., Inc., from John A. Connell, Ellen Connell and Parley DeBerry, further development of coal properties in Garrett County is presaged. The acreage thus acquired is on the line of the Baltimore & Ohio near Hutton and borders on the West Virginia-Maryland state line, extending as far south as Crellin. The price paid is understood to have been \$20 an acre. The coal acquired ranges from 3 to 5 ft. in thickness. The purchasers of the Connell tract will develop on an extensive scale, driving new openings and erecting the necessary tipples and other plant buildings.

MASSACHUSETTS

A resolution urging the government to take over and operate the coal mines of the country was adopted at the convention of the Amalgamated Shoe Workers of America at Boston, Aug. 22. The secretary was instructed to send copies of the resolution to President Coolidge and the members of both houses of Congress. As reasons for the suggested government action the resolution charged that New England and other sections of the country face a coal shortage "because a few favored men are permitted to monopolize and gamble in a necessity of life."

Resolutions have been sent to President Coolidge and Attorney General Daugherty by the Associated Industries of Massachusetts, comprising more than 1,500 manufacturers, opposing any recognition of the "check-off" and declaring "the action of the United Mine Workers of America in threatening to deprive not only New England but the entire American public of a sufficient supply of anthracite coal unless they be granted a monopoly of employment is opposed to the public interest and recognized public policy and should, therefore, be resisted."

MINNESOTA

F. A. Taplin, of the Western Coal Co., Cleveland, and Mr. Hutchinson and Mr. Atwater, Jr., of the W. C. Atwater Coal Co., of Cleveland, visited Duluth last week. They are interested in the Inland Coal & Dock Co. property and were on a tour of inspection.

These officers of the Washburn Lignite Coal Co., of Minneapolis, were recently

elected: W. P. McComber, president; Stanley Washburn, vice-president; Jefferson Steiner, secretary-treasurer. W. H. Keller, who has been secretary-treasurer of the company since its incorporation in 1902, retired at the age of 78. He remains a director.

The answer of the Great Lakes Coal & Dock Co., Minneapolis, to the suit of the West Jellico Coal Co., Paducah, Ky., for damages for alleged breach of contract sets up that the Jellico company nullified its contract through failure to deliver coal as agreed during the early months of the contract. The defendant says that had there been delivery during the first five months of the contract it could have used the coal to good advantage, but when the bottom fell out of the market, then plaintiff was eager to deliver at the high price, while the defendant was then able to get a better grade of coal elsewhere for no more money.

A suit for damages for breach of contract has been filed in Minneapolis by the West Jellico Coal Co., Paducah, Ky., against the Great Lakes Coal & Dock Co., Minneapolis. The complaint sets forth that a contract was made to furnish the Great Lakes Company with two cars of coal a day from June 26, 1920, to March 31, 1921, at \$4 a ton, but if car shortage should prevent complete delivery, the delivery should be on a pro rata basis as compared with the total contract business of the mine. Cost of production is set at \$1.82 a ton, and the headline writers see in the difference over 100 per cent profit. The complaint sets forth that car shortage did prevent full deliveries during June, July, August and September, but contends that deliveries were made as agreed and adjusted with the defendant but that in October there was a drop in the market and defendant was able to get coal from other sources at reduced prices and declined to give shipping orders on the contract, though they were often requested. Within the period from Oct. 25, 1920, to March 31, 1921, the defendant should have received 262 cars averaging 49 tons each, which plaintiff claims it was able to deliver, aggregating 12,838 tons of coal at a total price of \$51,352. Complaint sets forth a loss of profit of \$27,986 by the non-performance of contract and asks \$5,543 additional cost of operation on reduced output which added 35c. to 36c. a ton.

MISSOURI

The Edgar Zinc Co., of St. Louis, has paid \$77,000 for 159 acres of coal land and a big steam shovel that has been operated four miles southeast of Liberal in Barton County. The shovel and part of the land belonged to the Barton County Coal Co.

Walter and Elmer McDavid have purchased a one-third interest in the coal mine at Excelsior Springs, paying, it is reported, \$25,000 for the holdings. Perry Rice, the seller, will devote all of his time to his mine at Rayville. There will be no change in the management or operation of the Excelsior Springs mine.

The St. Louis & O'Fallon Coal Co., of Illinois, with a capital of \$150,000, has been incorporated in Missouri with a capital of \$50,000 and with headquarters in St. Louis. The incorporators are: E. L. Thomas, H. M. Needles and W. A. Reiss.

Coal in Carthage contracted for the various school is selling at about 25c. a ton less than a year ago. The School Board now is paying \$3 a ton for best mine run and \$4 for the best lump on the track at the mines at Pittsburg, Kan.

A new company has been organized at Yates to engage in strip-mining on the Stahlman farm and a stripping machine has been purchased at a cost of \$45,000 to carry on the work. The coal will be hauled by trucks from the farm to Yates over a road that will be oiled by the coal company.

The Kansas City Midland Coal & Mining Co. has closed mine No. 7, at Novinger, under order of Emmett Corrigan, general manager. C. L. Charleton, superintendent of the mine, declared that rock is falling so fast that more rock is being mined than coal. Three hundred miners are affected by the shutdown.

Operators of coal mines in Fulton announce that they will file an injunction suit with Judge David H. Harris of that city to prevent the board of managers of the Missouri School for the Deaf from carrying out a contract for the delivery of coal with a Moberly company on the ground that the bid was accepted contrary to law and contrary to their advertisement for the receipt of bids. According to statements given out by attorneys who have been retained by the Fulton operators the bid of the Moberly concern was for coal delivered at the station in Fulton, whereas

the law requires that the bids be on the basis of coal delivered to the institution. As a result there was no way to draw a comparison on the bids yet the Fulton operators contend that their bid was the lowest. Their bid was for coal delivered to the institution. Officials of the School for the Deaf said they had not yet entered into a contract with the Moberly company and will await the outcome of the injunction suit.

NEBRASKA

Governor Charles W. Bryan on Aug. 20 announced that he was making arrangements to have the state supply cities, villages and public committees with coal at \$6.25 a ton, f.o.b. Lincoln, with an additional delivery charge of not more than \$2 a ton. He said that he was moved to this action by the fact that, although the price of coal at the mines had been reduced \$1.25 a ton, Lincoln dealers were selling it at the same price quoted last winter and spring. With the maximum \$2 delivery charge, the state would furnish coal at \$8.25 a ton. Lincoln dealers are charging \$9.50 a ton for delivered coal.

NEW YORK

Wesley Lieb, who was sales manager of the Majestic Coal Co., New York City, has been placed in entire charge of sales. Three additional salesmen have been added to the sales force. A. J. Jaeger and E. J. Fraunheim will look after the New Jersey trade, and A. P. Crouze will cover the New England States.

Certificates of incorporation were filed Aug. 23 in the office of the Secretary of State at Albany, by the Williams Fuel Corporation, of Manhattan Borough, New York City, to deal in coal, coke, etc. The capitalization is 100 shares of common stock of no par value and the incorporation will commence business with \$500 paid in. Directors are Henry M. Williams, James E. Doherty and Patrick Doherty. Attorney for the corporation is James E. Doherty, of 150 Nassau St., New York City.

A certificate of incorporation has been filed in the office of the Secretary of State at Albany by the New York Central & Lake Shore Fuel & Products Co., Inc., of Troy, to deal in peat for fuel and fertilizer. The company is capitalized at \$15,000, of which \$2,500 is paid in. The directors are: Neils Schmidt, Troy; John A. Griffin, Watervliet, and George Benedict, Albany, N. Y. The attorney for the corporation is Henry J. Crawford, 128 State St., Albany.

A certificate of incorporation has been filed in the office of the Secretary of State at Albany by the Wilba Coal Co., Inc., of New York City. The corporation is capitalized at 100 shares of common stock of no par value and begins business with \$500. The directors are Charles E. Kelley, L. B. Grunder and A. G. Levick, all of 366 Madison Avenue, New York City. Attorneys for the corporation are Kelley & Becker, of 366 Madison Avenue.

The Lake Shore Coal & Coke Co., Inc., of Buffalo has filed a certificate in the office of the Secretary of State at Albany, reducing its capital from \$50,000 to \$5,000.

Albee & Albee, Inc., Buffalo, has filed a certificate of incorporation, to deal in coal, coke and builders' supplies. The corporation is capitalized at \$20,000, but begins business with \$10,500. Directors and subscribers to stock, E. H. Albee, H. M. Albee, and Wm. E. Mason, Buffalo; attorney, H. M. Albee, Buffalo.

In a letter to Governor Smith, Assemblyman George N. Jesse, last week, suggested an extraordinary session of the Legislature to re-enact the legislation of last year under which a fuel administrator was appointed by the Governor. Viewing "with grave alarm" the possibility of a stoppage in the mining of hard coal, with its resulting hardships, a situation similar to that existing a year ago, the Assemblyman says he would be glad to co-operate with the Governor in drafting a more drastic law than that which expired in April. Senator James J. Walker, Senate leader, hearing of Assemblyman Jesse's action, expressed the opinion that state officials could do very little in the situation, as no coal is mined in this state.

OHIO

J. Benham has qualified as trustee in bankruptcy in the case of the Clear Creek Coal Co. and has been accepted by Commissioner Greve.

E. K. Brooks, traffic manager of the W. E. Deegans Coal Co., of Huntington, was a visitor in the Cincinnati market during the latter part of August.

Assistant District Attorney A. Lee Beatty, of the southern district of Ohio, has

prepared his answer to the suit of the Houston Coal Co., seeking to recover \$314,000 for coal that was delivered to the navy under requisition.

The eleventh annual midsummer outing of the Cincinnati Coal Exchange was held at the North Cincinnati Gym. grounds at Bass Island on July 24 with over 100 in attendance. It was the largest gathering of coal men at such an affair in the history of the organization. Weightman D. Roberts, as a delegate from the Charleston Coal Exchange, asked that delegates be selected to attend a meeting in Columbus to look to the formation of a National Coal Inspection Bureau. In a talk to the Exchange Mr. Roberts declared that it was necessary that such an organization be effected in order to counteract the inordinate number of rejections that have been made during the past few months. He said that these were really controlling the downward trend in price. A special meeting of the Exchange was called to consider the problem. The outing closed with a ball game in which the Low Volatile side won from the High Volatiles by a score of 12 to something or other.

The Columbus Coal Bureau, a social coal club, composed of producers and jobbers, was organized at a meeting of about fifty representative concerns, at the Chittenden Hotel, Aug. 3. While the organizers are not disposed to give a complete description of the objects of the organization, it was denied that it was the intention to affiliate with the proposed National Coal Inspection Bureau, although some of those present appeared to believe that such was the object. The organization is the outgrowth of a number of informal meetings of the coal men in the producing and distributing ends of the industry. A board of directors, consisting of Fred W. Braggins, president of the Lorain Coal & Dock Co.; John M. Taylor, head of the J. M. Taylor Coal Co.; J. A. Teegardin, sales manager of the New York Coal Co.; C. M. Anderson, western manager of the Elk River Coal & Lumber Co.; Jay Miller, president of the Jay Miller Coal Co., and T. C. Collins, of the Ajax Block Coal Co., was named. The directors met and after discussing the situation decided to put off the selection of officers for a week, in order that the situation could be canvassed.

PENNSYLVANIA

Joseph E. P. Bonsall has been made manager of the Philadelphia office of the Bowman Coal Co., in the place of Archibald W. Garvin, who has severed his connections with this company.

TENNESSEE

The Southern Fuel Corporation, of Chicago, Ill., has acquired and will develop 25,000 acres of coal land in Tennessee.

TEXAS

The Palestine Coal Co. has been incorporated in Palestine, with a capital stock of \$150,000, by R. McDonald, T. C. Ritchey and L. A. Wadsworth.

WEST VIRGINIA

A visitor in the New River field of West Virginia a few days ago was Robert Green, in charge of the coal department of the Matthew Addy Coal Co., of Cincinnati.

C. H. Jenkins, vice-president of the Hutchinson Coal Co., of Fairmont, was a visitor in Eastern markets during the latter part of August.

Construction of a bridge across Elk River at upper Clendenin, in Kanawha County, is being urged as a means of making possible the development of what is said to be one of the best veins of coal on Elk River.

C. E. Cowan, of Greensburg, Pa., chief engineer of the Jamison Coal & Coke Co., spent a few days in Marion County, during the latter part of August.

Charles E. Hawker, well known in northern West Virginia mining circles, was a recent visitor in New England.

J. R. Thomas, president of the Carbon Fuel Co., of Charleston, has almost completely recovered from a recent illness.

M. K. Dobbie, of the Robinson Coal Co., and his brother, W. C. Dobbie, general superintendent of the Jamison Coal & Coke Co., in the Fairmont region, found it necessary to go to Douglas late in August owing to the serious illness of their father.

R. A. Pollock, formerly president of the Rivesville Coal Co., the properties and mines of which were sold not long ago to the Edward Hines interests of Chicago, has completed plans for the purchase of the mine of the Balkan Coal Co. at Dola on

the West Virginia Short Line of the Baltimore & Ohio R.R. The mine is being cleaned up preparatory to resuming operations, with the new owner in charge, in the near future.

Some idea on the large scale upon which operations are being conducted in the Scott's Run field of Monongalia County may be obtained from the fact that \$284,590.99 was paid out in wages by one bank in Morgantown toward meeting the payrolls of several coal companies for the first half of August, representing the work done during the latter part of July.

The Glenn Valley Coal Co., which was organized in July, has purchased two tracts of coal land in Ohio County aggregating about 56 acres, with a view to development. The consideration involved was approximately \$30,000. In one tract there were 31 acres, for which \$12,000 was paid, and in the other tract there were 26 acres, for which \$18,000 was paid.

Early this month in Greenbrier County there will be a reopening of the investigation into the alleged attempts of agents of the United Mine Workers to bribe jurors in the case of William Blizzard, president of subdistrict 2, District 17, charged with the murder of George Munsey in connection with the armed march on Logan County in 1921. Blizzard's first trial ended in a disagreement of the jury. It will be recalled that following rumors that the United Mine Workers were using money to influence jurors and prospective jurors, Judge Summers H. Sharp summoned a grand jury, which filed true bills against H. R. Harrah, widely-known farmer who had served as foreman on the jury which had been unable to agree upon a verdict, and against G. Clarence Hickey, an agent for the miners' union. Blizzard is also slated for a second trial soon after Sept. 7, when the regular term of court begins. A new jury will be summoned, as every member of the jury panel summoned for the second trial was dismissed by Judge Sharp when it became known that efforts were being made to influence prospective jurors.

George Wolfe, secretary of the Winding Gulf Operators Association, with headquarters at Beckley, was a visitor in Huntington recently, attending a traffic meeting there.

J. O. Caldwell, chief clerk of the Northern West Virginia Coal Operators Association was a recent visitor in Charleston. His headquarters are at Fairmont.

Fire of unknown origin completely destroyed the tippie at the No. 2 mine of the Eagle Island Coal Co. at Lax, in the Logan County field, late in August and at the same time seriously damaged three motors, one cutting machine and two mine cars. The damage wrought is estimated to have been approximately \$40,000 part of which sum is covered by insurance. The tippie was located about 800 ft. up the side of a mountain and a large steel bucket used to convey coal to a lower tippie tumbled down the mountain side when its cables were burned, almost completely demolishing the lower structure. It was necessary to shut down the mine following the fire, the miners being transferred to the No. 1 mine of the company. It will require several months to complete repairs so that the No. 2 mine may be operated again.

West Virginia's exhibit at the second annual exposition of the Women's Activities Association to be held at the Commodore hotel in New York on Sept. 24 will consist of working models of coal-mining equipment, photographs of West Virginia mining towns and samples of the various grades of coal mined in the state. Arrangements were made by J. O. Caldwell, secretary of the Northern West Virginia Coal Operators Association, for the exhibits from the southern part of West Virginia. The Women's Activities Association is an auxiliary of the Federated Business and Professional Women's clubs and the exhibition is to be held for the purpose of showing the principal industries of the various states in the Union.

WASHINGTON, D. C.

The Foreign Trade Committee of the National Coal Association for the coming year embraces the following: C. E. Bockus, president, Clinchfield Coal Corporation, New York; Lemuel Burrows, president, Castner, Curran & Bullitt, Inc., New York; G. H. Caperton, president, New River Coal Co., Charleston, W. Va.; G. Dawson Coleman, Sr., president, Marshall Coal Co., Philadelphia; George M. Dexter, president, Dexter & Carpenter, Inc., New York; T. F. Farrell (chairman), second vice-president, Pocahontas Fuel Co., New York; George H. Francis, secretary, Keystone Coal & Coke Co., Greensburg, Pa.; R. H. Gross, president, New River Co., Boston; Kuper

Hood, general manager, Houston Coal Co., Cincinnati; R. H. Knode, vice-president, Stonega Coal & Coke Co., Philadelphia; F. A. Sweet, president, Standard Coal Co., Salt Lake City, Utah, and F. W. Wilshire, vice-president, Consolidation Coal Co., New York.

CANADA

Output of coal from Canadian mines during May amounted to 1,252,000 net tons, a decrease of 3 per cent from the tonnage for the previous month, but an increase of 29 per cent over the average for the month of the preceding years. The output for the month showed decreases of 30,000 tons in British Columbia, 25,000 tons in Nova Scotia and 12,000 tons in Saskatchewan. In Alberta there was an increase of 29,000 tons and in New Brunswick 3,000 tons. The cumulative output from all mines for the five months of 1923 amounted to 7,406,100 tons, an increase of 26 per cent over the preceding three-year average for the same period. Comparison of May and April figures covering the importation of coal from the United States and Great Britain showed an increase of 44 per cent. May imports amounted to 1,683,700 tons, while in April 1,171,200 tons was brought in. The May importations this year were 73 per cent greater than the preceding three-year average for the month. There were no imports from Great Britain during the month. Total importation of all coal for the five months of 1923 was 7,640,500 tons, an increase of 42 per cent over the three-year average for the period. The imports of anthracite for May totalled 433,000 tons. This was 4 per cent greater than in April and 52 per cent higher than the three-year average for the month. All of the anthracite imported in May came from the United States. The total amount imported during the five months of 1923 was 2,186,000, an increase of 44 per cent over the three-year average for this period. Exports of Canadian coal during May were 23 per cent less than in April. The quantities were: May 99,100 tons, April 128,600. Comparison of the May exports with the preceding three-year average showed a decrease of 22 per cent.

Obituary

James R. Bresnan, a well-known business man of Brockville, Ont., and head of the retail coal firm which bears his name, died recently in that city at the age of 76. He was a native of Buffalo.

C. J. Thomas, representing the Morton Gardner Electrical Co., of Chicago, was crushed to death between two cars in the mines of the Moffett Coal Co., at Blocton, Ala., Aug. 11, while demonstrating the equipment to officials of the coal company.

Joseph R. Smith, superintendent of houses at the Johnetta Mine of the Bertha-Consumers Co., died recently at Johnetta, Pa. Mr. Smith had been married almost fifty years and during his entire life he was in constant employ of the Jones interests. He was the father-in-law of David McKelvey, a member of the Johnetta first-aid team, which at the time of his death was en route to Salt Lake City to attend the International meet. Funeral services were held at Johnetta, Pa., Sunday, Aug. 26.

J. Eugene Dana, retired coal operator and prominent citizen of Charleston, W. Va., for many years, died late in August at Crescent Manor Farm, Keswick, Va., near Charlottesville, where he had gone to spend the summer. Mr. Dana's death was the direct result of a series of strokes of apoplexy, from which he had suffered for several weeks prior to his death. He was not only interested in coal companies but also in many other enterprises in Kanawha County, W. Va.

Charles Crocker Bussey, inventor of the Bussey Process, died suddenly Aug. 29 while visiting his family home in Winterport, at the age of 57 years. His home was in Brooklyn. His invention constituted a great economic advance in the method of low-temperature distillation of coals in the production of oil, coke, acetylene and gas from bituminous coals, cannel, lignites and oil shales and his passing away came at the crowning moment of his life after devoting many years to the development of his process. Mr. Bussey was born Jan. 16, 1866, in Newburgh, Me., the son of a sea captain and one of a family of nine children. He was a descendant of Benjamin Bussey, founder of the Bussey Institute of Harvard University. His early education was received in the local schools and at Bucksport Seminary with intervals

of work on farm and sea. He was graduated from the Massachusetts Institute of Technology in 1895.

Victor White, Western manager for the Flat Top Fuel Co., died recently at his home in Fort Thomas, Ky. He had been ill for over a year, first from an automobile accident, then influenza and finally typhoid fever. He got his early training in the coal business with the Berwind Fuel Co. in Chicago, joining the Flat Top organization about ten years ago and opening their Cincinnati office some six years since. He had been vice-president of the Cincinnati Coal Exchange and was one of the prime movers in the organization of the Cincinnati Coal Trade Golf Association. He was 33 years of age and leaves a wife and three children.

Traffic News

Notwithstanding reports that there has been curtailment of coal shipments, figures covering coal tonnage handled by the Chesapeake & Ohio and the Norfolk & Western in southern West Virginia in July show an actual increase over June or more than a quarter of a million tons for each road.

During the latter part of August President C. W. Huntington; Vice President C. H. Hix, Chief Engineer H. Farnstrom and Electrical Engineer Clark, of the Virginian Ry., visited the Winding Gulf field for the purpose of studying the extensive improvements contemplated by the road and more especially the electrification of the road from Mullens to Roanoke, Va.

Locomotives in need of repair on Aug. 15, totaled 11,571, or 18.1 per cent of the number on line, according to the Car Service Division of the American Railway Association. This was an increase of 16 over the number in need of repair on Aug. 1, at which time there were 11,555, or 18.1 per cent. The railroads on Aug. 15 had 2,667 locomotives in storage ready to be used whenever traffic conditions warranted. This was an increase of 117 over the number in storage on Aug. 1.

At a meeting at Deer Park, Md., late in August, the Northern West Virginia Operators Association retained the service of E. J. McVann, traffic attorney, of Washington, D. C., to handle its rate fight before the Interstate Commerce Commission. This involves the petition of the operators in the Pittsburgh No. 8 field of Ohio and in the Pittsburgh district attacking all coal rates to the lakes from Fairmont and Kentucky. Already southern West Virginia producers are making a fight to maintain the present rates. The northern West Virginia Association contends that the freight rates of the Pittsburgh field and the No. 8 field are unjust to the Fairmont district. The understanding is that the Baltimore & Ohio R.R. will assist or co-operate with the Northern West Virginia Association in its case before the Commerce Commission. At the Deer Park meeting the Northern West Virginia Association was represented by C. H. Jenkins, George S. Brackett and Brooks Fleming, all of Fairmont; A. Lisle White, of Clarksburg; E. W. Ziler, of Elkins, and George Connell, of Connellsville.

Coming Meetings

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 24

NEW YORK, SEPTEMBER 13, 1923

Number 11

Credit Pinchot

ALL records were broken by Governor Pinchot when in two weeks he brought the anthracite operators and mine workers together on a settlement. Although neither side wanted a strike both gave every outward appearance of a willingness to see one through to a finish. But their heart was not in it. Nor was the consumer at all interested in having a grandstand seat at such a performance. It has loudly said "enough" and expressed its preferment for coal to contest. Nor did it rise to the bait of soft coal for the winter.

The Governor wants the credit; he should have it—all. He took on the job voluntarily; no one asked him in, other reports to the contrary, notwithstanding. The administration at Washington, acting through the Coal Commission, held and maintained the position that it was the business of the contestants to put their own house in order. Governor Pinchot, however, gets the credit for having justified Mr. Hammond's optimism.

Direct negotiations having failed twice, the Governor proceeded with his self-appointed task as savior of the country and of the treasury and well-being of the magnificent Commonwealth of Pennsylvania, in good sound trading fashion. He took counsel with the idealists and acted practically. He first assembled his facts. Here they are:

The public wants coal and not a strike. Fact one.

Controversies of this character when arbitrated always end in compromise. Neither side gets what it wants but takes less. Why, therefore, waste time? Get down to business at once and have it over with the sooner. Fact two.

The operators can be forced to come to terms at any time, so find the best possible terms the miners will accept and you have—Fact three.

The Republic expressed its gratitude to President Roosevelt for settling one anthracite strike. Fact four.

The other facts he had, or could have had, or thought he had, were just statistics. The statistics show, for instance, that with few exceptions the men working 200 or more days per year earn from \$1,200 up to more than \$4,000. The minimum outside day wage is \$4.20 and some contract miners average \$14 and more per day. Adding 10 per cent to each raises the lower-paid group by \$120 per year and to those already high it adds \$400. The Governor's plan of justice for all means 42c. per day to some men and \$1.40 to others. Thus he pricks a sore spot deeper.

"Yes, yes," one can hear him say as he registers impatience and worry, "that is some thing for the future, because to fix up those inequalities now would take at least six months. The prestige of this job demands action." So he sticks to his own facts. The only statistical fact that he needed was the amount his 10-per cent increase in wages would add to the price of coal. He announced a minimum on that and told the people that though they would have to pay it, they should not, and

that maybe some time, some way, they would not. Why bother, anyway, as they are to get anthracite to burn?

Just sum up Mr. Pinchot's achievements. The miners are satisfied. In fact they displayed unseemly haste in accepting the Governor's last proposal, the press account of the meeting on Friday of last week noting that four minutes after Mr. Lewis stated it to the full scale committee it was accepted. Capellini was so delighted that he stood on his head. It is a good deal for them because it is a gain with no losses.

He took the responsibility off the operators of naming an increase and telling the public what it would cost them. If that was to be the outcome, the producers should be grateful. He shortened the strike to a mere vacation, for which the public is appreciative. He added nearly a million dollars a year to the treasury of Pennsylvania. For this his constituents will have no complaint.

Governor Pinchot is entitled to the credit; let none withhold it.

Cogitation for Soft-Coal Operators

THERE is enough in the anthracite settlement and the manner of its coming to give the soft-coal industry food for considerable thought this winter. The strike was avoided as a matter of political expediency and by giving the miners nearly half the wage increase they had demanded. No one but the officials of the United Mine Workers and the *New Republic* claimed that as a whole they really needed more money. The earnings of the best-paid class without the increase are comparable with top notchers among the soft-coal miners.

Next spring the soft-coal mine contract will expire. It will be a presidential year and a strike would be considered most unfortunate. It is a safe guess then that the mine workers will weigh their chances of winning and will demand a 10-per cent increase. This one came so easy for the hard-coal workers as to hearten the soft-coal men.

Against this must be considered the market possibilities. By now the stock of soft coal in the hands of consumers is close to 60,000,000 tons. This is a high figure, but no more than is warranted in view of the character of industrial activity and the warnings of the railroads that they would need their facilities this autumn for other products. If, as seems to be happening, consumers scent a strike in the soft-coal fields next April, they will keep these stocks for possible later use and buy for current use this fall and winter. If as spring approaches a strike seems imminent, more coal will be stored.

This anticipation of a strike alone will hold up the market this winter. Without it prices will drag. The usual fall snap will be absent because consumers are so well fortified with stocks. It is hard to get a buyer excited when he has two or three months' supply on

hand, though when a buying panic starts none is immune.

With a dull market behind them the union soft-coal operators will be little inclined to grant a wage increase. Instead, they will think back on 1921 and, considering the possibility of non-union competition with reduced wages, will want a reduction of wages in their next contract. A downward reaction in the business world next year will intensify this feeling.

That the check-off has been given such scant attention by Governor Pinchot and by the Coal Commission will give the soft-coal operators ground to hope that they can succeed in throwing it out. The possibility will be attractive to the operators.

Some hard-coal dealers are free to predict that they will be seeking orders for hard coal by Jan. 1. The steam sizes of anthracite will have hard sledding against soft coal this winter and Mr. Lewis may hope to return the favor to the hard coal operators by raising the cost of the soft coal that competes.

Meanwhile with production of bituminous coal over 11,000,000 tons a week car shortage is appearing in the East. The strength of the market will be known when buyers decide to take it or leave it as prices stiffen up.

How Different!

SEVERAL coal-mining engineers went on the trip to Ontario and Quebec with the American Institute of Mining and Metallurgical Engineers, and found the practice quite different in the metal mines from that in coal mines. These engineers are wondering—still wondering—that at one mine rock is being extracted and loaded for 17½c. per ton, that in the same workings wages averaged about \$4.50 per day for tonnage men and that the output per miner was about 26 tons. In fact the manager said he would not keep a miner on the job who could not load his 20 tons daily.

How different it is in the union mines of the United States, where the output is kept low, and the consumer, whether workingman or capitalist, is compelled to pay many times 17½c. per ton for the mining of coal in order that the miner can make big pay out of moderate output.

Along with the party in Canada was the Minister of Mines of Ontario, who genially and with pride stated that about half the selling price of the metal product in that province was profit. If that could be said of anthracite mining how great would be the lamentation on all sides, Canadian and American! As it is, with less profits in coal mining than in the mines of Ontario the public is continually demanding investigations. Canada is hardly a foreign country, but conditions in the mining regions of Ontario and Quebec looked strangely different from those in union coal mines of the United States; so different that it might have paid the U. S. Coal Commission to be along to ask just why these things should be so.

But, after all, perhaps it is no great loss that the facts of the coal controversy are not exposed. The public and the politician do not want to know the truth for that would hamper them in following their purposes to the end. Even the most upright of men are disposed to seek the expedient course. The public must save itself from coal shortages and high prices, the politician, or statesman, if you will, must carry popular approval with him. So both are disposed to hedge when coal problems are at issue, and both try to back an improper

judgment with the best reasons and most convincing half lights they can contrive to find.

Everybody is prone to say he would execute judgment, but when the time comes he is likely to do what he is asked to do by the aggressive voter or what he thinks can be done with the least resistance, and he calls *that* justice, though he knows it is not. The wonder is that our judges are so free from this weakness which assails almost every other kind of public official and many of our newspaper editors, finding them utterly defenseless against its attack.

Earthquake in Japan

IN THE thickly inhabited area occupied by Tokio, Yokohama and Yokosuka, an earthquake probably unequalled in history in its death roll and damage recently occurred. Apparently it did not cover a large area—the three cities are not far apart, Tokio being about 20 miles from Yokohama—but it struck at the business center of Japan, razing the buildings while waves from the ocean, broken pipe lines, grounded wires and house and industrial fires completed the destruction and added to the number of victims.

The Japanese will bear their affliction with resignation and stoicism, as is their practice. They will rebuild their cities and will take up the thread of life where the earthquake snapped it. They will use their marvelous advances in surgery and hygiene to reduce as far as possible the effects of the catastrophe.

Their resources are not greatly reduced by the disaster. Advices are none too complete or reliable, but so far nothing seems to have been received that would indicate that the disaster seriously affected Osaka, Kobe, Kioto or Nagoya, four cities exceeding Yokohama in size, though all smaller than Tokio.

The main manufacturing and mining regions probably are not much, if at all, affected. The coal fields of the island of Kyushu lie five hundred miles to the southwest and those of the island of Hokkaido an equal distance to the north. There are coal mines on the extensive island of Nippon, where the earthquake occurred, but they are relatively unimportant except those in the Joban field, which is an active district and near the point of disturbance.

In view of the size of the islands, the great length of the crescent they occupy and the small area subjected to the earthquake shock the real sources of the wealth of Japan—its mining and manufacturing and the indomitable industry and will of its people—are not destroyed. In consequence the Japanese nation will recover speedily, even though it may be found that Tokio and Yokohama are no longer as suitable for large centers of population as in the past.

The United States sincerely condoles with the Japanese in their misfortune and is anxious to exhibit its sentiments and good will in something more substantial than mere words. There is need for money to care for the many dispossessed Japanese in the cities which earthquake and fire have destroyed. For these reasons the American Red Cross is making collections. Surely where the suffering has been and is so great the width of the Pacific Ocean and the profundities of the great Tuscarora deep will not act as bars to our good will and assistance. A people 110,000,000 strong such as ours should be able without much self-sacrifice to minister adequately to the sufferers of the small area of Japan thus terribly afflicted.



General View of Navajo No. 5

Navajo No. 5 Mine Turns Waste Piles Into Power and Solves Water Problem with 2,882-Ft. Well*

Boilers Operate Full Blast with Low-Grade Fuel and at a Low Rating with Bone—Precious Water Supply Is Derived from Three Levels in a Single Well and Purified

BY H. B. COOLEY

General Superintendent, Allen & Garcia Co., Chicago, Ill.

POWER for Navajo No. 5 mine of the Gallup American Coal Co., near Gallup, N. M., as well as for the company's old slopes now being worked out, is supplied by a central plant conveniently located adjacent to the main shaft. Provisions have been made for an ultimate boiler capacity of 2,514 boiler hp. (manufacturers' rating) and a total generating capacity of 6,000 kw.

The boilers, turbines, condensers and a part of the plant auxiliaries and piping were furnished from other plants of the operating company. Consequently the problem of the engineers consisted mainly of the proper assembly of these units and the combining of them with such new equipment as was necessary for satisfactory and economical operation.

Every effort was made to modernize this second-hand equipment and to bring it up to the standard of present-day power-plant practice. By a redesign of the boiler setting, the selection of high-grade stokers and the application of forced draft and superheaters the boiler installation developed into a very satisfactory plant. In like manner the application of direct-connected exciters to the turbines and the adoption of surface condensers for the old jet condensers eliminated all the objections to the use of this second-hand equipment.

It is certain that the saving in initial investment much more than offset any slight advantage that might have been gained by using new equipment throughout. Too often the danger in carrying out such a program is the tendency to attempt the use of second-hand equipment which is not suitable for the conditions imposed. A loss rather than a saving may result, especially when the plant operation is in any way handicapped.

There are a few features of unusual interest in the general layout, and perhaps the most interesting details

are in connection with the boilers, water supply and labor-saving accessories.

As is the case with practically every other coal-mining plant, the first requisite of a satisfactory boiler plant is the ability to utilize cheap fuel consisting of slack and refuse, which represents the unsalable product of a coal operation. That this plant has been able to do this is evidenced by the fact that much slack and refuse which had accumulated through years of operation of a neighboring mine have been utilized as fuel.

The present boiler plant (Fig. 1) consists of four 419-hp. horizontally baffled Heine boilers, each of which is being served by a forced-draft Harrington stoker 7 ft. wide by 14 ft. long. These stokers are capable of operating the boilers continuously at 200-per cent load with a fuel having 10,000 B.t.u. heat value and a total non-combustible content of 27 per cent. The rating of 200 per cent continuous or 250 per cent for short periods is set as the maximum at which this type of boiler should be operated. The stokers are suited for operation, but at reduced ratings, with fuel having as much as 45 per cent of non-combustible material.

The grate area of the stoker is sectionalized into four compartments so that the air pressure can be properly controlled by dampers over four areas independently, thus providing the proper quantity of air for each combustion zone.

The draft is furnished by motor-driven high-speed fans discharging into a common duct, the quantity of air and the pressure being controlled by a damper in the discharge duct. A concrete chimney 10 ft. in diameter by 240 ft. high provides the natural draft for removing the furnace gases.

The stokers are driven by independent vertical steam engines, and the stokers and the air pressure in ashpit and furnace are all automatically controlled by an Engineer Co. installation providing balanced draft control. The speed of the stokers and the air pressure in the

*This is the third part of Mr. Cooley's article on Navajo No. 5 mine. The first part appeared in *Coal Age*, Aug. 2, and the second on Aug. 16.

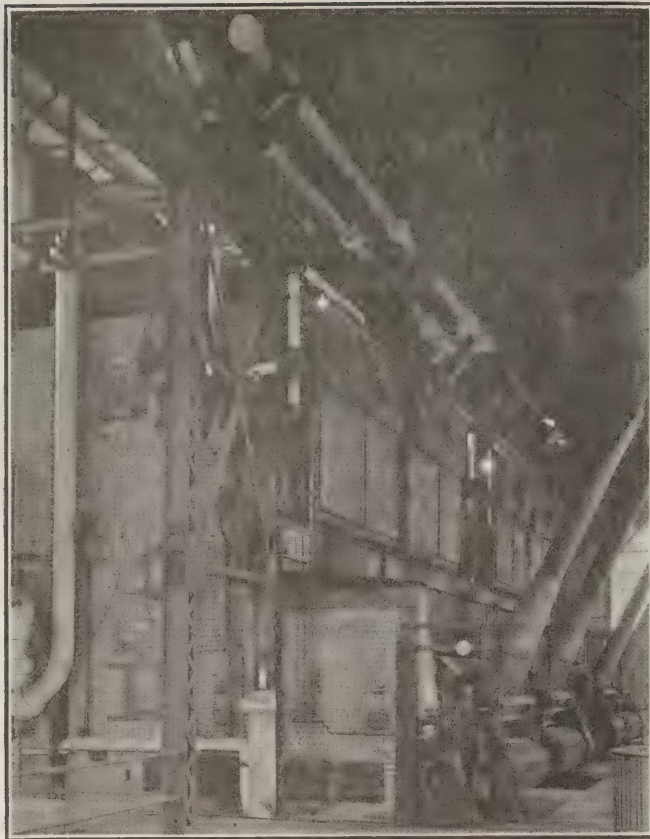


FIG. 1—BOILER PLANT BUILT FOR MAXIMUM ECONOMY

The pressure on the top of the fire is just a little over atmospheric, so there is no tendency for air to enter from outside through leaky doors or side walls, as is the case where there is a heavy vacuum. The pressure is regulated so that the fuel, which is sub-bituminous and tends to disintegrate in the fire, will not leave the grate surface.

ashpit are controlled primarily from the steam pressure. The pressure over the fire is controlled by a furnace-pressure regulator, and is set to hold approximately 0.08-in. pressure over the fire. A low pressure above the grate is essential for this installation because this coal disintegrates in burning and with a high draft the particles thus formed have a tendency to leave the grate surface with the furnace gases.

Up to the present, with a normal output up to 1,600 kw. and peak loads up to 2,000 kw., two boilers ordinarily have been carried on the line, but for short periods loads up to 1,600 kw. have been carried on a single boiler. With the load equally divided on two boilers the operation is extremely economical. The boiler and stoker efficiency range around 70 per cent with 14 per cent of carbon dioxide.

STEAM SUPERHEATED IN TUBES OF FOSTER TYPE

The boilers are set with the front headed 12 ft. above the floor line, which provides proper combustion-chamber content considering the characteristics of the fuel and the ratings at which the boilers are to be operated.

The superheaters are of Foster type and are located in the rear of the combustion chamber, being placed at a slight angle with the horizontal. The steam in them is superheated mainly by radiant heat. These superheaters are supported on cast-iron pipe of 6-in. and 8-in. diameter which have open ends that provide for a circulation of air of sufficient volume to prevent the pipe from being burned out.

Fig. 2 shows provisions for both a high-pressure water back and for high-pressure water cooling of the pipe

supporting the superheater support. It was later decided that this support could be properly maintained by air cooling alone.

The water back was entirely eliminated as being unnecessary, the air being sealed satisfactorily by an ash seal approximately 3 ft. long below the stoker chain. Owing to the fact that the ash pits are practically airtight and that the air pressure in the combustion chamber is held a trifle above atmospheric not much air courses over the rear of the stoker.

Several rows of Carbofrax brick are set along the side of the furnace directly above the grate. After much investigation, E. J. Franklin, consulting mechanical engineer for the coal company, recommended the installation of this material as a preventive against clinker adhesion, despite the fact that the temperature of the furnace approaches the melting point of the ash.

When driven hard the fire attains a dazzling white heat, and the slag or ash which adheres to the wall will melt down and drip off the sides. When the furnace operates at low ratings this slag will form again and will be melted off again whenever the temperature is increased sufficiently. Both the arch and the brickwork are thus well protected by this coating of ash, and it appears certain that the maintenance cost will be reduced to a minimum.

FIRE ARCH IS SUPPORTED BY STEEL BEAMS

Attention also is called to the method of supporting the Liptak arch. It will be noted that this is a double suspension arch carried by steel beams. These beams do not, however, rest on the side walls of the furnace setting, but are carried by steel columns independent of the brickwork. This method of support not only relieves the brick walls of a tremendous load, thus preventing cracking, but also enables repairs to be made on the side walls without disturbing the arch support.

The supply of water to the boilers is controlled by "Stets" feed-water regulators. Approximately 15 lb. of excess pressure is carried against these regulators, and when operated in conjunction with pump-pressure governors the water regulation of the boiler is automatic. Separate water columns are used and a bypass provided so that the feed of the boiler can be controlled by hand if necessary.

Coal is fed by gravity to the stoker hoppers from overhead bunkers. A Merrick Weightometer is installed on the conveyor that carries the boiler fuel to the bunkers. This device automatically registers the tonnage delivered to the power plant, enabling the management to determine the coal used in the power house and to check the railroad shipping weights against mine weights. This is a desirable feature as the miners are paid by the ton for the coal they load, and this furnishes a check against the total of the weights of the individual cars as recorded for them.

The stokers deliver the ash to enclosed hoppers located below the boilers in the basement. The ashes from these hoppers are drawn into a steel-lined ash car and are at present used for surfacing the mine yards and roads adjacent to the mine. When these ashes are no longer required for this purpose they will be dumped from the car onto an ash dump near the plant.

In the generating room are already installed a 1,500-kw. turbo-generator unit and three 500-kw. units. Provisions have been made and space left in the building for a 2,000-kw. unit.

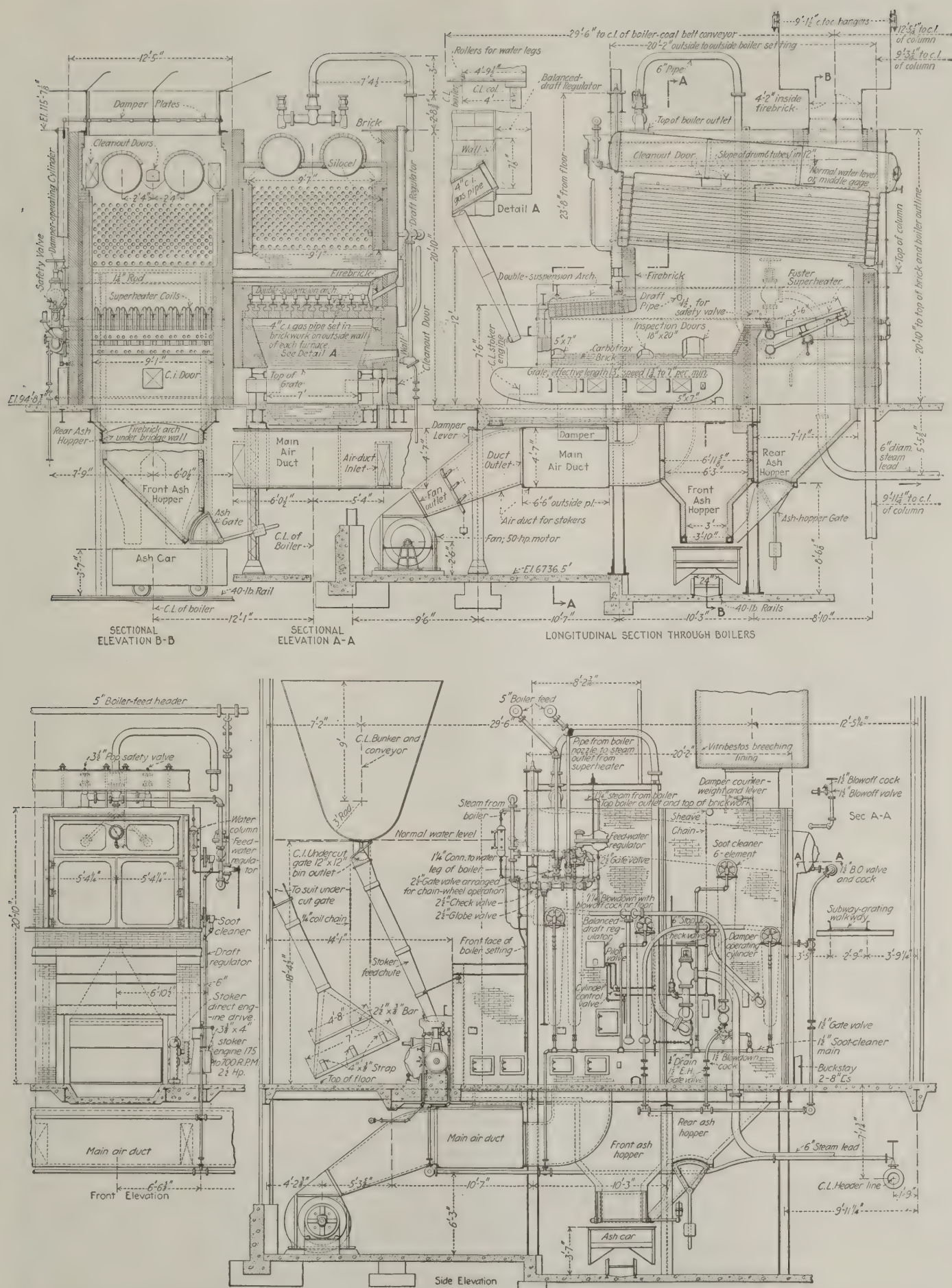


FIG. 2—WATER-TUBE BOILERS WITH CHAIN-GRATE STOKERS, SUPERHEATERS, SUSPENDED ARCHES, SOOT CLEANERS AND FORCED AND CHIMNEY DRAFT

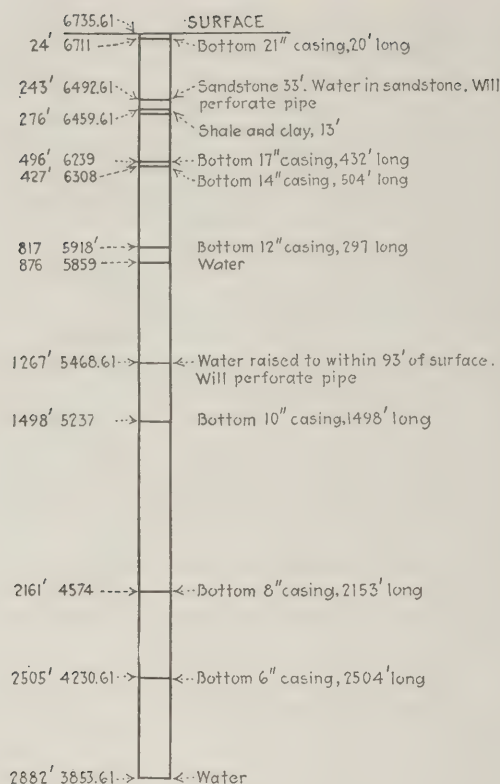


FIG. 3—CASING SIZES AND WATER CONDITIONS

The first water encountered was 300 ft. down, but the water obtained in sinking the hole to its final depth rarely rose above a point 600 ft. from the surface. Finally at a depth of 2,882 ft. a sufficient water supply was tapped. The water now rises to within 100 ft. of the mouth of the hole, the capacity being about 125 gallons per minute.

All the turbines are provided with surface condensers which are fitted with Wheeler Rotex air-and-condensate removal pumps. Condenser water is recirculated by sprays over a concrete basin 180 ft. long by 160 ft. wide, the spray equipment consisting of 162 nozzles.

The switching equipment is located in a switch room adjacent to the generating room. The switches are remote, manually controlled from the switchboard panels, which are placed in line with the main supporting columns of the building and serve as a wall between

the generating room and the switch room. Sufficient panels with their switching equipment are supplied for the control of the generators, auxiliaries and segregated feeders to the various circuits above and below ground.

The water supply for boiler use is one of the interesting features of this plant. Flowing streams or dependable reservoirs are unknown in this section of desert county, and the railroads and former mine operators soon learned that deep wells were the only source of water supply. The mine provides only a small quantity of water; in fact the mine pumps provide only enough water to supply the miners' wash house.

The single well which at present supplies the power plant is 2,882 ft. deep, and the log, as briefly recorded in Fig. 3, gives the size of the casing at various depths. Water was found at the 300-ft. and 1,250-ft. levels but not in sufficient quantities to insure an adequate supply. The water rises to within 100 ft. of the surface, and tests show the capacity of the well to be about 125 gallons per minute. This capacity will be greatly increased when perforated casing is installed at the 300-ft. and 1,250-ft. levels.

BOILER WATER RAISED FROM WELL BY AIR LIFT

An air lift is used for raising the water to the surface, a No. 4 Ingersoll-Rand footpiece being supplied with air from a 16-in. and a 7x10-in. compressor driven by a 100-hp. motor. Many of the difficulties encountered with the air lift have been overcome by the mining interests of the Southwest and all the experience gained by the Allied-Copper Co.'s installations were available for this work.

The water thus obtained (Table I) is pumped at much expense and every possible precaution is taken to prevent waste and to return to the system in the form of condensate as much of the generated steam as is possible. Compensation is made for the unavoidable losses of water in the boiler system by make-up water supplied from a water-purifying plant.

Ordinary methods of water treatment did not appear to meet conditions or to be adaptable to this water, especially as some of the impurities, notably the chlorides, were difficult to remove. In order to provide that

FIG. 6

Switchboard

This board has remote manually operated circuit breakers controlling the generator and feeder circuits. It will be noted that it has a dead front, all the wires being in the rear. The panels line up with the building columns and do not project into the main generating room.

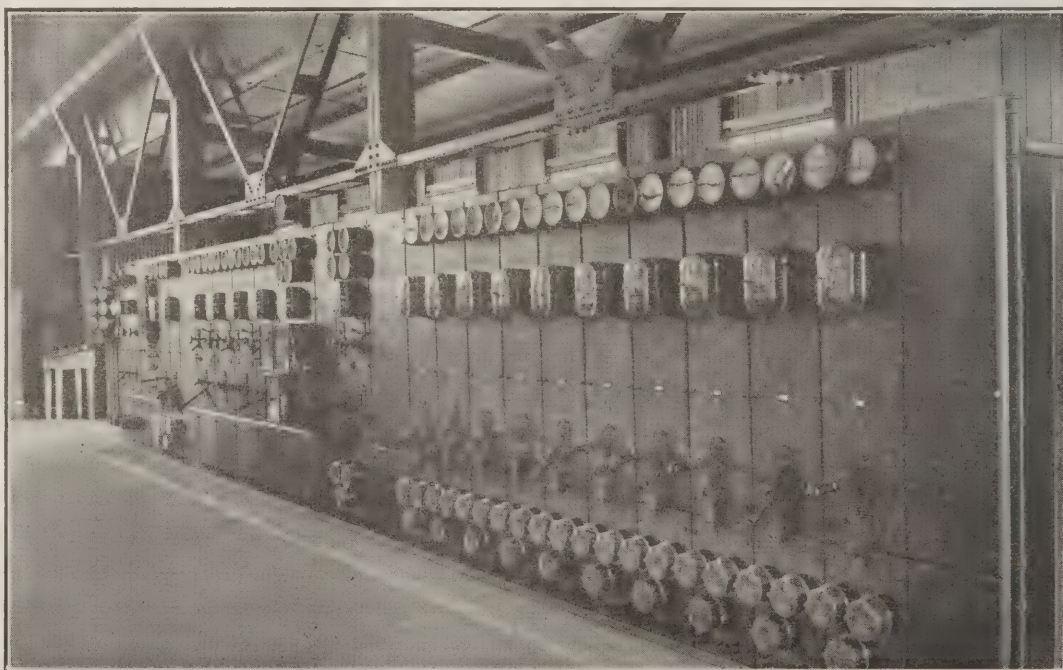


TABLE I—ANALYSIS OF WATER OBTAINED
FROM 2,882 FT. WELL

	Grains per Gallon
Silica	0.736
Oxides of iron and aluminum.....	0.128
Carbonate of lime	7.618
Sulphate of lime	4.397
Carbonate of magnesia	3.822
Sodium and potassium sulphate.....	16.829
Sodium and potassium chlorides	0.850
Sodium and potassium nitrates	Trace
Loss, etc.	0.193
Total soluble mineral solids	34.573
Organic matter	Trace
Suspended matter	0.292
Total soluble incrusting solids	16.701
Total soluble non-incrusting solids	17.872
Pounds soluble incrusting solids per 1,000 U. S. gallons	2.30
Pounds soluble non-incrusting solids per 1,000 U. S. gallons	2.55

the water would be pure and at the same time to prevent any waste of water and of heat an evaporator or system furnishing distilled water as "make-up" for the plant losses was installed. With this system all impurities are prevented from entering the boilers and all expense from scale, boiler blow and priming is eliminated.

The evaporator system is of the double-effect high-heat level type. High-pressure steam from the boilers enters the coils of the first-effect evaporators and in condensing, evaporates the water in the shell. The vapor thus formed passes to the second-effect evaporator coils and repeats this process. The vapor from the second-effect shell is condensed in a high-heat level condenser using boiler feed for circulating water. This also is the path of the bulk of the heat in the steam supplied to the evaporators, so this heat is not lost but returned to the boilers as increased feed temperature.

The drains from the evaporator coils and high-heat

level condenser are normally returned to the plant open heater, but can be pumped direct to the boiler-feed line if desired. The evaporator-feed water is heated in an open heater by exhaust steam from the plant auxiliaries to a temperature of 198 deg. F., which is nearly the boiling point at the altitude of Gallup (elevation, 6,750 ft.). This degases the water as soon as it enters the system, and as an extra precaution the contents of the plant open heater are held at nearly the boiling point by the hot-coil drains and the exhaust steam.

Griscom-Russell high-pressure submerged multicoil evaporators are used. There are two units per effect or a total of four evaporators. The coils of the evaporators are entirely submerged and are covered with an enveloping baffle in order to prevent the possibility of priming. The evaporators are entirely self-scaling. Scale is removed every eight hours. Just after the evaporator shells have been emptied and refilled with cold water, live steam is turned into the coils, and their resulting distortion cracks off the deposit of scale, which falls to the bottom of the shell and remains there during the eight hours, being blown out when the shell is emptied.

Each shell is provided with a float control to maintain automatically a constant and continuous blow sufficient to carry off the impurities in the water. This, however, can be changed to an intermittent blow-down if conditions should prove that to be more economical.

The relative location of the units comprising the evaporator system are shown in the power-house cross-section (Fig. 5). The evaporators are in the basement, the mixing tank and plant open heater on the boiler-room floor and the high-heat level condenser is located on a platform high enough so that the drains will return by gravity to the open heater.

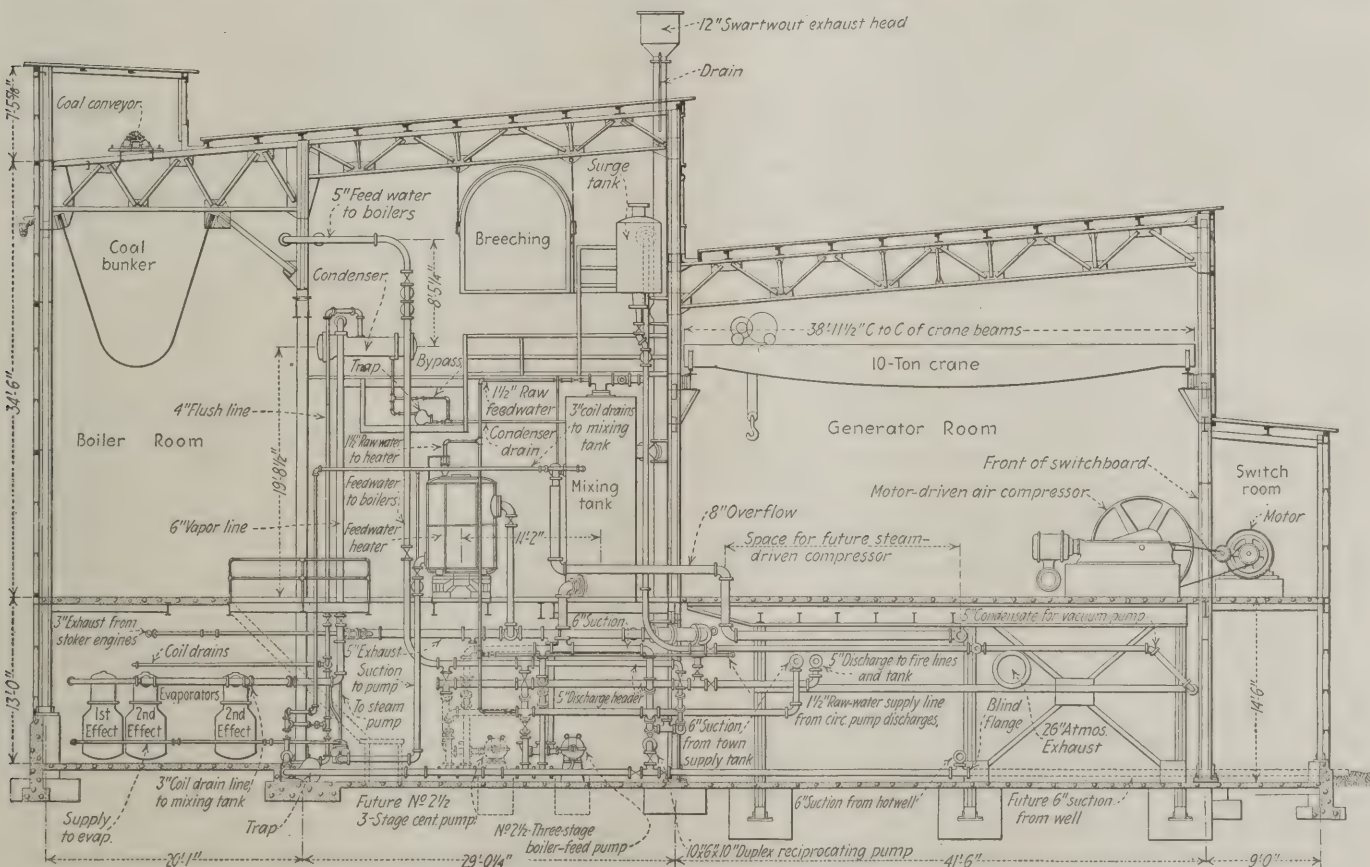


FIG. 5—CROSS-SECTION OF POWER HOUSE SHOWING EVAPORATOR SYSTEM

With only about 125 gallons per minute to draw on and that supply perhaps none too certain, every care had to be taken to economize in the use of water. For this reason it is used over and over again, but this has an advantage in that the water remains pure. Whereas others are continually purifying the water they use, the water at Navajo No. 5 is made pure once and for all and used repeatedly.

Revolutionizing Mine Pumping with Automatically Primed, Started and Controlled Centrifugal Pumps

Development of Automatic Equipment—Application of Simple Devices to Complex Operations—Advantages and Economies Realized—Details of Equipment and Operation

BY EDGAR GEALY

Electrical Engineer; Associate Editor, *Coal Age*

AUTOMATIC operation of simple devices is now quite common, but its application to complete operations of complex machines is still new. There was a time when it was considered highly desirable to depend upon the human factor in the operation of equipment, but gradually and slowly mechanical and electrical devices have been perfected to a degree which has proved them to be more reliable than the human element. Many of these simple devices are performing their duties with almost unquestionable exactness and regularity. Therefore the application of these simple automatic devices to complex operations is the real engineering pioneer work of today.

Many of the most arduous operations that must be done around the coal mines are now being done by the use of machinery. In the application of this machinery thought was not always given to the possibilities of automatic operation; in fact, many engineers and mine managers lost sight of the idea as greater safety and economies were being realized through the greater application of machinery.

No small number of simple protective devices have been developed and applied about the coal mines. The need has been apparent and their value and importance have been well established. The combination of these ideas has only recently made possible the automatic reclosing circuit breaker and the automatic converting substation. Now we have the automatic centrifugal pumping outfit, which no doubt will revolutionize mine pumping.

LARGE VOLUMES OF WATER PUMPED

One of the greatest of mining problems is pumping. Water must be handled and rehandled in almost every mine whether in operation or idle. In the bituminous-coal field it is asserted that an average of about two tons of water is pumped from the mines per ton of coal mined, while in the anthracite field the ratio is about eleven tons of water to each ton of coal; in some places the figure runs as high as fifty tons of water per ton of coal. Obviously the investment in pumping apparatus is large and the importance of the pumping station is great.

In the opinion of many mine engineers the centrifugal pump has become the logical pumping unit for most large pumping problems and its automatic operation is very desirable. Strange as it may seem the development of the first automatic centrifugal pumping outfit was due to the failing of the human element in non-automatic operation.

The idea of developing an automatic centrifugal pumping outfit was first suggested in May, 1922, by J. T. Jennings, power engineer for the Philadelphia & Reading Coal & Iron Co., with offices at Pottsville, Pa. Realizing the usual difficulties which go with the opera-

tion of centrifugal pumps, he decided to set out to devise some means by which the centrifugal pump could be primed and started automatically. Collaborating with him were B. M. Horter, of the Cutler-Hammer Manufacturing Co.; Guy V. Woody, of the Allis-Chalmers Manufacturing Co., and Otto Haentjens, of the Barrett, Haentjens Co., of Hazleton, Pa.

Prior to this date, certain devices had been developed for priming centrifugal pumps by means of a vacuum pump and a vacuum breaker to prevent the flooding of water into the vacuum pump. It was around this equipment that the automatic features were built. After some preliminary development of ideas and plans Mr. Jennings purchased certain electrical auxiliary apparatus, a vacuum pump and vacuum breaker and put into operation what later became the first automatically primed, started and protected centrifugal pump. The installation was at the Draper mines and was put in operation last June.

Since that date many automatic centrifugal pumping outfits have been laid out and ordered and some are already in operation. The success of these first outfits seems to indicate clearly the great need and keen desire for automatic pumping stations.

REASONS FOR AUTOMATIC PUMPING

It is interesting to trace the events which led up to the development and installation of this pumping station. The Philadelphia & Reading Coal & Iron Co. had recently decided to electrify its properties on a rather large scale, and was confronted with the problem of installing electrically driven plunger pumps or electrically driven centrifugal pumps to handle the large volume of water encountered in its mines.

The electrically driven centrifugal pump offered the ideal pumping unit for underground service, as it takes up little space, has a smaller initial cost and a lower operating cost.

For several years centrifugal pumps have been used as mine pumps in the anthracite field. The extended use of this type of pump, however, has been retarded by the seemingly inherent unreliability of the pump, which apparently is due to acidulous mine water acting on the vital parts of the pump in such a way as to destroy its efficiency in a relatively short time. This has resulted in high power costs, heavy repair bills and annoying shutdowns. The company had used centrifugal pumps as relay pumps since 1904, but had not considered this class of pump for its permanent plants.

Confronted with the problem of deciding between plunger pumps and centrifugal pumps, a comprehensive study was made of the several makes of centrifugal pumps and it was decided that the advancement made in designs justified the installation of a test plant of

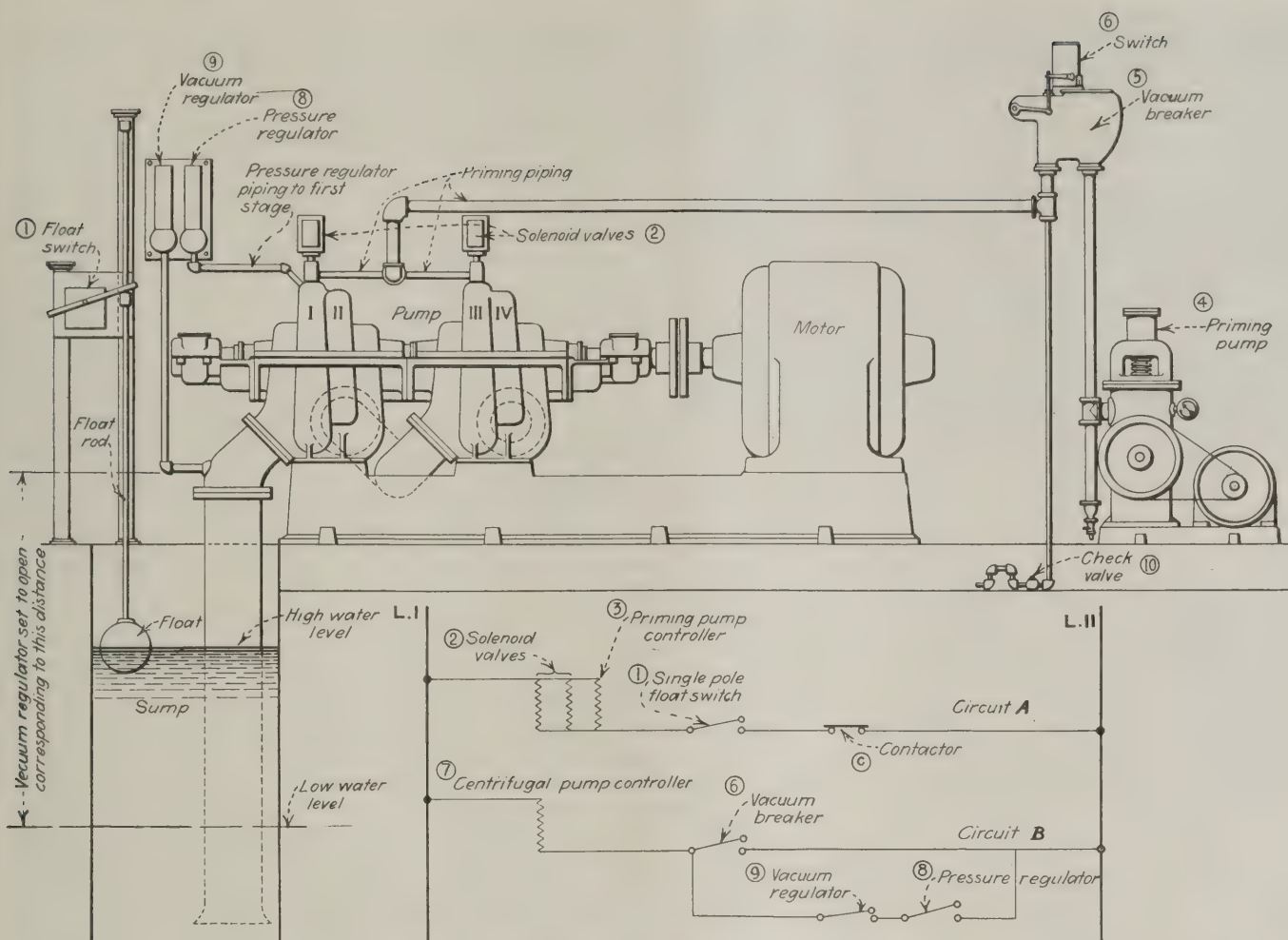


FIG. 1—PUMP LAYOUT AND CONTROL WIRING

The complete equipment is shown here, including the priming pump and control panels. The wiring diagram shows the starting and operating circuits with protective devices.

sufficient capacity to eliminate entirely one of the steam pumping plants. It was therefore decided that this test pumping plant be located at the Draper Colliery, in the Mahanoy Valley about 12 miles from Pottsville.

The pumping plant as originally installed comprised two six-stage centrifugal pumps having a combined

capacity of 4,000 gal. per minute against a head of 650 ft., each pump driven by a 400-hp. 2,300-volt 900-r.p.m. slip-ring induction motor with automatic contactor control panel. When finally completed and put in operation the initial tests showed a pump efficiency of a little better than 75 per cent. For a few months this plant received close attention and no troubles whatever developed; but when close supervision was relaxed and the plant was placed under the sole care of the pumpmen, pump

troubles began to develop, causing stoppages of the pumps for repairs.

The Reading engineers became anxious over these stoppages and after a thorough investigation decided that many of the breakdowns were due in part at least to the operator's starting the pumps before they were properly primed and continuing the operation of the pumps after the sump was lowered. Realizing that any attempt to operate the pump not properly primed was disastrous to the pump, it was decided that to make a really successful centrifugal mine pumping plant, the several manual operations should be made automatic, thus eliminating the human element in the vital stages of operation.

A canvass of all the mining companies, however, disclosed the fact that no steps had been taken to make the operation of centrifugal pumps automatic; neither

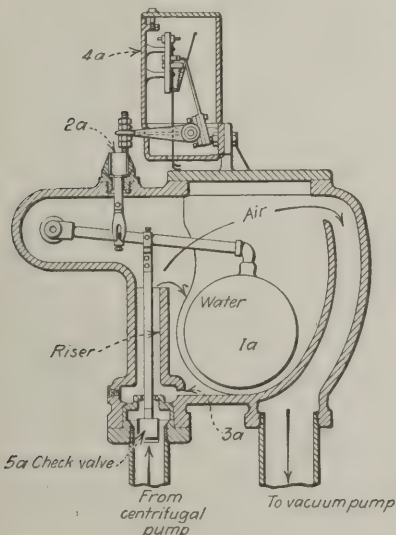


FIG. 2—VACUUM BREAKING DEVICE

This device is the most important piece of equipment in the automatic apparatus. It protects the vacuum pump and controls the starting of the centrifugal pump.

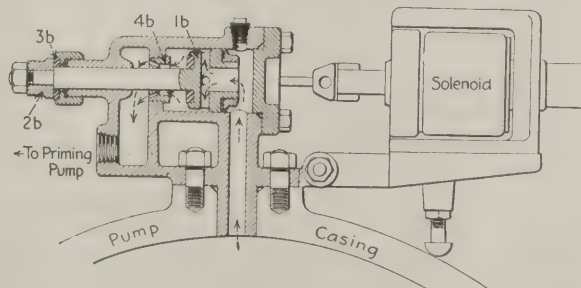


FIG. 3—SOLENOID PRIMING VALVE

This valve allows the pump to be primed and closes when the pump is started and ready to pump. Its action is very positive due to the pressure created inside the pump during operation.

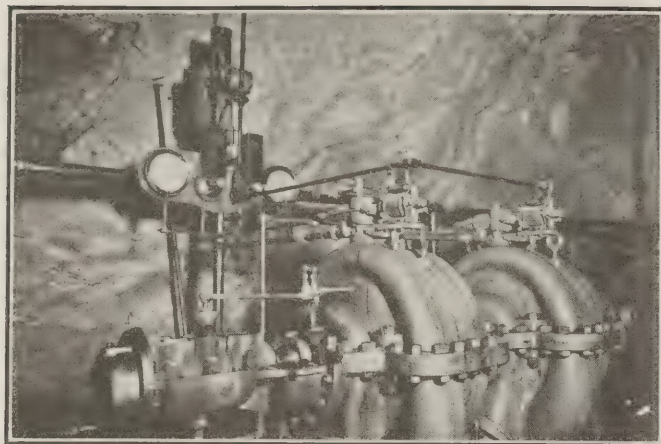


FIG. 4—FOUR-STAGE PUMP AND CONTROL

This pump is made up of two separable units; each unit is shown with its automatic priming valve. The vacuum breaker and float switch appear between the pressure and vacuum gauges.

had any of the pump manufacturers anything to offer.

Guided by the desire to provide only the essential protection and operating features with a minimum of equipment, Mr. Jennings decided that the following conditions had to be met:

- (1) Starting and priming the centrifugal pump when the water in the sump reached a predetermined high level.
- (2) Protection against starting the centrifugal pump unless fully primed.
- (3) When the pump is properly primed, the motor is started and the pump brought up to speed.
- (4) Stopping the priming pump when the centrifugal pump is up to speed.
- (5) Running the centrifugal pump through its protective devices.
- (6) Stopping the centrifugal pump when the water in the sump recedes to a predetermined low level.
- (7) Protection against running the centrifugal pump if it loses its water or if the column breaks.

With these points in view, development was carried on until the automatic pumping outfit took its present form, and additional plants have been installed by this company at the Kohinoor and Boston Run Collieries.

Fig. 1 shows the general layout and arrangement of the complete priming, pumping and control equipment. The cycle of operation is as follows:

When the sump was filled to a predetermined height, at which the pumping should start, the float closes switch 1, thereby closing circuit A, thus energizing the solenoid valves and closing priming pump switch 3. The solenoids open the priming valves and the priming pump 4 begins to run, drawing air out of the suction pipe and pump casings, through the priming piping, and into the vacuum breaker 5. The pump is thus primed by the water taken up from the sump.

Fig. 2 shows the vacuum breaker. Float 1a rises and closes switch 6, thereby closing circuit B, thus closing the centrifugal pump motor switch 7 and starting the centrifugal pump. As soon as the pump begins to run, water is forced through the priming valves 2 into the priming piping and vacuum breaker, causing float 1a (Fig. 2) to rise further and open the air valve, 2a. Air now enters the vacuum breaker, breaks the vacuum and the water drains out through the check valve 10, float 1a falls and opens switch 6.

The centrifugal pump motor would now stop if the shunt around the switch were not provided. This shunt

circuit contains a normally closed vacuum regulator, 9, and a normally open pressure regulator, 8. The pressure regulator is connected to the first or any other stage of the centrifugal pump and closes when the pressure approximates the normal pressure developed in the stage to which it is connected. This takes place soon after the motor is up to full speed. The vacuum breaker is so arranged that switch 6 is kept closed until this pressure regulator has closed, so that when switch 6 opens, the current passes through the vacuum regulator and pressure regulator which now controls the starter 7, as will be explained later.

In circuit A, contactor C is connected. This contactor opens and de-energizes the priming valve solenoids and opens switch 3, stopping the priming pump as soon as the centrifugal pump motor is up to speed. This contactor is actuated through a device on the motor shaft which opens when the motor is up to speed. When the centrifugal pump stops, contactor C again closes and the priming pump will start again providing the float switch, 1, is closed. This constitutes the starting operation.

The wiring diagram of Fig. 1 shows that by means of circuit B the motor-control circuit is such that the centrifugal pump will come to a stop when one of the regulators opens. The vacuum regulator, 9, is set for a degree of vacuum depending upon local conditions. If the vacuum regulator is used for stopping the pump when the sump is pumped down, the amount of vacuum is equal to the distance from low-water level to the connecting point of the regulator piping to the suction line. This is done when the sump extends over a large area necessitating a long, sloping suction line. If the sump can be arranged as shown in Fig. 1, which is the ideal arrangement, then a 2-pole sump switch can be used for stopping. In the latter case the vacuum regulator is set for a slightly higher value and acts only when the suction increases unduly, due to a blocked strainer.

The pressure regulator opens when the pressure fails. This may be caused when the inflow of water is restricted, due to a blocked strainer, a broken column line, or when air enters the pump through leaky joints in the suction line or through the stuffing box on the suction side of the pump. A small amount of air reduces the capacity of a centrifugal pump, because water entering the first impeller creates a mixture of expanded air and water. The air is compressed after passing through the first stage and therefore its presence is more easily detected in the first stage than in the fol-

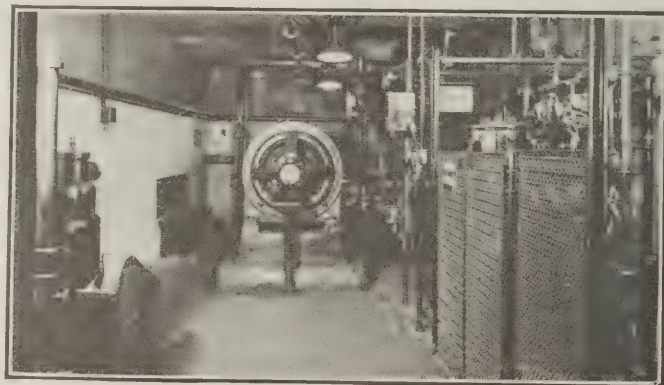


FIG. 5—MODERN PUMPING STATION AT KOHINOOR COLLIERY

This is how the latest type of mine pumping station looks. This station is fully equipped with automatic starting and control apparatus for both the pump and motor.

lowing stages. The pressure regulator should, therefore, be connected to the first stage. Actually it is taken off the priming valve connection to the pump.

From the above it obviously is necessary that one priming valve must be connected to the first stage, because if the first stage is not completely freed of air, the pump will not start. It is usual on this type of pump to provide one priming valve for two stage pumps, two valves for four stage pumps, three valves for six and more stages. The vacuum and pressure regulators are standard Cutler-Hammer equipment. The priming pump and vacuum breaker were originally designed for manual operation by the Barrett-Haentjens Co., of Hazleton, Pa., and were fully described in the March 30 issue of *Coal Age* in 1922.

For automatic operation the vacuum breaker has been slightly altered and is shown in Fig. 2. The water does not flow directly into the vacuum breaker housing but enters through a riser, the foot of which is pierced by a hole 3a. The riser serves a double purpose. The water when entering is mixed with air and is therefore turbulent; and this would cause a jerky operation of the float. By coming out over the riser the air now goes directly to the vacuum pump and the water falls into the pocket, raising the float gently. The float, through lever 5a, closes first the switch and then opens air valve 2a, whereupon the water falls rapidly from the inlet side of the riser but slowly from the chamber, thus delaying the opening of switch 4a, which must be kept closed until the centrifugal pump is well under way and has established the normal running pressure required to close the pressure regulator. Switch 4a can be of the 2-pole type and would then stop the priming pump and de-energize the solenoids the instant the centrifugal pump starts up.

Should switch 4a fail, water cannot be drawn into



FIG. 6—DRAPER PUMPING PLANT, THE FIRST AUTOMATIC MINE PUMPING STATION

Due to the location and moisture the control and feeder wires in this station are run in conduits suspended from the roof. The vacuum priming pumps are shown on the left.

the priming pump, as air will enter through valve 2a, breaking the vacuum. Should the priming valves stay open after the centrifugal pump has started and discharged more water into the priming piping than check valve 10 can pass, check-valve 5a will finally come to its seat and prevent water from entering the priming pump.

The solenoid priming valves were especially designed for mine service, being made of cast acid-resisting bronze and having no small bolts. The valve as shown in Fig. 3 is open; the solenoid when energized pulls stem 1b to the right until crosshead 2b touches washer

3b. The solenoid remains energized as long as the priming pump runs. The pull of the solenoid is supplemented by the atmospheric pressure, which tends to push stem 1a to the right when there is a vacuum within the valve body. Preferably the valve is mounted directly on the pump casing. The air passes through small holes in the stem, as shown. The area of these holes is ample for air, but when the centrifugal pump starts up, water under pressure enters and cannot escape quickly enough through the small holes so that an excess pressure is built

up on the right-hand side, which pushes the stem to the left until the leather-faced part of the stem touches seat 4b. This makes a tight joint, which can also easily be renewed. The closing force therefore is great. A 1-in. valve has a 2½-in. plunger, so that the valve on the first stage is pushed closed with a pressure of several hundred pounds, depending on the pressure developed by the first stage. The valve, however, closes slowly as the pressure builds up, but is held closed with the full pressure and therefore stays tight.

When closed, the valve cannot open until the solenoid is energized. This is important when one priming pump serves a number of centrifugal pumps. Only the pump whose solenoids are energized is primed. The other valves of the other pumps, due to the vacuum in the priming piping, are pulled tight to their seats. One priming pump can serve a number of centrifugal pumps, but each centrifugal pump must have its individual sump float switch, vacuum breaker and regulators.

An interesting feature in connection with this equipment is that in case of any trouble the priming pump will operate to prime the centrifugal pump four times before shutting down and then locking out. This arrangement insures the starting of the pump in the event of some slight irregularity. Arrangement can be made for a bell alarm whenever the station is thus locked out.

The automatic pumping equipment performs many functions besides automatic priming and starting, although they are the major features. A complete outfit will prime and start the pump when the water in the sump reaches a predetermined height and stop the pump when the sump has been pumped down to a set level.



FIG. 7—WATER LEVEL INDICATOR

This indicator gives a visual indication of the amount of water in the sump. Control equipment on this indicator starts and stops the automatic pumping. Note the strainer with removable cover shown at the right of the picture.

Should the suction line become blocked, the pump shuts down. If the suction line or pump leak air, the pump shuts down. When the column line breaks or has an excessive leak, the pump shuts down; this is highly desirable when the pump has a column line which would cause the water coming out of the break to run back into the pump room, where it probably would drown the pump out. It also is impossible for the pump to operate unless all conditions are such that the pump would operate satisfactorily. Improper priming and operation of centrifugal pump have been a real source of danger and expense. Frequently pumps have been wrecked and lost due to not being properly primed before starting or due to losing its water during operation.

There are several additional operating and economic advantages obtained with automatic pumping equipment. Pump runners often do not know to what level water in the sump should be pumped out and frequently the pumproom layout is such that they do not know the level of the water in the sump unless they go to some trouble to find out. The result is that the water in the sump is sometimes pumped so low that the pump rattles, causing excessive strains. At other times the sump may be allowed to fill up to an unsafe level. Both of these conditions are made almost impossible with the automatic features of operation.

Remote control of the pumping also is made possible. Frequently pumps must be placed in inconvenient places in order that the suction line can be made as short as

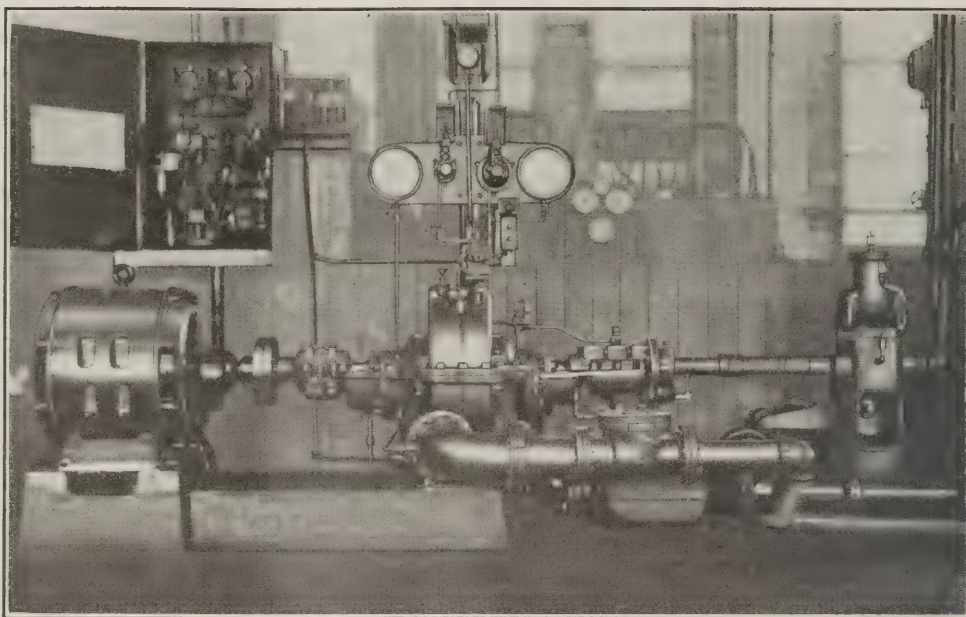


FIG. 8—COMPLETE EQUIPMENT FOR AUTOMATIC PUMPING STATION

possible, yet it usually is undesirable to place the control equipment where the pump is located. In this event it is entirely feasible to place most of the control and priming equipment in a higher and safer position where inspections and repairs can be accomplished under better conditions.

Cost for pump operators also has been an important item to the coal manager and especially is this true in the event of a temporary idleness of the mine, when it is desirable to keep fixed charges as low as possible. In the event of suspension, strike or shortage of labor, automatic pumping equipment makes possible the operation of a large number of pumps with only a small amount of occasional inspection. With automatic equipment one mechanic can keep a large number of pumps in perfect operating condition.

Seizure of Ruhr Mines May Bring About Crisis in French Fuel Supply

Business men are skeptical as to the outcome of the action of the French Government on July 29 in seizing cokeries and mines in the Ruhr for direct operation, says a cable to the Department of Commerce at Washington from Chester Lloyd, commercial attaché at Paris. Apprehension lest the supply of fuel from the Ruhr cease is increasing, and Strasbourg business interests are asking for the establishment of an emergency winter coal stock of 500,000 metric tons, complaining that little coal has been received from the Ruhr and that a coal crisis similar to that of 1920 threatens the district.

Basil Miles, Administrative Commissioner for the United States of the International Chamber of Commerce at Paris, in a report says that France is getting only about one-third as much coal and coke out of the Ruhr as she previously got from the regular reparations deliveries. The Ruhr, he says, may be regarded in many aspects as an industrial district on strike as the result of German passive resistance. Mr. Miles reviews economic results of the occupation and says that wherever the Germans refused co-operation the French proceeded without it and at the same time retaliated by measures established under martial law. Where the Germans refused to mine coal and make coke for the French, the French replied that they would not be allowed to make it for themselves, and an embargo was placed on the exportation of coal and coke, and on products of the metallurgical industry into unoccupied Germany.

As the German Government has refused to continue coal and coke deliveries since the occupation, the French are systematically seizing accumulated stocks, taking one mine or factory at a time. Practically every time they do so the workmen concerned strike and refuse to continue production for French consumption. Contrary to expectations, theoretically there is no unemployment in the Ruhr. Workmen are overhauling factories and opening new veins of coal, non-productive work which will be useful in the future.

With six months freedom from allied control, Mr. Miles says, the Ruhr probably could produce more coal than ever before; certainly within a year its present capacity could be organized to a production much in excess of any pre-war year. Mr. Miles says that the idea that the French themselves can produce Ruhr coal, coke and steel without German labor and management is fantastic.

The coal and coke so far removed from the Ruhr, according to advices from the Berlin correspondent of *Coal Age*, consists solely of the reserves accumulated during the earlier months of the occupation. Nothing has been added to them since the middle of April. The critical stage will be reached in September or October, when these reserves are exhausted with no new supply forthcoming. Allied shipments in July dropped to about 5,000 tons of coal and 1,300 tons of coke per day, according to German observations. While at first only coke and high-grade coking coal were seized, coal of inferior quality is now being taken. The reserves in existence at the end of July were estimated at 1,000,000 tons, a large part of which is stored in localities difficult of access and consists in part of lean, soft grades unsuitable for coking.

Present Practice in the Design and Sinking of Shafts*

Ground Water Adequately Protects Most Timbered Shafts, and Preserves Them Also—Concrete Both Scales and Pockmarks—Should We Use Vitrified Brick?—Buntions of Concrete Not Resilient—Shall We Grout or Drain Shaft?

BY R. G. JOHNSON†
Pittsburgh, Pa.

FIFTEEN years ago, only where the coal was less than 100 ft. below the surface did mining engineers think a slope the more desirable way of reaching it. In those days either a chain or rope hoist was used for moving the cars. Today rubber-belt and steel-apron conveyors are installed in slopes, and in consequence many prefer to drive a slope even when coal is found as much as 200 ft. below the surface.

The width of a shaft can be determined by the length of the car, always, however, making the width in excess of that length from bumper to bumper, to prevent the link from hitting the shaft lining when the cage is being hoisted or lowered. At least 4 in. of clearance should be allowed at the ends of the cages to provide for any irregularity in the concrete lining and for the possible accumulation of ice. Unfortunately, the hoist compartments must be either neutral or downcast, and for this reason they are cold in winter and likely to be filled with frozen water. In fixing the distance between the faces of the guides on which the cages slide the cagemaker's dimensions should govern. An allowance of about $\frac{3}{8}$ in. for play should be made on each shoe of the cage.

In 1903 at South Brownsville, Pa., two shafts were sunk as concrete caissons, this method being made necessary by the fact that there, as well as on both sides of the Monongahela River in many of the stretches just above Brownsville, river silt overlies the rock. After sealing the caissons in the rock the shafts had to be sunk about 45 ft. to the coal, and this length was lined with concrete in place of the usual timber-set lining. These, as far as I can find, were the first shafts lined with concrete throughout. In 1903 at Gary, W. Va., two deeper shafts were constructed, elliptical in shape and lined entirely with concrete. Engineers generally were slow in accepting this new method of lining, but as time went on the value of the new designs impressed themselves on mining engineers, and today most of the new shafts are concrete-lined, and many that formerly were timbered have been lined with concrete when relining became necessary.

Though concrete provides a stronger lining, standard 8x10-in. timbers on 5-ft. centers with 2-in. lagging provide a lining amply stout, and with water rings which are catchbasins around the shaft just behind the lining and proper draining a timbered shaft can be made as dry as a concrete shaft. The question really resolves itself into a comparison of first and ultimate costs. The life of a first-class lining of white oak or long-leaf yellow pine, if the shaft is dry, will be from twelve to twenty years. If the shaft is wet, with water constantly dripping over the timbers, its life with minor repairs is almost unlimited.

If the field of coal being worked is so small as to

give a life of twenty years or less, timbered shafts in most sections of the country will be cheaper than concrete even in the long run because the moisture that is found soaking into the timbers in most timbered shafts, especially around Pittsburgh, provides a good fire protection and acts effectively as a wood preservative. Only in exceptionally dry shafts is a timber lining dangerous. The timbers in some of the later installations have been treated with wood preservatives, but this is not advisable, for it would prove a splendid fuel for a fire. Because of the fire risk, timber linings are not permitted in new shafts by the state laws of Illinois.

After twenty years of watching developments in the design and construction of concrete-lined shafts, I am not sure they are entirely satisfactory. A large number of the downcast shafts which are lined with concrete are pockmarked. The lining is slowly scaling and disintegrating. Moisture or rain or dripping shaft water is sucked down with the incoming air and, of course, wets the surface of the lining. The concrete naturally absorbs some water and alternation of freezing and thawing eats into the lining, causing it to peel scale by scale. I am convinced that we must find a suitable waterproofing for downcast concrete-lined shafts, or we shall have to provide a veneer of some impervious nature. I believe vitrified brick would make an effective veneer, the brick to be laid in cement and locked every four or five courses to the concrete lining with a row of headers.

Of course, in constructing a plain concrete lining, it is possible with very careful puddling while the concrete is being placed to remove most of the small air bubbles, and in some linings waterproofing compounds have been used, but the success of these waterproofings has been rather indifferent. This trouble with linings is today the most serious problem in shaft construction, closely akin as it is to the handling of the water through the lining.

A New York waterproofing concern has proposed a method of treatment for a shaft lining in the Pitts-

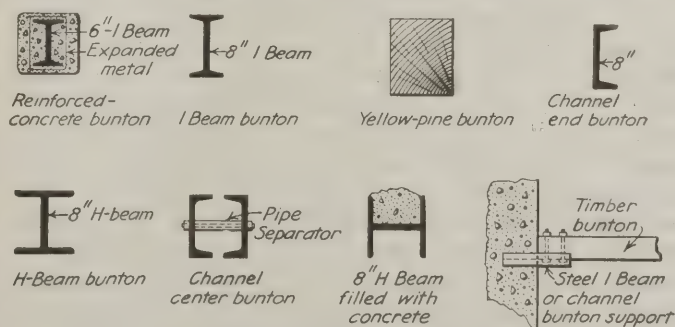


FIG. 1—VARIOUS TYPES OF SHAFT BUNTIONS

A buntion should give a little when bumped or it will tend to break. If made of steel and shaped so as to collect water it will rust away rapidly unless the receptacle thus created is filled with concrete. It is well so to arrange the buntion that it can be removed without injury to the walls.

*Abstract of paper read before the Engineers' Society of Western Pennsylvania; from *Proceedings*, May, 1923, p. 134.

†President, R. G. Johnston Co.

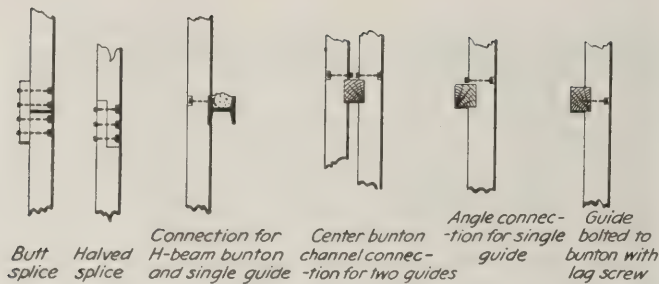


FIG. 2—METHODS OF SPLICING AND HOLDING GUIDES

The simplest and best of splices is the butt splice. The bolts should be countersunk into the guides so that the bolt heads will be at least a quarter of an inch below the exposed face.

burgh region which has scaled and become pockmarked by the action of water and ice, and the work, which I understand will start this spring, will certainly be watched with interest.

In England, France and Germany brick is used for most of the deep shafts that are masonry-lined, but engineers in this country have never strongly inclined toward either brick or concrete block. In a flat-sided shaft, brick or block will not give the desired strength where the strata are soft. Concrete fulfills all requirements of strength and will stand the unusually severe strains produced by the blasting which the sinking process makes necessary.

Pipes, drains, and buntion and guide connections can be placed in the lining as it is being constructed. The concrete should be mixed in the proportion of 1:2:4. It should be from 12 to 18 in. thick. Provision always is made, however, that points of solid rock may project within 4 or 6 in. of the concrete form. This unquestionably adds to the support of the shaft lining.

Concrete, then, will be the medium for the lining of the shafts we are designing, a vitrified veneer being used for the downcast compartment, which will be separated from the hoistways by vitrified-brick walls laid in panels on the buntions.

The function of the buntions in a concrete shaft is principally to hold the guides in position. Their strength is seldom calculated with the idea that they have to support or brace the lining except near the top of the shaft, where they help to prevent the bulging of the loose earth. This does not conform to the ideas of some designers, but experience has surely proved that the rock measures have no lateral movement when they are practically horizontal. Use has been made of many different sections of buntions. The material of which they are made may be wood, steel, or combinations of steel and concrete. With timber-set lining the buntion is a necessary part of the framework.

Timber buntions and steel buntions have resilience to absorb and dissipate the strain imparted to them through the guides by a fast-moving cage or skip, but the only reinforced-concrete buntions I have ever seen were full of small cracks, caused, I assume, by vibration. The steel H-beam makes an ideal buntion for a concrete shaft. It should be placed on edge and the top concavity filled with concrete to prevent water from settling therein, but the steel buntion is not readily replaced in case of a wreck of the shaft, and many designers in the last few years have used the timber buntion either concreted in place or set in hitches left in the lining or else a timber buntion which is bolted to short sections of I-beam or inverted channel concreted in.

The various types are shown in Fig. 1. The principal objection to steel is its susceptibility to corrosion in

the combination of mine air and mine-water drippings, and, though it easily can be painted outside the shaft, nothing entirely effective can be done in the shaft on account of the dampness. The best paint for mine buntions is a homemade mixture of coal tar, portland cement and kerosene applied hot to the clean steel.

I know of one case where the buntions were painted with this combination ten years ago, yet recent investigation showed them to be in fine condition. Many believe steel buntions are best, but, being concreted in, they cannot be quickly replaced, and many engineers incline toward the timber buntion bolted to short steel I-beams concreted in the lining. Where a masonry partition wall is built in the shaft, steel buntions, are, of course, best.

Guides for the cages are practically always of timber, a prime grade of long-leaf yellow pine being the most desirable. Steel has been tried, but I know of no successful safety device that will work on steel guides to guard the cage from falling in case of accident. Set accurately to plumb-line and gage, the guides are dapped over the buntions and bolted to them. There are several methods of splicing the guides, and the simplest and best of these is undoubtedly the butt splice. All bolts are countersunk into the guides, and the heads of the bolts should be set in at least $\frac{1}{4}$ in. deeper than the face of the guides (see Fig. 2).

Partitions in timbered shafts are of yellow-pine tongued-and-grooved sheeting either of two layers of 1-in. tongued-and-grooved material spiked with loose joints to the buntions, or of one layer of $1\frac{1}{2}$ -in. tongued-and-grooved sheeting. Partition walls, or curtain walls, as they are often called, in concrete-lined shafts are nearly always of reinforced concrete, and though some have been constructed as a continuous solid concrete wall from top to bottom, a thinner and stronger wall can be constructed on steel buntions placed at intervals of 5 or 6 ft. in the shaft.

ADVOCATES VITRIFIED BRICK FOR SHAFT WALLS

The walls usually are reinforced, and a typical design is shown in Fig. 3, but some of the concrete walls in downcast shafts have peeled and are constantly scaling. I believe that they too should be made of vitrified brick. The light reinforcement that is now used in concrete walls can be used just as well in the brick wall. Laid in cement mortar with thin joints, they should serve their purpose well.

I favor vitrified brick simply because it is the best medium that I know which presents an impervious face. If we can find a waterproof paint that can be applied so that it will be absorbed into the pores of the face of the concrete or a waterproof plaster that will cling to the lining and will stand the test of time in its resistance to the water, our problem is solved, and concrete so treated will be ideal.

The method of handling water which is encountered in the sinking depends largely upon the quantity of water and the nature of the rock. Grouting is the only method of preventing the water from coming into the shaft, and today provision for the sealing of water by injecting cement into the fissures of the water-bearing strata is a part of all specifications.

Today all prices in contracts for sinking shafts are based on the assumption that if water is encountered it will be kept back by grouting and the work paid for according to provisions made in the contract. Grouting usually is paid for per barrel of cement

injected, but it would seem that a method fairer to both parties would be an agreement to pay for the cost of grouting on a basis of cost plus a fee per barrel, the fee to include the use of the contractor's plant and his profit.

The grouting clause and its price today takes the place of the water clause in the contracts of twelve and fifteen years ago. This clause in former contracts provided for additional prices per vertical foot sunk in case certain quantities of water were struck, the prices to increase as the quantity augmented, but this was an inequitable manner of paying for the cost. On one job I saw the contractor lose everything he had because he could not get below the water, the rock being blocky and full of fissures, so that he could make no footage at all in sinking and consequently could earn no premium to pay for the cost of his constant pumping.

On another job a contractor was able to construct a water ring just below the water stratum, which was reasonably close to the top of the shaft, and, placing his pumping plant at this ring, he pumped on, the pumping having no effect on his sinking, which was practically dry. According to the water clause, he was paid, of course, by the foot sunk for the additional water, and he sunk well and his coffers were filled with gold, and there was joy in the house of the contractor.

The fairest water clause for pumping is the one based on paying by the million-foot-gallons for all water pumped. This form of water clause (in addition to the clause for grouting) was used in the contracts for the shafts and tunnels for the Catskill aqueduct, which was completed several years ago. A typical water ring is shown in Fig. 4.

HIGH-PRESSURE GROUTING IN SOLID ROCK

The pressure used in grouting varies greatly according to conditions. If you are grouting in solid rock, the higher the pressure the more efficient will be the grouting. Usually with a grout tank you will use up to 125 lb. pressure. If you are using a pump, the pressure available is limited, of course, by the steam pressure and the ratio of the cylinders on the pump. In several cases on the Catskill aqueduct grouting was done under pressures as high as 500 lb., and my recollection is that in one or two cases a pressure of 600 lb. was used through the use of special equipment. Little high-pressure work is done in this section.

In grouting behind a shaft lining special care must be taken to gage the pressure properly, and definite results can never be guaranteed. If the holes to be grouted are in a round shaft, or in the round ends of a long shaft, they will, of course, stand more air pressure than in the flat side of a shaft, but it is practically impossible to force grout behind a lining with less than 20 lb. of air, and the possibilities of breaking a flat lining under even 20 lb. of air are great.

When grouting behind linings was first started, pans or blisters of tin usually were put against the rock rib where the water ran out when the lining was being poured, and a hole was punched in the tin from which a pipe led to the concrete lining form, and the grout was forced through this pipe. This is still done in many cases, but if it is possible to drive a pipe into the water-bearing crevice and calk the rock seam so that all water will lead into the pipe, a much better grouting job can be done, for higher pressures can be used, as there is not the area of lining over which the pressure of the grout can act.

The most successful grouting job in mine-shaft sinking was done near Welch, W. Va., on the Tug River. Here a shaft that had been sunk for ten years was still making 750 gal. of water per minute. When the mine changed hands improvements were planned and it was proposed that the shaft be lined with concrete, the lining to be designed so as to withstand pressure sufficient to grout the flow of water. We designed a heavy reinforced lining and used an unusually heavy H-beam section for the buntons, which were figured as struts.

Back of the lining we placed corrugated iron, and canvas back of this, our idea being that when the grout was forced behind the lining it would fill the pores of the canvas and absolutely insure a watertight job. When the grouting was finished, the shaft made, as nearly as we could figure, one quart of water per minute. I may add that the success of this job is

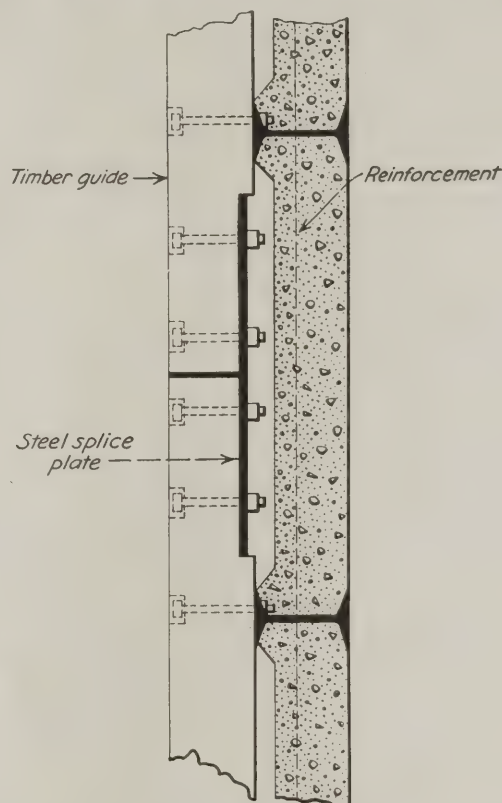


FIG. 3—SHAFT CURTAIN WALL

Illustration shows buntons with concrete in panels, a butt guide splice and the connection between the buntons and guides.

extremely unusual. Many equally heavy streams are encountered nowadays, but they are grouted in the sinking, and the necessity for heavy linings is avoided.

Grouting in slopes is more difficult. As the strata usually are horizontal, the grout injected into the crevices must travel over a large area to be effective. In water-bearing country it is wise to keep a test hole ahead pointed downward at a greater angle than the angle of the slope. If water is struck, more holes are drilled and grouted to refusal, but in driving a slope through a horizontal water-bearing crevice it requires a long horizontal distance to get beyond the drainage area of that crevice. In consequence the sealing of water from a single crevice often requires several grouting operations. Each operation requires not only the time for the injecting of the grout but a longer time to allow it to set before again shooting the face.

With the coal operator who is not familiar with the process of grouting the question of cost naturally arises

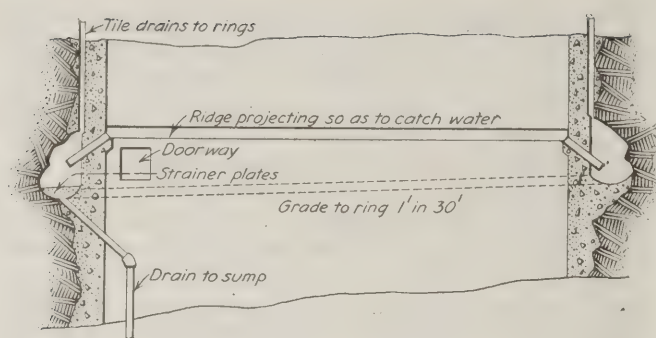


FIG. 4—TYPICAL RING IN CONCRETE-LINED SHAFTS

What little water is permitted to escape into a grouted shaft is caught by a protecting ridge and carried back to a shaft ring through pipes. This ring collects the water to a low point and is drained by a pipe to the sump.

when letting a contract. He is, of course, anxious to cut down the cost of his pumping, and any process or device which will save him dollars is interesting. Let us take a typical case. Assume the shaft to be 400 ft. deep and a stream of 200 gal. per minute encountered in the sinking. If this stream is not sealed the operator will have to pump it throughout the life of the mine. If his power averages 1c. per kilowatt-hour, it will cost him about \$3,000 a year. On a 15-per-cent basis it will be found that he could afford to spend \$20,000 to seal off the water.

Though the rock in different sections of the country largely determines the grouting conditions, and hence the expense of grouting, the average cost of sealing off this quantity of water would run over \$3,000 or \$4,000. I have been connected with jobs on which the total cost of grouting streams far in excess of 200 gal. per minute was not over \$2,000, and I know of no work on which a stream of this quantity has cost more than \$5,000. The operator could thus pay for his grouting in a year and save \$3,000 or \$4,000 a year afterward.

Some engineers believe that in the development of the mine the same water may be caught that has been sealed from the shafts. There are cases where I believe this is possible, and if the stream is directly above the coal I can appreciate that the engineer might hesitate to instruct the contractor to grout the fissures, although the absence of such a stream in the shaft, even though it should come out later in the mine, would be of much advantage to the shaft bottom.

If the water is above a substantial streak of fireclay or a thin bed of coal above the one being worked, I do not believe there is much likelihood that water will penetrate the strata above the coal and flow into the mine; at least until the pillars are drawn and the roof measures have sagged or fallen. Water usually flows in underground streams rather than lying in huge pools. It is seldom possible to pump dry a stream encountered in sinking. I am familiar with only one case where this was possible.

I have not discussed airshafts as such, for the general details are, of course, the same as in hoisting shafts. Stairs, if such are installed, are either of steel or wood. Steel makes the cleanest looking and strongest job, but a steel stairway is exceedingly difficult to paint effectively in the shaft. Yet of all details a stairway from a mine should be fireproof.

For lining purposes the contractor will carry 40 or 50 vertical feet of concrete forms, which usually are made in sections. When it is decided to concrete, the

muck is leveled off in the bottom of the shaft and sections of forms, designed according to the plan of the shaft and usually 5 or 6 ft. in height, are bolted together to make a complete ring. The buntion ends or buntions are placed in notches set in the forms, and the space between the rock rib and the form is filled with concrete.

This process is repeated until the stretch of concrete is joined to the old concrete above. As soon as the stretch of concrete is completed, the muck in the bottom of the shaft is taken out and the concrete forms are removed, and the process of sinking is again resumed. That blasting so soon after concrete is placed does not shatter the concrete seems remarkable, but I have never seen cracks from this cause.

No discussion of shaft design and sinking can be closed without saying a few words as to slopes, for in the last few years and at the present time they are being favorably considered for coal under 200 ft. in depth both for haulage and for manways. Conveyors both of the rubber-belt and steel-apron type have been successful in moving big tonnages at a low cost. For rubber belts a slope with a maximum of 33 deg. has been used, but I have heard users of the 30-deg. slope say that they are too steep.

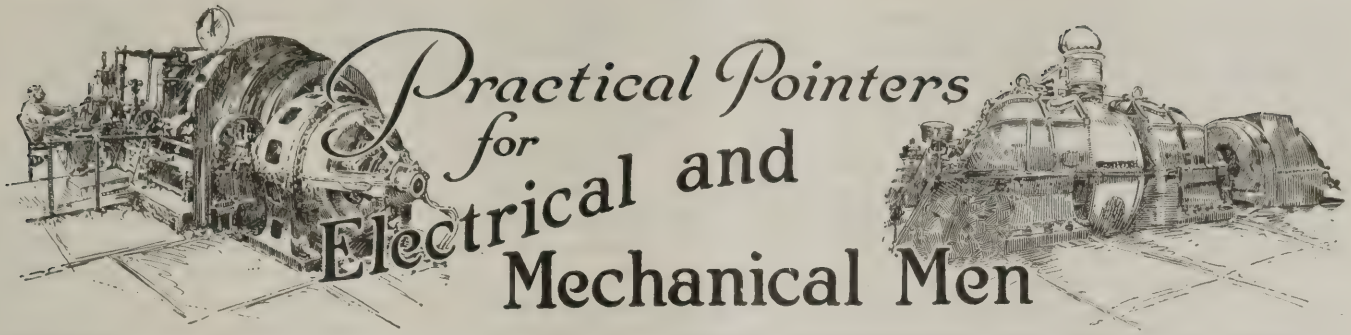
Slopes for manways and supplies usually are sunk on a 25-per-cent gradient. Slope linings of concrete depend upon the span of the roof for their design. Openings over 15 or 16 ft. wide are expensive to construct in localities where there is soft rock or an unusual depth of earth over the rock. Any slope is difficult to sink in soft earth and, as has been noted, is extravagantly expensive in running ground. In ordinary earth it costs about twice as much per lineal foot to sink as in solid rock because the earth is more difficult to remove than blasted rock, and timbering with sets closely spaced is required to prevent the roof and sides from caving.

In order to overcome the difficult construction of a wide slope in localities where there is excessive earth or soft rock, two companies in the Pittsburgh field have constructed double-deck slopes. Though expensive to build, one such slope is cheaper than two slopes having the same capacity or than one slope of the same area with the compartments side by side. Practically all concrete-lined slopes today have arched roofs from 12 to 18 in. thick. The thickness of the side walls should be 12 to 15 in. Arched slopes are naturally the strongest and do not as a rule require reinforcement. The additional area afforded by the arched roof always is to be desired for ventilation and headroom.

What Next?

Troutville, a mining town in Clearfield County, Pennsylvania, it is reported, is destined to become as famous for ice mining as it once was as a coal-producing center. With the discovery of a second "ice mine" reported in the state on a farm near the town, this form of mining is expected soon to assume the proportions of an industry. This natural refrigerating plant is in an abandoned coal pit on the farm of G. N. Rishell.

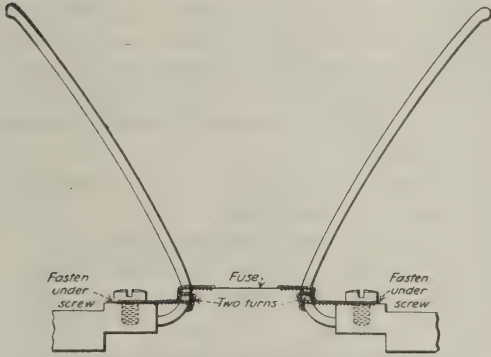
Cold air seeping in during the winter cools the rocks to a temperature far below the freezing point, but no ice forms because the air is too dry. In summer, however, the whole shaft becomes moist and when coal was being mined there recently miners had to remove two to three car loads of ice every morning before they could get at their work. This caused the shaft to be abandoned as a coal mine, thus opening the way for a brand new industry.



Protecting Attachment Screws When Severe Arc Goes Up the Horns

SOME time ago I noticed in one of your issues a suggestion for preventing the attachment screws from burning when the fuse of a horn-gap fused switch opened a circuit under heavy load.

I recently tried out this idea with success. On the switch that I tried this method of attaching the fuse, we had a heavy ground last month and the arc that went up the horns when the fuse blew was most severe.



DOUBLE FUSE EXCEPT AT MIDDLE
The fuse is caused to rupture in the middle by doubling the fuse wire where it goes around the horn and is attached to the screws.

On a horn-gap fused switch which I recently fused, I doubled the fuse wire except at that part between the two horns where the fuse should open. Doubling the fuse wire in this manner, I believe, will cause the wire positively to melt between the horns instead of back by the screws, which sometimes is the case, especially if the fuse wire becomes nicked in attaching to the fuse switch.

A READER IN KENTUCKY.

Considerations in Laying Out a Belt Drive

A BELT drive is used to carry a certain amount of power from one revolving pulley to another. Sometimes there is an additional purpose and that is to reverse the direction of rotation. However, the first problem that confronts the belt user is to determine the kind and size of belt to use in order to obtain the most desirable results.

The amount of power transmitted will depend on several factors, among which are the velocity at which the belt travels, the tension under which it is placed on the pulley and the arc of contact which the belt has with both pulleys.

Several different types of belts are obtainable, all of which have considerable merit under certain conditions. Some are more adaptable to certain conditions than others, and therefore considerable care should be exercised in making the proper choice. In order to

make an intelligent decision on any belting problem certain essential facts must be considered.

In many cases it is advisable to supply the manufacturers from whom belting is purchased with complete details and allow them to advise from their viewpoint of greater and more practical experience. For this purpose the following information should be given in order that a thoroughly accurate decision may be made:

(1) Horsepower to be transmitted: (a) average; (b) least; (c) most. (2) Diameter of driving pulley. (3) Diameter of driven pulley. (4) Number of revolutions per minute made by one of them; state which one. (5) Distance between pulley centers. (6) Whether drive is vertical or horizontal. (7) Whether the tight side runs on top or underneath. (8) Operating conditions such as dampness, fumes, flying grit, changes from light to heavy loads; high speed over small pulleys; running at $\frac{1}{4}$ twist; use of idlers, mule pulleys and stepped or flanged pulleys.

Certain types and sizes of belts have been proved thoroughly satisfactory and are known to be standard for many uses. Therefore it often is possible for men familiar with belting problems to state accurately what is the proper belt to use based on requirements of horsepower, uses, size of pulley and working conditions. Sometimes it is found that differences of opinion exist among manufacturers. In many cases this is due to the possibility of interchange of types. The best guide as to the type of belt to be used, however, will be founded upon a knowledge of good usage, cost per year and working conditions.

Lubricants for Electrical Equipment

HOT bearings are due to a large extent to poor lubrication or to an inferior grade of lubricant. The fundamentals of correct lubrication are the use of the right lubricant, applied in the right way, and in the right amount. The amount and application of lubricant depend largely upon the design of the bearing and the service conditions.

OIL.—Grade.—Oils are either animal, vegetable or mineral. For mining haulage equipment use a good grade of neutral mineral oil. It must be free from acid or alkali, either of which will corrode the bright surface of the metal.

Purity.—The oil should be free from dirt and water. Water will reduce the lubricating value of the oil, as it tends to wipe the oil from the bearing. Particles of dirt and grit will increase the friction and cause the bearings to heat up.

Fluidity.—The oil should flow readily and be taken up by the waste and held. If it is too thin, the waste and bearing will rapidly drain the oil, and the bearing will soon run dry. Therefore the oil must have enough body to cling to the waste and be fed to the bearings

as required. It should be heavy enough to furnish a supporting film between the journal and the bearing to sustain the load. For this reason a light or thin oil should be used in winter and a heavy or thick oil in summer.

The oil should not gum, as it will then clog up the lifting or wick action of the waste and tend to prevent the oil from entering between the journal and bearing surface.

Cost.—Quality of oil should never be sacrificed to first cost. Tests to determine the quality and lubricating properties of an oil require an extensive laboratory equipment; therefore one should always deal with reliable producers who have had years of experience and testing facilities which enable them to guarantee the uniformity and reliability of their product.

SPECIAL LUBRICANTS.—Specially prepared lubricants which are not entirely oils are used by some companies with very good results, and are highly recommended.

GREASE.—*Uses.*—Grease is used in connection with the lubrication of some of the old type haulage motor bearings and on all main motor gears and pinions. The same grade of grease selected for motor bearings can be used for the gears and pinions, but some special grades and compounds prepared for gears and pinions are not suitable for motor bearings, on account of their high melting point.

Grades.—Grease consists of a fatty soap impregnated with a mineral oil. The solid part simply acts as a carrier for holding the oil in position, and has little value as a lubricant. Greases usually are graded according to their stiffness, which has an important bearing upon the ease with which they can be handled and the service they will give. They are mostly graded from the softest to the hardest with numbers indicating their relative melting point. Thus a No. 1 grease usually is softer than a No. 2 grease, etc. A limesoap grease with a neutral reaction (which does not show any traces of an acid or an alkali) gives best results in service.

Purity.—The grease should be free from dirt and grit and the percentage of water should be very low, as all of these would reduce the lubricating value and increase the heating of the bearing.

Melting Point.—To insure its being retained in the bearing, the grease should have a melting point of 10 to 15 deg. C. above the normal operating temperature. If it is too hard it will not flow readily and will increase bearing losses. On the other hand if the melting point is too low it will not be retained in the bearing.

Cost.—The same consideration referred to in connection with oil also applies to grease. In general, do not be misled by a highly colored or scented product with a fancy name and a correspondingly high price.

WASTE.—*Grades.*—Waste or packing is commonly made up of wool threads alone, or wool and cotton threads mixed with a resilient mineral or fiber, such as asbestos, cocoa fiber, moss, etc.

Dirt and Moisture.—Dirty particles are likely to be carried by the oil up to the bearing and work into the oil film. All waste contains some moisture, but if too much is present, you pay for water instead of waste.

Elasticity.—Unless the waste is springy and elastic it will fall away from the bearing window and thus cut off the supply of oil being fed to the journal. To obtain this quality it must be of the right grade of material,

such as long wool threads or a mixture of wool threads, cotton threads and a fibrous material. By proper machining, the material is intimately mixed and formed into a fleece with the threads all running in one direction.

Quality.—Wool waste is commonly considered the best material as it is springy and elastic after being soaked in oil and readily parts with the oil to the journal. However, its absorbent property and wick action are not quite as good as that of cotton threads. Cotton threads are not springy, but absorb more oil than wool and have a better wick action. Some manufacturers consider that a mixture of wool and cotton threads gives best results in service. A good packing should have the power of holding the correct quantity of oil evenly distributed through the threads of the waste, which also should be able to carry the oil by wick action against the force of gravity, if necessary to the threads in contact with the journal.

Long fibers are preferable as they carry the oil from the oil well to the bearing windows more satisfactorily than short strands, thus insuring a steady supply of oil. This is made possible by the wick action of the material when in a long continuous thread.

Special preparations to make the waste springy and elastic are made up and used with fairly good results. They consist of various grades of wool and cotton thread mixed with horse hair or asbestos. Another brand is made by binding the waste in small bundles using a thin brass wire.

Good rules to follow in the selection of lubricants may be briefly summarized as follows:

- (1) Trade with reliable and experienced dealers.
- (2) In considering first cost, do not lose sight of final results. A few hot bearings may wipe out all first-cost savings.
- (3) Lubricants that have given good results in service need no further recommendation.
- (4) Neglect frequently is responsible for troubles charged up against oil, grease and waste.
- (5) Proper facilities for handling and storage should be provided.

Many large companies find it to their advantage to make a contract with some reputable oil company for all lubricants used during the contract period. In this event the proper lubricant for each piece of machinery can easily be determined and used for long periods without continual experimentation, with resultant inconveniences and expense.

Prefers Sandpaper to Emery Cloth For Cleaning Commutators

WITH reference to the article on "How Best to Undercut Commutators of D.C. Armatures," which appeared in the Aug. 23 issue of *Coal Age*, I wish to suggest that the statement, "After slotting is completed the face of the commutator should be thoroughly polished and cleaned of all particles of copper by means of emery cloth" be changed to "by means of sandpaper."

My experience has been that sandpaper is the better for this purpose. I have had pump runners, machine runners and motormen use both emery cloth and sandpaper but by discontinuing the emery cloth and using sandpaper entirely, much of the luminous or fiery commutation of the machines was eliminated.

Linton, Ind.

JOHN R. LUXTON.



Problems of Operating Men

Edited by
James T. Beard



Working Three Seams of Coal with Slate and Shale Partings

Use Longwall Method—Drive Roads in Middle Seam—Lift Floor and Bottom Coal Advancing—Drop Roof Shale and Work Upper Seam Retreating

IN RESPONSE to the request for criticism and suggestions regarding the proposed method of working three seams of coal separated by slate and shale partings, offered by a correspondent in *Coal Age*, Aug. 9, p. 219, I gladly submit the following outline, as the result of my experience when working under similar conditions.

The correspondent does not state whether the seams are flat or pitching, but I will assume the former condition. In the first place, allow me to suggest that the three seams described cannot, in my opinion, be worked successfully by the room-and-pillar method as proposed. Also, I believe the seams are too thin to consider driving rooms from 60 to 90 ft. in width.

HARD COAL MORE EASILY WORKED LONGWALL

Again, as indicated in the accompanying figure, the two upper seams are described as being "hard splint coal," which would be difficult to shoot and should be more readily mined in the longwall method of working. Whatever method is adopted, however, it will be necessary to brush all roads for headroom, and the longwall method affords ample storage space for the resulting waste material, which is not the case in the room-and-pillar method of working.

The correspondent proposes drawing back the pillars between the rooms by splitting each pillar with a 20-ft. room. In doing so, the roads would have to be brushed as before, making a large amount of extra work, to say nothing of the disadvantage growing out of shooting the hard coal. It cannot be denied that the longwall method of mining not only produces a larger percentage of big coal and a greater output per man per day, but the proposition of ventilating the working face is much easier than in room-and-pillar work.

Briefly, I would open the mine, as our friend has suggested, in the middle seam. I would employ the longwall advancing method, driving the main and branch levels in the middle seam, at the same time lifting the bottom parting and the twelve inches of coal in the seam below, for a width of 12 ft., which

would give ample room for any kind of haulage desired. The waste material should be built on each side of the road.

The branch levels should be driven to the right and left of the main level, at distances of 250 ft. apart. These branch levels will cut off the longwall faces as they are advanced and so concentrate haulage and save traffic. It may be better to drive the branch levels but 10 ft. wide, brushing them in the same manner as the main levels. This will be best determined by the space found to be required for building the waste along each side of the road.

UPPER COAL TAKEN OUT RETREATING

All working places should be driven 8 ft. wide, on 40-ft. centers, which will generally provide material enough for building the necessary packwalls. The working places are driven parallel to the main level and, as each place is cut off by the 250-ft. branch level, the work of taking down the roof shale and extracting the upper coal can be started back on the retreating plan.

It may chance that too much gas will be given off to make this plan practicable. In that case, the work of extracting the upper coal must be started, back at the mouth of the place, and conducted on the advancing plan, shooting down the rock and leveling it off sufficiently to lay track on which to load out the top coal. Part of this rock can be used to build packwalls for the support of the roof overlying the top seam.

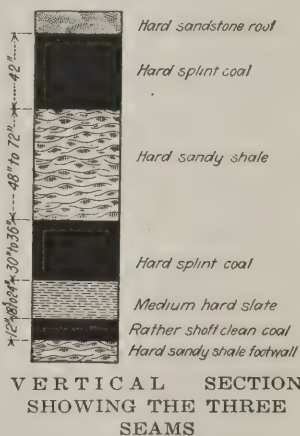
It seems to me that the longwall method is the only method to adopt in working these three seams. Driving the gateroads 8 ft. wide, on 40-ft. centers, leaves but 16 ft. on each side of the road as the distance through which the coal must be handled at the face.

ANOTHER PLAN OF WORKING THE TOP COAL

It is possible that the top coal can be worked out on the longwall retreating plan, by brushing a hole 6 ft. square in the middle parting, every 30 ft., and throwing the coal down through these holes into cars standing on the roadway below. If it is found that this can be done there will be a considerable saving effected in the cost of brushing and handling the waste material.

Another plan would be to start back at the same point as in the first working and shoot down the four to six feet of roof shale, and level it off so as to lay the track on this debris. This will enable the working out of the upper seam on the longwall retreating plan, as the seam has a good roof.

My belief is that it will generally prove more practicable to mine the upper seam through holes driven up in the roof of the middle seam, as just mentioned; or else to adopt the advancing plan of dropping the shale parting and carrying the track on top of that waste, while loading out the upper coal. I believe that the



VERTICAL SECTION
SHOWING THE THREE
SEAMS

output, per man per day, would be greater and a larger percentage of round coal produced than by any other plan.

JAMES GRAY.

Newcastle, Wash.

REFERRING to the question of working three seams of coal with slate and shale partings, contained in the inquiry that appeared in *Coal Age*, Aug. 9, p. 219, and the request for any criticism of the proposed plan and suggestions as to the best method of working to obtain a high percentage of production, per man per day, and to get out the coal in as large size as possible, let me say there are several objections to the proposed method.

First, in driving the rooms 90 ft. wide and laying three tracks in each room, there will be a large proportion of the waste rock that must be taken outside of the mine as the rooms cannot gob themselves in this arrangement. Second, where there is so large a quantity of waste to handle there will be much difficulty in keeping the coal clean. It will require close supervision of the miners and the enforcement of strict regulations in regard to the loading of dirty coal.

However, assuming that it is possible to overcome these two objections, there is yet imminent danger of squeeze resulting from driving 90-ft. rooms with 50-ft. pillars between them. A little reflection will show that such a plan is not practicable in this case. For example, the total span of roof resting on a pillar 50 ft. wide, flanked with 90-ft. rooms, is 230 ft., from rib to rib. Then when this pillar is split by a 20-ft. room the two 15-ft. ribs of coal remaining will be crushed and lost beyond recovery.

DIFFICULTY MET IN LOADING CLEAN COAL

In my experience I have seen coal mined under similar conditions in respect to the large proportion of waste material that had to be handled. As far as the work in the rooms was concerned, much time and patience was consumed in keeping the coal clean and loading it in a condition fit for the market. In pillar-work, however, to load clean coal was a practical impossibility, although the partings of slate were not more than 2 ft. thick in that case.

My conclusion is that the three seams mentioned cannot be worked in a single face. I would say, forget the lower and middle seams and go after the upper one, adopting a method of working that promises the best results. To my mind the longwall method is preferably the one that should be chosen in this case. It must be a gateway system, however, as the roof is too strong here to make a conveyor system successful.

Even a room-and-pillar system might be successfully employed in working out the coal in this upper seam. But, under no consideration, should 90-ft. rooms be driven. The width of the rooms should not exceed 30 ft. and a road should be laid along each rib, making the distance for handling the coal at the face less than 15 ft. The pillars between the rooms should have an equal width of at least 30 ft. and as much more as conditions may require.

Care must be taken to extract all the coal and no stump must be left in as that would cause trouble in working the two lower seams. The plan that I have suggested may seem strange to many, but it is my opinion that it would prove the surest method of securing the best results, in the working of these three seams, and I recommend its careful consideration.

In a mine where I worked, in Durham County, England, the coal was 12 ft. thick. Owing to the bottom 4 ft. of the seam containing many impurities, the company mined only the upper 8 ft. of the coal. Later, a new company came into possession of the mine and took out the remaining 4 ft. of bottom coal, finding that it could be made saleable.

My conclusion is that, in the present case, after working out the coal in the upper seam, there would not be any difficulty in working the two lower seams. It is my belief that a lot of trouble and expense will be saved by avoiding the experiment of trying to work the three seams in one operation. THOMAS HOGARTH.

Indiana, Pa.

Mine Safety Bulletins

Getting the miner interested in his own safety—Follows line of least resistance—"Rules made to be broken," the logic of some miners—Insistence on obedience to rules important.

IHAVE BEEN reading the excellent letter of F. C. Cornet, *Coal Age*, Aug. 9, p. 218, in which he strongly urges the need of both operators and miners obeying the spirit of the law and not the letter only. He calls attention to the fact that operators often deceive themselves into thinking that they have performed their duty to the men they employ when they have placed a few safety bulletins and danger signs to warn the unwary miner of his danger.

It is a characteristic of a large class of miners that they are not deeply interested in anything in particular. It may be that this is, in a measure, the result of their daily occupation in the bowels of the earth. However, for that reason, we cannot expect the average miner to become enthusiastic about many things that should appeal to his common sense.

To expect a miner to read elaborate rules and circulars, explaining safer practices in the mine, more sanitary and healthful modes of living and other like things for his betterment, is more than one familiar with his habits will expect.

Some one has remarked that "the average miner is not interested in anything but four o'clock and payday." While that is not far from the truth, it cannot be said to apply solely to miners. The majority of workers regardless of their occupation have much the same characteristics, in reference to the hours they work and the compensation they receive.

Bearing these facts in mind when we make certain rules, the first thing to be done is to start a campaign of getting the men interested in their own safety. It is useless to draft a set of rules and hand a copy of them to each workman, expecting that they will read them carefully and everything will go along well from that time, as though the system was to be automatic. We shall soon learn that the rules might as well never have been published.

Naturally, men follow the lines of least resistance; and the success of any system we would inaugurate must make that line lie in the direction of safety. Too often, the idea prevails among workers that "rules are made to be broken." Of course, they mean it as a joke; but the joke generally becomes a reality and we learn too late that we have taken the wrong road to insure the success of our efforts.

A sign or a bulletin well worded and easily readable is the best foundation for starting a good mining cam-

paigned of safety. For example, take a bulletin that reads somewhat as follows:

“Never forget that the safety of an employee is more important than the work itself.”

Such a bulletin can be read at a glance. Even the fellow who cannot read it will not fail to get the sense of it from those who have read it and comment on it freely. But, example goes further than precept and when it appears that the mine officials live up to the spirit of these signs and bulletins, posted in all conspicuous places and freely handed around among the men, results will follow.

Nothing is more important than insistence on strict compliance with rules and regulations on the part of mine officials and workmen alike. In my opinion, the suggestion that too strong insistence of this kind will cause men to quit and find work elsewhere is not true. Why men leave one mine and seek work in another is owing to the lack of good working conditions and not because a boss insists on safe mining practices.

Pikeville, Ky.

GEORGE EDWARDS.

Good Light Needed in Firebossing

Close study of lamps and lighting conditions in gaseous mines—Time lost working with dim light—Firebosses' service neglected.

IT IS seldom that I have been more impressed than when reading the two letters that appeared in *Coal Age* Aug. 9, the one entitled, “Approving Use of Miner’s Electric Cap Lamp by Firebosses,” p. 217; and the other, “Give the Fireboss the Best Possible Light,” p. 218. The writers of these two letters are to be congratulated on their statement of facts as they have found them.

For several years I traveled through both the anthracite and the bituminous regions, visiting the mines and working in the lamphouses. During that time I often made the rounds with firebosses, mine foremen and inspectors. My purpose in doing so was to make a close study of safety lamps and their use, in daily mining practice, in gaseous mines.

I wanted to obtain first-hand information regarding conditions of lighting, in the performance of work in the mine, in order to determine more exactly the requirements of lamps adapted to the work. What I learned in this manner has been of great advantage to me since and I can fully appreciate what a good light means to men working in a coal mine.

When going about with the men, as I have stated, all of whom were making their examination of the mines in the old way, by the dim light of a safety lamp, it appeared to me that much time was lost and the life of the examiner often menaced by losing his light and having to retreat in the darkness to a place where it would be safe to relight his lamp.

Let me say that one of the most valuable services rendered by a fireboss, a mine foreman or an inspector, in making an examination of a mine, is being neglected by the management in failing to provide him with the best possible light, in addition to his safety lamp or other means of detecting the presence of gas. Attention has been drawn to the fact, which we all recognize, that gas is not the only danger that it is the duty of the examiner to seek to find, and these other dangers require a good light that will reveal their presence.

_____, Pa.

READER.

Inquiries
Of General Interest

Use of Steel Mine Track Ties in
Heavy Motor Haulage

Proposed Long Haul with 10- or 12-Ton Locomotives — Steel Track Ties Not Recommended for Heavy Traffic — Conditions Must Determine

WE ARE about to lay 3,000 ft. of track, in the extension of our main locomotive haulage road. This track will be laid on an easy grade, where the bottom is hard and always level across the track. That is to say, there is no sidehill, giving an inclination that would have a tendency to spread the rails. One 10-ton and one 12-ton electric motor will be used to haul the empty cars from the shaft bottom to the inside parting and bring the loaded cars back to the shaft. The entire distance is nearly two miles for the round trip. Each locomotive will haul trips ranging from thirty to forty cars.

Before proceeding with this work, we are anxious to learn of any coal mine using iron or steel track ties, on a main haulage road where the locomotives weigh as much as ten or twelve tons. Assuming the ties are properly spaced and the rails heavy enough to carry the weight without bending or being thrown out of alignment, we desire to ask if steel track ties will stand up under this service and give satisfaction.

Wooden track ties are becoming more and more scarce each year, and their required size lessens the headroom or height above the rails by several inches. On this account, it is often necessary to shoot down the rock in many places on the haulage road. Further light on the subject by *Coal Age* will be appreciated.

Punxsutawney, Pa.

R. W. WALKER.

This inquiry being submitted to A. F. Brosky, the Pittsburgh editor of *Coal Age*, brought the following response: “It is my belief that steel mine-track ties should never be used where 10- or 12-ton locomotives are employed on the main haulage road. During the last two years, I visited but one mine where steel track ties were used on butt entries. Such ties may work well where but a small tonnage is hauled, at a comparatively low speed, and the bottom is hard and not liable to heave. Also, the coal must lie practically level to obtain the best results in the use of iron and steel ties. While there are varying conditions that would cause exceptions to the rule, I think I am safe in saying that the use of steel track ties should be restricted to traffic where the weights of the locomotives do not much exceed six tons.”

In addition to the question of rigidity, in steel ties for mine tracks, there must also be considered the question of the effect of corrosive or acid mine waters on the ties. The action of such waters on the metal may often greatly impair the efficiency of the tie and shorten its life. We agree with the suggestion that steel ties should not be used where the track is laid on a soft bottom, or there is the slightest tendency of the floor to heave.

Consideration must also be given to the fact that, in the use of steel ties, there is not the same opportunity afforded for the ballast to hold the track in place, as

where wooden ties are imbedded in the ballast, which holds them firmly and prevents shifting. This is an important factor where the track makes a sharp bend in rounding a curve and, in any case, where trips are hauled at a comparatively high speed.

In locomotive haulage, particularly where the traffic is heavy, the absolute rigidity of the track, which is assured by a solid roadbed, is of the first importance. The necessity of brushing the roof to secure the necessary headroom where wooden ties are used is a matter of secondary importance in the economic operation of the mine. We shall be glad to hear of the experience of others and learn their opinions in respect to the limitations in the use of iron or steel track ties, under heavy traffic.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 8-14, Incl., 1923

(Selected Questions)

QUESTION—*With a fan developing 30 hp. at the fan and a water gage of 2.3 in., when but 50 per cent of useful effect is obtained, what quantity of air would be available?*

ANSWER—The useful effect being 50 per cent, the horsepower on the air is one-half that delivered to the fan. Therefore, the work performed on the air is $0.50 \times 30 \times 33,000 = 495,000$ ft.-lb. per min. The pressure corresponding to a water gage of 2.3 in., is $2.3 \times 5.2 = 11.96$ lb. per sq.ft. Finally, dividing the work performed on the air, expressed in foot-pounds per minute, by this unit pressure gives for the quantity of air in circulation, in this case, $495,000 \div 11.96 = 41,388$ cu.ft. per min.

QUESTION—(a) *What are permissible explosives? (b) What conditions make their use necessary in a mine? (c) What charge limit has been established by the U. S. Bureau of Mines for such explosives?*

ANSWER—(a) The term "permissible explosives" relates to any explosive that has passed the test and received the approval of the Bureau of Mines and is used according to the instructions and subject to the limitations placed on its use by the Bureau. Used under any other conditions, a so-called permissible explosive is no longer one in fact.

(b) Owing to all permissible explosives being practically flameless and possessing a greater degree of safety in the presence of gas or dust than black blasting powder, the use of a permissible explosive, instead of black powder, is essential in all mines generating gas or dust in quantities that render accidents in blasting possible through the ignition of the dust or gas by the flame of the shot.

(c) The Bureau of Mines, in its Miners' Circular No. 2, p. 6, has prescribed a charge limit of $1\frac{1}{2}$ lb. for all permissible powders used in blasting in a mine.

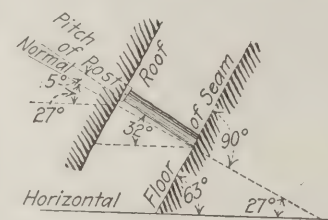
QUESTION—*What are the efficient limits to which the ventilation of a mine may be split?*

ANSWER—Dividing the air current into two or more

separate splits reduces the velocity of the current in the same proportion. The limit of splitting is attained when the velocity of the passing air, at the working face or in any portion of the mine, is not sufficient to sweep away the gases lodged at the roof, in cavities or other void places and keep them clear from such accumulations. Also, the quantity of air in any single split must be sufficient to supply each man working on that current with the quantity of air required by the state mining law and as much more as may be necessary to make the place healthful and safe for work.

QUESTION—*The center props in a slope of 63 deg. pitch are set 5 deg. up the pitch. What is the pitch of the prop?*

ANSWER—In the accompanying figure is shown a portion of a slope having a pitch of 63 deg. with the horizontal. As indicated in the figure, a normal line in the seam or a line perpendicular to the roof and floor makes an angle of $90^\circ - 63^\circ = 27^\circ$ with the horizontal. But, since the post is set 5 deg. up the pitch from the normal, the pitch of the post or the angle it makes with the horizontal is $27^\circ + 5^\circ = 32^\circ$.



QUESTION—*A shaft 500 ft. in depth is to be enlarged; how would you proceed to do the work having special regard for the safety of the workmen?*

ANSWER—The answer to this question must depend on the style of the enlargement intended. The shaft may be a two-compartment shaft and it is desired to make a third compartment or manway, by excavating the material on one side of the shaft, which can be done with perfect safety without interrupting the hoisting of coal or interfering with the operation of the mine. Likewise, a single-compartment shaft may have to be enlarged so as to afford room for two compartments or more.

On the other hand, the question may call for increasing both dimensions of the shaft, making it wider and longer to accommodate larger cages and make possible an increased output of coal. In that case, the work can be done more speedily and effectively by closing down the mine for a month or two in the dull season. To attempt to cut the face of the shaft down while hoisting operations are in progress would be hazardous in the extreme.

Assuming the mine is closed down, the work of enlargement should be started at the surface by installing a templet of heavy timbers that will form the foundation of the new headframe to be erected later when the work is completed. The cage should then be lowered to a point 10 ft. below the surface and holes for cross-buntons cut in the curbing on the two faces of the shaft. Two heavy timbers should be inserted here as cross-buntons, at this point, keeping the cage always below them, using one cage only in this work. On these cross-buntons a platform of heavy 4-in. planks should be laid, for the support of the workmen while enlarging the shaft to the required dimensions. As the old curb timbers are taken out a few at a time, new timbers must be set in place and firmly wedged, supporting them temporarily by struts or posts resting on the solid formation below. In this manner, the work should proceed, in sections of 10 ft., throughout the entire depth of the shaft.

Force of Public Opinion Only Remedy for Coal Strikes

Fixed Code to Avert Tie-Ups Urged by Coal Commission in Report on Civil Liberties—Says Congress Should Take Jurisdiction When Miners or Operators Ignore Law—Indorses Open Shop

In a report to Congress on civil liberties in the coal industry made public Sept. 9 the U. S. Coal Commission enumerated the causes which induce strikes and interrupt interstate commerce, and made recommendations that might help to prevent strikes which threaten cessation of production by the miners. The commission refused to endorse the principle of the closed shop, contending that it was the right of the producers to operate their properties as they pleased, if the laws of the nation were observed. It was the right of the miners, also, the commission held, to organize for collective bargaining, but they, too, must respect the law.

The report follows in full:

TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES:

In an attempt to answer the inquiry of the Congress with reference to the "causes which from time to time induce strikes, thereby depriving interstate carriers of their fuel supply and otherwise interrupting the flow of commerce," the Commission finds that a very large part of the friction which from time to time has stopped the machinery of production and frequently resulted in violence and bloodshed has arisen from:

- (1) Disputes as to what are popularly known as the civil rights of American citizens.
- (2) Practical breach of these rights in the operation of the industry, even when they are theoretically acknowledged.
- (3) The inappropriate application to present conditions of principles enunciated under totally different economic conditions.
- (4) Attitudes of public opinion produced by ancient grievances.
- (5) Lax administration of the law induced through fear, favor, affection, malice, hatred, or ill-will.
- (6) Unwise even though lawful interference of strangers in local conditions.
- (7) The effect of universal suffrage upon law administration.

The Right to Run an Open Shop.—There is no intellectual dispute touching the academic proposition of the right of a man to run an open shop, nor of the right of men to organize for the purposes of collective bargaining. The non-union mine operator freely admits the right to form a union. He will not, however, employ union men to work beside non-union men in his mines, assigning as a reason therefor that they are trouble breeders. In other words, when reduced to the actualities of the industry the open shop of the non-union operator is the open mine for non-union labor but closed to union labor. On the other side of the controversy officials of the United Mine Workers of America, in theory, or in the absence of a contract made, admit the principle of the open shop and the legal right of the individual to work therein, but they refuse to work with non-union men, assigning as a reason therefor that no man has any right to obtain benefits which accrue to him through the activities of the United Mine Workers of America and not become a member thereof, pay his dues, and bear his share of the expenses. Thus, the mine workers have also their open shop, but it is open actually only to members of the union.

Those who choose to do so may examine the statement of facts, the affidavits or other documents, and the arguments presented to the Commission upon these subjects. The Commission does not deem it either necessary or advisable to insert these documents in this report, nor to attempt to fix ultimate responsibility. Many, if not all, on both sides are at fault and all have some excuse arising from the weaknesses and passions of human nature. It is sufficient to say that a certain type of mind could reach the conclusion from public statements made, both by the United Mine Workers and union operators, that it was the purpose

of this organization to unionize all the mines of America, peaceably if it could, forcibly if it must. Another type of mind could satisfy itself that the operators of non-union mines propose to keep their mines from being unionized—peaceably if they can and forcibly if they must. Neither of these conclusions would add anything to the sum of human knowledge with reference to actual conditions and attitudes of mind in the mining industry.

The Commission does not find, notwithstanding many unfortunate occurrences, unlawful acts, and unwise statements that it is or has been the ultimate object of the officials of the United Mine Workers of America to unionize all the mines by force if necessary. Upon the other hand, it does not find, regardless of unfortunate statements and unlawful conduct, that it is the fixed purpose of non-union operators to destroy the United Mine Workers of America. The Commission chooses rather to give those who are from the moral standpoint, whatever it may be from the legal standpoint, charged with violation of the law the benefit of the doubt as to criminal intent. The Commission does not believe that the running down of the different unlawful occurrences in the mining industry of this country to the original breach of the law, if it could be found, fixing the responsibility therefor, and then strengthening the case by all subsequent acts of violence and intimidation of like character as set forth in the brief of counsel, would afford any justification, whatever, save as such justification may be found in the common and ordinary passions of mankind, for the other side to have met force by force, to have fought fire with fire.

Relates Some History of Herrin.—The Commission reports certain facts which it believes will give to the Congress and the people a clear understanding of the real situation:

Herrin, Ill., is situated in Williamson County. That county is an American community. Of the 61,092 population given by the last census, 54,052 are white native born and 1,825 are negroes; the foreign born are principally Italians, Russians, Lithuanians and Southern Slavs. Of the native whites, 1,265, or 3.2 per cent, are illiterate, while of the foreign born 30 per cent are illiterate. The native born are the descendants of two streams of immigrants, one from the North composed largely of Pennsylvania Germans, and the other, and predominating element, being from the mountains of Kentucky and Tennessee with some contributions from Alabama and the Carolinas. The community has distinctly a Southern flavor in both dialect and personality.

The soil of the county is largely of a light red clay. Before the beginning of the era of coal mining the inhabitants eked out a precarious existence by agriculture. Then one of the richest coal regions in the world was discovered. Almost the entire country was underlaid with three veins of superior bituminous coal. The population gradually changed in reliance for a livelihood from agriculture to the coal-mining industry, which supports three cities of 10,000 population each and several smaller ones. It has splendid residences, fine business blocks, good schools, churches and lodges. It has more automobiles than any county in the state save Cook. It has a certain lawless element and many feuds. The blood of the people is such that they fight for their convictions. It has more homicides than any other county in the state except Cook. It is intensely patriotic and had a fine record during the World War. Its people are intelligent, soft-spoken, extremely religious, not given to profanity, and would resent any suggestion that they were not good, patriotic, American citizens. How can one account for the execration of such a county as this at the hands of the American people? It is not difficult to find the reason when the facts are known.

When mining began in that county it was upon a ruinously competitive basis. Profit was the sole object; the life

and health of the employees was of no moment. Men worked in water half way up to their knees, in gas-filled rooms, in unventilated mines where the air was so foul that no man could work long without seriously impairing his health. There was no workmen's compensation law; accidents were frequent and there was no common ground upon which employer and employees could meet. They had no interests in common, and they regarded each other with hostility and distrust. The average daily wage of the miner was from \$1.25 to \$2.

Then came the union in 1898 and 1899. Peace and goodwill and mutual respect have been the general rule since that time. The Workmen's Compensation Law was enacted. Earnings advanced to \$7, and even to \$15 a day; improvement in the working conditions was reflected in the appearance of the workman, their families, their manner of life and their growing cities and public improvements. There are 13,000 miners in the county, 62 per cent of whom own their own homes, and most of them own automobiles. All occupations are unionized. They believe in the union, for they think it brought them out of the land of bondage into the promised land when their government had been careless or indifferent to their needs. They hold themselves to be good Americans and proved it during the Great War, but what they have of daily comfort they think comes from the union and not from the government.

The county was 100 per cent unionized when the promoter of the Southern Illinois Coal Co., started in as a "wild-catter" to operate a strip mine, investing in it some \$250,000 or more. In April, 1922, he secured the consent of the union to work at uncovering the coal during the strike with the promise that there would be no production of coal. The union men were discharged June 13. Then workmen from the labor agency in Chicago began to appear and armed guards from the Hargraves Detective Agency were placed about the mine to protect it. These facts indicate that he intended to work the mine and feared trouble.

A call from Chicago was made on the Adjutant General on June 17 for troops although there had been no attack on the mine at that time. Workmen arriving from Chicago had been intimidated and some turned back. It is not needful to report the acrimonious controversy between Colonel Hunter and the Adjutant General of Illinois with reference to the responsibility for failure to secure the presence of the State militia. The highway ran by the Lester mine and persons traveling it were stopped by armed guards. Stories were circulated that they assaulted travelers on the highway, held up and robbed people, insulted women, and that they were guilty of general terrorism. Some were pure fabrications, other grossly exaggerated, while others were true. The report went out that the sheriff had been killed in an attempt to interfere with the unlawful activities of the guards. Pickets loitered about the mine, and assumed a provocative attitude. The mine owner appealed to the sheriff through his superintendent. The sheriff visited the mine, but made no effort to prevent the trouble. He was a union miner until elected sheriff, and was at that time candidate for County Treasurer, and later was elected by an overwhelming majority.

The State's Attorney, operators, union officers, and citizens appealed to the owner and his superintendent to cease operations, and warned them that bloodshed was certain. They replied that they had been in such situations before and knew how to take care of themselves. On Wednesday morning, June 21, a party of workmen for the mine was detained at Carbondale and started overland in a truck for the mine, piloted by an automobile. They were ambushed and four men were wounded, one mortally. The same unlawful mob raided hardware stores at Herrin and Marion and took all guns, revolvers and ammunition, telling the proprietors to charge them to the locals. Wednesday afternoon a large force of armed men surrounded the mines and three union men were killed. One of them, George Henderson, known as "Geordy," was a popular favorite, and the story was circulated that he was killed while attempting to reach the mine for a peace parley. In the evening an airplane reconnoitered the fortress, and Robert Officer, an office man at the mine and one of the survivors, claimed that the

airplane dropped bombs on the mine, but as the attacking force was using dynamite he could easily have been mistaken.

Flag of Truce Fired On.—Conference after conference took place in the hope of adjusting the situation. Shortly after daybreak Thursday morning firing began again. The survivors of the mine claimed their white flag was fired on and ignored. The besiegers claim the besieged fired from under the white flag. The fight did not last long, and there was a parley. It was agreed that the besieged should march out unarmed and have safe conduct out of the county. It is reasonably certain that those who made the promise made it in good faith; but in the meantime recruits were arriving by the hundreds, not only from Williamson County but from adjacent counties.

The crowd became rampant. It was reported that troops were on the way. This, added to previous stories, made the crowd wild for revenge. The fact that most of the stories were untrue made no difference; they believed them and acted accordingly. Three-fourths of a mile from the mine, McDowell, the superintendent, was taken from the line of prisoners and killed. Then someone suggested that they "kill them all and stop the breed." The suggestion was acted upon and the men were taken from the road into the wood, lined up before a barbed wire fence, and told to run. As they ran, while climbing the barbed wire fence, the mob fired.

There were between 40 and 60 prisoners; 16 were killed at or near the barbed wire fence; some escaped and were never captured. Hunting parties pursued those who escaped. Six men, four of whom were wounded, were rounded up by a portion of the mob and taken into the city of Herrin. They were tied together by their necks, marched to the cemetery, and butchered. After they were shot down, two or three of them who cried for water had their throats cut. Strange to relate, one of them survived and was able to tell afterward how one of the mob expressed impatience at his tenacious hold on life, and kneeling with one knee on his chest, he took the helpless man by the ear, and twisted his head around so that he had easy access to his throat, which he then slit with a pocket knife. Nobody will ever know how many were killed; the best estimate is twenty-five. After the surrender of the men, the steam shovels and all other equipment were dynamited and burned.

Neither the sheriff nor any of his deputies interfered or even visited the scene. The police officers of Herrin ignored the march through one of the paved streets of the city of the six prisoners and their execution at the cemetery, although all the rest of the population knew about it and many followed and witnessed the tragedy.

Questions Communism Charge.—It has been suggested that this was a communistic movement. It is true that communists have made efforts to establish organizations in that county and that a few foreigners were induced to join; but there is no evidence that this had any relation to this lamentable and horrible occurrence. The voters are intensely partisan and divide along normal party lines with a negligible Socialist vote.

These homicides took place in the presence of innumerable witnesses. It cannot be true that the persons or many of them who engaged in the mob are not known to numbers of the citizens of that county. If those indicted, tried and acquitted were not guilty, there must be many people in Williamson County who know who the guilty ones are. Yet there has been no conviction for this breach of the criminal law nor is there the remotest possibility there ever will be one.

Coroner's Jury Voices Local Viewpoint.—The local point of view is well stated in the verdict of the Coroner's jury: "We, the jury, find from the evidence that the deaths of decedents were due to the acts, direct and indirect, of the officials of the Southern Illinois Coal Co. We recommend that an investigation be conducted for the purpose of fixing the blame personally on individuals responsible."

There is no doubt that when the promoter of the Southern Illinois Coal Co. started to operate his mine in defiance of

the union, he was inviting mob violence and flirting with death; he knew it and prepared to meet it. The resentment was spontaneous and instantaneous. He challenged the supremacy of the union. Those in the mob undoubtedly believed that it was an attempt to return to old conditions before the mines had been unionized. There were, of course, fatal omissions of duty on the part of public officials, and neither the officials nor the public wanted troops to protect the operator in his union-destroying operations. It might have been stopped by the sheriff, by the officers of the miners' union, by public sentiment, but all were for the union and all believed that an attempt was being made to destroy it.

Although the Commission finds that the tragedy might have been prevented, it also finds that the union officials and the public officials never anticipated that it would happen. They all believed that the non-union miners would be kicked out of the county and that this would end it. Then came into the equation an unknown quantity. Nobody can tell how much this had to do with the failure to punish the members of the mob. It was the storm of protest that swept through the public press of this country. It was the condemnation of the union, the union officials, and the public officers. It presented the common aspect of a stranger interfering in a family row. The Commission, of course, cannot say what might have been the result if public opinion had waited until the courts had either attempted or refused to discharge their duty. But the whole economic life of the county puts it beyond peradventure that when an indiscriminate assault on the union and the people of the county was made it rendered the punishment of anybody impossible in that county.

Finds No Justification for Union Audacity.—This statement, unfortunately, cannot end here. Clothed with all the charitable excuses above set out, these furnish no justification for the brazen audacity with which subordinate officials and members of the United Mine Workers of America defended the crime and the criminals. That they were espousing the cause and defending the lawbreakers is further shown to the Commission by the fact that they have since bought the mine where the tragedy occurred, and have paid therefor \$729,000.

Bearing in mind the changed and bettered conditions which came to this country through the unionization of its mines, with its resultant attitude of mind toward non-union labor, the Commission calls attention to the fact that the bituminous mines north of the Ohio had also become largely unionized. These mines came into competition with certain non-union mines in parts of Pennsylvania, West Virginia and Kentucky. It was felt by union operators that the non-union mines either undersold them in the market or made a greater profit than their own and that this was due to cheaper labor. How far these operators desired the United Mine Workers to go in unionizing mines would be mere conjecture, but there is no doubt of their desire to equalize conditions by bringing the non-union mines under union control. That vast sums of money have been spent in this effort; that rioting and bloodshed and destruction of property have taken place, is beyond doubt. For years the controversy has gone on.

The area of greatest civic disturbances has been the counties of Mercer, McDowell, Mingo, Wayne, Boone, Logan and Kanawha, in West Virginia, and the counties of Johnson, Pike, Harlan and Bell in Kentucky. All of these counties are mountainous, underlaid with rich veins of coal. They were almost exclusively peopled by mountaineers, native whites of ancient American ancestry. They were a law unto themselves. Their annals are crimson with feuds and the gun was the "supreme court." The coal-mining industry has introduced large numbers of negroes, as well as foreign-born and native whites from other sections of the country; still the local traditions exert a dominating influence and account very largely for the outbreaks of violence. Much of this violence had nothing to do with the coal industry but had to do with the nature and racial characteristics of the people, yet it has furnished excellent argument for one side or the other. The primitive conditions of life of this

people can scarcely be paralleled anywhere, unless in the mountains of North Carolina and Tennessee.

The mountains of West Virginia come down to a point like the letter V and down this narrow crease flows a small river; leading into this from a smaller valley there will be a creek, into the creek a branch, and into the branch a fork. The nomenclature of the entire region is based upon the names of these rivers, creeks, branches and forks; towns, camps, mines and railroads being named after them, and each constituting a little world within itself. Each district is separated from its neighbor by a mountain range, or ridge, with no roads or direct means of communication. Agriculture is meager and primitive, and the homes are for the most part, small whitewashed dwellings or log cabins in keeping with the poverty-stricken surroundings.

While these regions were undeveloped the coal mines had only a potential value because of the difficulty and cost of constructing railroads and getting the coal to market. The exploitation of this coal was nearly coincident with the growth of the United Mine Workers, though parts of this general region had been organized long prior to the events of 1919.

Preparations to Unionize Unorganized Fields.—There were serious labor troubles in 1912-1913, after which there was a period of quiet until the extraordinary demand for coal during the World War. At the same time the union made elaborate preparations to unionize the unorganized fields. The topography of the country, the sparseness of the population, the isolation of the valleys one from the other, the general poverty of the counties, lack of level ground upon which to build towns, and the fact that mining machinery and equipment were usually on leased ground are all important factors in the situation. The operator had to establish his business where the coal was and bring his labor to it. He had to construct houses for his employees and furnish them with necessary appurtenances, such as water supply, and establish stores where they might purchase food and clothing. He arranged for medical attendance and hospital service, provided for schools and school houses, employed teachers, or, at least, paid part of their wages, and endowed churches and community buildings.

Thus it appears that each mine or group of mines became a social center, with no privately owned property except the mine and no public places or public highways except the bed of the creek which flowed between the mountain walls. These groups of villages dot the mountain sides down the river valleys, and need only castles, drawbridges and donjon-keeps to reproduce to the physical eye a view of feudal days. There are no public corporations in many places to provide for the public welfare or to maintain law and order, so the mine owner had one of his employees deputized by the sheriff, and thus came into existence the much discussed "mine guard." As the employees were the only ones who were furnished homes, and their occupancy was contingent upon their employment, the courts of that state have decided that the relation of landlord and tenant did not exist, but that it was the relation of master and servant and when the employment ceased the mine owner came into possession of the house.

Thus the position of the miners in company-owned houses is anomalous. They are not tenants and have no more rights than a domestic servant who occupies a room in the household of the employer. The documents which pass for leases often give the company complete control over the social life of the families who live in the houses owned by the company. One which has been called to the Commission's attention from Fayette County, Pennsylvania, actually stipulates that the lessee "hereby further agrees not to use, allow, suffer or permit the use of said premises, or the private ways or roads through and over other lands of the lessor used to reach said premises from the public road, for any purpose other than going in to said premises from the public road, and out from the same to said public road, by himself and the members of his family; and further to do no act or thing, nor suffer or cause the same to be done, whereby the public or any person or persons whomsoever, may be invited or allowed to go or trespass upon said

premises, or upon said private ways or roads, or upon other grounds of the lessor, except physicians attending the lessee and his family; teamsters or draymen moving lessee and his family belongings into said premises or away from the same; and undertakers with hearse, carriages and drivers, and friends, in case of death of the lessee or any member of his family."

Why Miners Seek Own Remedies.—Under existing laws the miners have a legal right to sign and the companies have a right to require them to sign such leases as a condition of obtaining employment. That they are ill-advised, obnoxious and inconsistent with the spirit of free local communities hardly requires argument. Self-respecting American citizens will find a way to put an end to them. In the case of a helpless, submerged working population, the legislatures of the several states might well consider making such "leases" illegal, like any other contract which is contrary to the public interest. Self-respecting American miners, who have on other occasions shown themselves by no means contemptible defenders of their own interests, may prefer to take the remedy into their own hands and by insisting on reasonable leases, on the incorporation of their villages, and otherwise, win for themselves those elementary civil liberties which must always be won and held by free peoples for themselves rather than thrust upon them by external benevolence.

Operators rarely, if ever, reside at the mines; managers and superintendents were the possessors of all the authority, both public and private.

Whether there was an agreement between the United Mine Workers and the Operators' Association of the Central Competitive Field by the terms of which the union was to undertake the complete organization of the West Virginia and Kentucky fields is the question involved in an injunction suit tried before the Judge of the U. S. District Court for the Southern District of West Virginia, the evidence in which was concluded June 3, 1923. For the purposes of finding the facts which this Commission deems of moment to Congress it is not needful that the Commission should consider this question.

If one were to assume at their face value the statements presented by non-union operators, together with the record of convictions in the courts, he would be justified in finding that it was the deliberate purpose of the United Mine Workers to compel all operators to unionize their mines, and force agreement, not only with reference to wages and working conditions but the check-off and other matters. If, upon the other hand, statements with reference to intimidation and violence exercised toward the mine workers are taken at their face value, one would be justified in finding that a vast majority of the miners of this country were sincerely desirous of joining the union, paying the check-off and delegating to a central body for settlement, subject to their ratification, all questions of wages and working conditions in the industry. Blacklisting can clearly be proven from the testimony; it can clearly be shown from counter testimony that it has ceased to be used.

Much Testimony from Both Sides Valueless.—But the Commission is unwilling to guess as to the truth. A large part of the testimony furnished is absolutely valueless. It consists of statements and affidavits. It is not surprising that the laymen could believe these things, but that lawyers could try to impress the Commission with the absolute verity of these statements is somewhat remarkable. No opportunity has been afforded for cross-examination. No means have been devised to punish anyone for perjury. There is no way in which the Commission can test the interest, bias and prejudice of the witness that may be done in an ordinary lawsuit. Nor would men, when moved by self-interest, refuse to admit that acquittal or convictions cannot be relied upon as furnishing the absolute truth of the guilt or innocence of the parties charged. The verdict is as likely to come out of the atmosphere as it is out of the evidence.

Of course, there are men in the non-union fields who desire the union. How many, nobody knows, nor will there be any way of telling until the rights of American citizens have not only been admitted but have been guaranteed to

them by the courts and officials of this country. Without minimizing the number who may have desired to join the union, it is nevertheless the truth that in 1919 the United Mine Workers began an extensive drive to unionize the remaining unorganized fields of West Virginia. Although many of the miners desired unionization, it does not appear that this was a spontaneous movement of the non-union miners but rather an attempt by professionals especially skilled and trained in the art. Only a secret ballot conducted under absolutely impartial conditions could determine the actual attitude of the majority of the miners.

How Union Organizers Work.—The system has been that organizers go to a camp or mine village and the nucleus of a local is formed. Then a committee from the local waits on the superintendent, and demands that the operators sign a contract recognizing the union, making the mine closed to non-union labor and granting the check-off. On refusal a strike is called, and this inevitably leads to complications. The striking miners occupy the houses of the operators, and operations cannot be resumed until the operators dispossess them and fill their places with other employees. The strikers refuse to vacate the houses and evictions follow. This starts hostilities. The organizers find a suitable spot in the vicinity, erect tents and furnish relief funds for the evicted miners and their families. An armed truce exists, ultimately breaking into open war. Owing to the rugged nature of the country, men can secrete themselves on the mountain sides of the narrow valleys and with long-range rifles shoot into the tippie or mine shaft. The power house or tippie is dynamited and destroyed. Workers are ambushed and killed.

The operator appeals to the sheriff. The sheriff informs the operator that he has no deputy to spare and no funds to hire deputies with. The deputies are not appointed by the sheriff, but by the county court, and in some instances the court has appointed deputies at the expense of the operators. The miners regard these deputies as hirelings of the operators, and thus the bitterness and hostilities grow until the mine is put out of operation because workmen are afraid to stay at the mine, or because the mine is destroyed. The United Mine Workers of America have paid more than \$400,000 in damages for the destruction of the Willis Branch Coal Co.'s mines.

Organizers Build Up Class Hatred.—Sometimes the first acts of an organizer is to denounce constituted authorities, advise armed resistance to civil process and police control of public order. This foolish talk is naturally creating a feeling of resentment and hostility upon the part of public officials, which runs from the Governor down to the local constable; it is reflected by business and professional men and practically all classes not directly affiliated with labor unions. Thus class hatred has grown up, which may well be compared to the family feuds that formerly existed in this mountainous district. Hatred, bitterness and mendacity are cultivated on all hands as virtues, and it is difficult to put your finger upon a statement that you know is absolutely true.

The other side of the situation is that the operators of non-union mines are thus far determined never to enter into contractual relations with the union. Entrenched in their mountain strongholds, with control of the local governments and with ownership or possession of all the lands, they feel that they have an economic advantage so long as the union can be kept out. They stop the union at the mouth of the valley. Many require applicants for jobs to sign what is commonly called the "yellow-dog" contract, justifying it by pointing out that the union when in control requires the employer to sign a similar "yellow-dog" contract. Members of the union are discharged and blacklisted.

Many operators, however, do not use the "yellow-dog" contract, believing that it is immoral, or at least a tactical blunder, and that it has resulted in more harm than good. All sorts of opinions are expressed by the miners in these fields. Many of them worked formerly in union mines, and were not pleased with the "check-off" and union rules, and migrated to non-union districts to escape the unions. Many of them are seasonal miners, small farmers and other

workers, who come to the mines in the busy season, where they work at odd intervals. These men are not interested in the union and do not care to be long to it. The non-union miner also reaps the advantage and bears none of the burdens of the union.

How Mine-Guard System Originated.—The non-union mines are not run as they were in Illinois before the union took charge. There has been a great improvement in wages and in working and living conditions, and thus incidentally the United Mine Workers have bettered the conditions of those who are not members of their organization. The so-called mine-guard system is a result of the inability of local government to maintain law and order. Take Logan County, West Virginia, as an example. It covers over four hundred square miles of bold mountains. The Guyan River traverses it for thirty-five miles, and fifty thousand people live in scattered mine camps perched on the mountainsides along the river. Logan is the only town of considerable size, and there are but two incorporated towns outside of it, in the valley.

These numerous mining camps contain native whites, blacks, and foreign born, the latter varying with the camps but averaging 20 to 25 per cent. There are 70 companies operating 145 mines. Tax rates on land are necessarily low, as a high rate would prove confiscatory to the farmers, although farming is a negligible factor in the economic situation. The taxes raised are insufficient to maintain a large force of peace officers, although crimes by violence and moonshining are frequent throughout the mountain regions. So there came into existence what is commonly known as a mine guard, an officer appointed by the courts and paid by the operator.

The clamor raised against these deputies caused a change in the method of paying them. The operators now "loan" the county an amount equal to the extra cost of maintaining these special deputies. There is no record that these "loans" have been repaid and the operators do not seem to be pressing for payment. In Logan County the sheriff has nine regular deputies and many others who are stationed at the mines. Many of these are stable bosses, paymasters, and office guards, sanitary officers, etc. One of their special duties is to keep a sharp lookout for union organizers, and to devise ways and means to discourage them from remaining longer than the next train. The steep mountainsides converge at the banks of the Guyan River and a railroad bed has been cut out of the side of the mountain. There is here and there an impassable road, but generally speaking, all the ground except the bed of the creek is privately owned, and a union organizer can scarcely move off the station grounds without becoming, technically at least, a trespasser.

Once his business is discovered, it is the duty of the deputy sheriffs to prevent his activity by ejecting him from privately owned property. Actually, without the consent of the operators, a union organizer can do little more than ride on a train and look out of the windows. The operators' associations do not deny that it is their determination to keep out organizers, or "agitators," as they call them. They assert that their right to exclude objectionable persons from their mine property is as clear as the right of a manufacturer in Chicago or a home-owner in Washington to exclude undesirable persons from their premises. Whatever may be the legal phase, it is undoubtedly a fact that under present conditions, Logan County, as well as Mingo and McDowell counties, West Virginia, are now closed to representatives of the miners' union, especially if they engage in union activities.

The operators claim that the exclusion of the organizers has prevented destruction of property and loss of life, while the miners claim that the presence of armed men about the mines is bitterly resented by the workmen and that the ultimate result is an uprising against a system amounting to peonage.

Nine Hundred Indictments Pending in Johnson County.—These theories may be illustrated by Johnson County, Kentucky. It is a small county in population, probably 15,000, almost all white, who are typical mountaineers. There are

now pending on the Criminal Court calendar 900 indictments. Each grand jury returns 250 to 300 indictments, and meets four times a year. The sheriff is a mountaineer, and before his election was a union miner. At Thealka and Van Lear, near Paintsville, the county seat, are the mines of the Northeast Coal Co. and the Consolidation Coal Co. The relations of these companies with their men had always been harmonious until the calling of a strike by the miners' union.

The officials of the companies applied to the sheriff for protection, they, at that time, having no guards. He refused, and the reason for his refusal is a subject of dispute. The operators allege that the sheriff refused to appoint any deputies to guard the property, while the sheriff insists he was willing to appoint deputies, but refused to accept those nominated by the coal companies. There were no deputies appointed. Shortly afterward, men going to and from work at the mines were ambushed and shot. A local constable at Paintsville appointed twelve deputies who attempted to protect the mines and miners at Thealka, but without success, as two men at the Thealka mine were blown up by dynamite and killed.

The experience of the Consolidation Coal Co. at Van Lear was similar to that of the Northeast Coal Co. at Thealka. After workmen had been threatened and intimidated, the town board of Van Lear authorized the town marshal to appoint ten deputies. During this strike the drift mouth of the mine at Muddy Branch was dynamited.

Logan County, West Virginia, and Johnson County, Kentucky, are compared for the reason that at the outbreak of trouble in Johnson County the sheriff was the secretary-treasurer of the miners' local. There were no mine guards in the county, and the violence that broke out could not be justly chargeable to anything except a determination on the part of the strikers that the mines could not operate unless they accepted union terms. During all this strike district officers and organizers were busy in Johnson County. The Commission received a telegram from the president of District No. 30, and the secretary-treasurer, dated Paintsville, April 5, stating that their lives were menaced by mine guards. No confirmation of this telegram could be secured. The sheriff, a friend of these union officials, never heard of the affair, and no other person could be found who knew anything about it.

The irrepressible conflict between the organizers of the United Mine Workers and the non-union operators and miners, with the racial traits and characteristics above described, together with the inability of the state and local authorities to cope with the situation, is the real cause, not the mine guard. That, however, a public police official should be privately paid is indefensible. It is so admitted to be by the Governor of West Virginia.

There seems to be no evidence that people have been interfered with, either in the free use of the mails or in the receipt of their mail.

Public Officials Resent Unionization Plans.—There is now a practical cessation of violence in the coal fields of West Virginia and Kentucky due to the activity of state and county authorities in prosecuting and convicting persons, to proceedings in the federal and state courts for injunction, and to the desire of both sides to prevent their cause being prejudiced by unlawful acts. Unionism in the Logan, Mingo and northeastern Kentucky fields is not largely the outgrowth of local sentiment but is the result of a campaign of foreign organizers. The United Mine Workers do not deny that it is their purpose to unionize these mines if possible. This is so deeply resented by public officials and all other persons not engaged in mining that free travel, free speech and public assemblage has been practically abridged. The foreign element is not responsible for any of the troubles that have occurred.

The conditions now are those of an armistice which, unless peace can be secured with a better understanding, is liable to break down in trouble, resulting in riot, bloodshed and destruction of property.

Recurring to the Herrin (Ill.) situation, there is indisputable proof that three union miners were killed and that no attempt has been made to ascertain or to punish the guilty parties. There is no doubt that what are commonly

known as strike breakers, gunmen or thugs were brought to that county thoroughly equipped with arms and ammunition, and perfectly willing to shoot with or without provocation.

It is not needful to report further facts about this unfortunate condition of economic life, wherein so many criminals have gone unwhipped of justice. That the election of officers by the people has something to do with the administration of justice can not be denied. Where the territory is unionized and the officials are elected by the vote of the union miners, they naturally have a friendly feeling for the United Mine Workers. Where it is non-union and they are elected by men who are opposed to the union, a like condition of mind necessarily exists.

The inquiry will naturally arise, if the Commission is unwilling to fix ultimate responsibility for the destruction of life and property, leading to strikes, riot, tumult and disorder, how it justifies such a finding. The disregard of the civil rights of American citizens, as commonly understood by those who are versed in our principles of government, the breaches of the criminal law of the land, the frequent immunity from punishment, and the occasional unjust conviction of men, has heretofore been viewed exclusively from an altruistic standpoint.

The Commission would impress upon the law-making power of the land and the common sense of our people this ever to be remembered fact: All justice is human and fallible. Always its enforcement depends upon the education, environment and heredity of the people who are called upon to enforce it. It will only approach perfection when the intelligence, the judgment and the conscience of men are educated more and more toward higher ideals. It would not be fair to omit from the equation in West Virginia the outlook of the people upon what is commonly called law and order. It would be unjust to fix the responsibility of non-union operators by charging them with the effects of racial characteristics.

Justifying a Feud.—It was not the intention of the Commission to quote evidence in this report, but the idea it entertains can be gleaned by relating a conversation had with two bright fifteen-year-old boys of Anglo-Saxon origin, engaged in social work, and living in eastern Kentucky. Asked how they explained that a religious people such as they were could justify the feud, the explanation diffused a startling light upon the situation. It was this: "I become fearful that my neighbor is going to kill me. I have no desire to take his life, but I have a right to defend my own. It is his life or mine, and so I kill him. Fear that he may kill me constitutes the right of self-defense, even to the taking of his life."

That fairly expresses the outlook. What goes to the defense of one's life goes also to the defense of one's home and one's property. It is a mistaken idea, but it accounts for much of the trouble where all men go armed. On the other hand, you may take a union organized territory such as Williamson County, Illinois, and so strong has grown the opinion of the rights of unionism that its people, however, mistakenly, quite honestly believe that they have a right to resist, even to the taking of life, the interference by anyone with the privileges of organized labor. In either district the enforcement or lack of enforcement of the law shocks the moral sensibilities of that great body of Americans who believe that the courts and the police officers are to be the preservers of our rights and the defenders of our liberties.

But while these ideas remain instilled in the minds of these men and are not removed by educating them along different lines of thought, however much it may be and should be deprecated, the judgments of the courts and the verdicts of juries will speak the common conscience of the multitude over whom they preside. For years this irrepressible conflict between the undoubted right of a man to operate his property as he pleases in America and the undoubted right of men to organize for collective bargaining with reference to wages and working conditions has gone on. Principles of government, acknowledged, admitted, have been tossed into the scrap heap every time they have faced actual conditions. The law has been, is now, and ever will

be but the average of the judgment and conscience of the community.

From each of these two sides the Commission sought helpful suggestions with reference to minimizing, and in time ending, these denials of civil rights leading to breaches of the criminal law. So obsessed with the eternal verity of its particular right has each side been, that the only solution has been the destruction by legislative enactment of the other fellow's right.

The non-union operators and miners have suggested: "Break up the United Mine Workers of America and all will be well with the world."

The United Mine Workers of America have said: "Unionize all the mines and peace will brood over a war-worn industry."

Each Side Wants Peace by Suppressing the Other.—Each admits the principle in which the other believes, but each is quite satisfied that peace can only come by killing the other fellow's principle. Unfortunately, the Commission cannot kill principle. It is not a lord high executioner authorized to take anybody's statement as to what will produce peace, and either destroy the United Mine Workers of America or force the unionization of all the mines. The Commission has been compelled to consider the viewpoint of each and to report upon these well-known facts what, if anything, can be done to spell peace and prevent strikes or lockouts.

The condition resembles the conflict between the definition in the Declaration of Independence concerning human rights and the then clearly constitutional right of human slavery. The great mass of those arrayed upon either side were unwilling to compromise or adjust. It was permitted to go on until the agony of a fraternal war solved the problem. It is to be hoped that we have learned wisdom by experience. There is a patriotic side to this question which is of more compelling force in the mind of the Commission than even the economic one. A democracy that cannot spell peace with justice will sooner or later be succeeded by a government that will spell peace regardless of justice. The owners of these mines have a right to operate them as they please, if they be but a mere business enterprise. But the Commission believes that absolutely necessary as their output is, not only to interstate commerce but to the comfort of the whole people, it is their patriotic duty to make some personal sacrifices in the interest of the common weal, a principle equally applicable to the United Mine Workers.

The United Mine Workers of America have a right to exist. They have a right to bargain collectively as to wages and conditions under which they will labor. They have a right to place the authority for the determination of these questions where they will. They have a right to work or to refuse to work. They have a right, peaceably and by persuasion, to endeavor to swell their ranks.

In this clash of right, every red-blooded American in the industry should yield as much as is necessary of his unqualified legal right to the end that the mining industry may be owned and worked by loyal citizens, whether native born or naturalized, in the spirit of fairness toward the public and for the preservation of the principles of civil rights as now understood by the American people. It is the conflict between these rights that results in strikes and lockouts. It is the unwillingness to present controverted points to any sort of arbitration. Compulsory arbitration is not only impossible but inadvisable. Voluntary arbitration is desirable.

Some difficulty has confronted voluntary arbitration in the past as has confronted the Kansas Industrial Court. No difference on which side of the line one may stand, one naturally fears, and unjustly so, the submission of questions to even voluntary arbitration when up to the present time no yardstick has been prepared by which the arbitrators are unqualifiedly required to measure the facts. One of the evils of today in American life is government by discretion. The sooner we return to a government of laws and not of men, the sooner we may expect stability and peace. No individual man is willing to be tried by discretion. None can find fault by being tried by laws which he himself has helped to make.

Urges Voluntary Arbitration.—It is the opinion of the Commission, therefore, that certain standards should be adopted under which controversies touching the same should be submitted to voluntary arbitration. The Commission is of the opinion that an honest finding of the facts measured by the standards so set up will have such force of public opinion back of it as to compel its adoption and prevent cessation of work in the industry.

The Commission has considered the advisability of setting up a code by which through arbitration many of the questions involved might be tried, but it has reached the conclusion that these principles would far better be worked out by the operators and the miners and include in their contracts, as they would vary certainly from region to region and perhaps from mine to mine.

If industrial peace is to be hoped for—a peace that looks toward continuity of employment, stabilization and stimulation of production—then some method must be found to guarantee, as near as fallible human judgment may, equally exact justice to capital, to labor, and to the public. There must be one yardstick adopted by which all controverted questions are to be measured. Public interest demands that certain fixed principles shall be recognized by both capital and labor as this yardstick.

(1) No contract is of any valid binding force and effect in America which has not been freely and voluntarily entered into. No law could, therefore, be enacted compelling the making of contracts or fixing the terms and conditions thereof. But when once executed, contracts should be mutually binding upon the parties thereto, and each should be required to preserve scrupulously the same or be responsible to the other party in damages for the breach thereof.

(2) The right of a man to work when, where, for whom, under what conditions, and at what wage he chooses, so long as he elects to assert his individual right, must never be interfered with and the State must furnish him protection and peace while he exercises this right.

(3) In a free government men have a right to combine themselves together in organizations for collective bargaining with reference to terms and conditions under which they will work. They must exercise this right without force and intimidation, gathering into their ranks those who voluntarily desire to become members of the association, but they must not by coercion, duress, restraint, intimidation, or any species of violation of the criminal laws of the land, interfere with the right of the man who chooses to dispose of his time individually.

(4) When society consents to the formation of corporations of capital to engage in business, and grants the right of labor to bargain collectively with reference to wages and working conditions touching any of the prime necessities of life, and particularly with reference to that great public necessity, coal, society has a right to fix a limitation beyond which it will not permit either these *de facto* or *de jure* organizations to go. The public welfare is the thing to which private interests, as exercised through corporate organizations, must yield a certain measure of the inherent right of the individual. Therefore, a corporation, which is a creature of the state, must not be permitted to break up a *de facto* organization of labor in other ways than by argument and advice. Nor must it be permitted to prevent its employees from voluntarily organizing for lawful purposes. On the other hand, labor organizations must not attempt in other ways than by peaceful argument to induce men to join the union.

(5) Society ought not to shift its moral responsibility to look after its unfortunates onto individual persons, firms and corporations, but government ought not, and presumably does not, authorize the combination of capital, whether into partnerships or corporations, without the implied duty upon the part of such partnerships and corporations to pay to the humblest of its workers who is able-bodied, willing and competent, and who gives a good honest day's work in an occupation that may properly be considered a man's job sufficient wage to enable that person and his family to live in accordance with the standards of American life, and to pay in addition thereto for skill and experience and with reference to the irregularity

of employment, and when thus it has provided for skill and experience, no organization or group has the right to hamper the initiative of the individual, preventing him from making all the money he can.

Recognition of the principle that wages should be sufficient to maintain an American standard of living does not imply approval of any particular current estimate of its cost, or that any stated income will insure such a standard in different localities where not only the cost of necessities but the habits and traditions of the people may differ in varying degrees.

(6) The necessities of life are not obtainable from year to year at even a fixed price, eliminating the fluctuating purchasing power of the dollar. These fluctuations affect the industry no more than they affect the general public. The general public, commonly called the consumer, has a right to demand of its government that it shall not freeze in the midst of an abundance of coal. Unless, therefore, the capital and labor invested in this industry shall of its own volition adopt methods that will furnish to the public coal when needed, an outraged public sentiment will furnish the supply by either the army or the penitentiary.

When negotiations are pending looking to a new contract, sixty days before the date thereof the President of the United States should be informed of the facts and principles in controversy, and should appoint some disinterested person to make a report upon these facts and principles so that the public may know whether the operator is receiving a reasonable return upon his investment, the wage earner a living commensurate with American standards, and if not, who is to blame.

(7) When contracts have once been voluntarily entered into, the enforcement thereof should not be left to strikes or lockouts, but the industry itself should provide boards of arbitration—local and appellate—to dispose speedily of these causes in accordance with the terms of the contract and the principles herein set out.

Condemns Violence on Both Sides.—The Commission calls the attention of certain persons in America to a very wise statement made by the Apostle Paul when he said, "All things are lawful to me, but all things are not expedient." Men have, of course, the inalienable American right to go into strange communities and diagnose the evils under which the community suffers and offer remedies for a cure. But many times it is not expedient to exercise this right. Men not connected with the industry have no right to make inflammatory speeches leading to the use of violence, nor have operators the right to hire gunmen under mere pretense of protecting their property. Both actions are to be condemned. Unionism must justify itself by its wise, sane, conservative and constructive conduct; not by force, threats or intimidation. Non-union operators must justify themselves by the satisfaction of their workmen with their wages and living conditions and not by the use of force and arms.

Notwithstanding the decisions of the Supreme Court of the United States that the so-called "yellow-dog" contract is legal, the Commission is of the opinion that it is a source of economic irritation, and is no more justifiable than any other form of contract which debar the individual from employment solely because of membership or non-membership in any organization. The right of an employer to discharge for disloyalty, dishonesty and incompetency or other unlawful conduct should not be abridged, but he should not be permitted to blacklist a discharged laborer for any other reason than disloyalty, dishonesty or unlawful conduct.

Rights of General Public Must Be Preserved.—As heretofore reported by the Commission there is a vast difference between the rights of individual men and the rights of artificial persons, in the form of *de facto* or *de jure* corporations. These artificial persons are not individual citizens of the Republic. They derive their right to exist from the common consent of the people of this country. In their dealings with each other they must, therefore, take into consideration the fact that the general public has some rights which they are bound to respect. They cannot combine to prevent the mining of coal nor can they agree to such outrageous prices as will work a distinct hardship upon

the citizen. They must deal justly with each other and with the public, making their contracts so as to get a fair return to the owner, a wage commensurate with American ideals to the laborer, and a steady output to the American people.

Regardless of what the law has been in the past, it is the opinion of the Commission that the Congress of the United States must compel full publicity from both operators and United Mine Workers, upon forms prepared and furnished by some governmental agency to the end that the people of America may determine whether they will longer permit, even under governmental supervision, the existence of these artificial persons. They will gladly do so if the corporations work no injury to the common weal, but they will resent any effort to exploit the people by their corporations, *de facto* or *de jure*, or by the united efforts of these corporations.

The Commission reiterates that it is seeking something better for the future than the mere fixing of responsibility for past violations. It does not minimize the gravity of all sorts of crimes which have taken place. It cannot too strongly condemn the custom of permitting either operators or miners to furnish deputy sheriffs, policemen, or other public officials not paid out of the public treasury. That state and local government has not risen to the level of the average idea of justice in America which has not both the will and the power to preserve the life and the property of its citizens.

The Commission condemns equally the lax local government which has seemed to render it necessary for the owner

of property to police it at its own expense and in the event of strikes to bring in professional strike breakers, who are frequently better gunmen than they are laborers, and the exercise of that right which inherently belongs to an American citizen, namely that of a stranger voluntarily walking into a community, hiring a hall, and giving that community a lecture on what its rights and duties are. Many good-intentioned people, seeking to serve the common weal, have unwittingly contributed more to crime than to character making.

And finally, if neither the patriotism, private conscience nor business common sense of the industry shall lead all persons engaged in it not only to observe the law but to help enforce the law; and if state and local authorities shall be impotent in prosecuting and convicting violations thereof, then it is the solemn duty of the Congress of the United States to assume jurisdiction over these American rights, bringing the full power of the Union to their preservation by the prosecution and conviction of all persons, whether high or low, who shall dare to violate them.

The legislative, judicial, and executive branches of this government must not permit a union of operators, a union of miners, nor a union of both to become greater than the Union of the States.

Attest:
EDWARD EYRE HUNT,
Secretary.

JOHN HAYS HAMMOND, Chairman,
THOMAS R. MARSHALL,
CLARK HOWELL,
GEORGE OTIS SMITH,
EDWARD T. DEVINE,
CHARLES P. NEILL.

Pinchot Letter to Coolidge Suggests Means To Save Public from Higher Coal Cost

With the anthracite strike on the way to a termination Governor Pinchot on Sept. 9 wrote a letter to President Coolidge, suggesting a means whereby the public need not shoulder the \$32,250,000 increase in the production cost of coal necessitated by the 10-per cent wage increase. During the Harrisburg conference the Governor said that the wage increase would result in an added cost at the mines of 60c. a ton to anthracite, and that 10c. of this should be absorbed by the operators and the remaining 50c. by the transportation and distribution agencies. The operators in replying to his proposal said this cost would be 80c., 75c. of it being due to the wage increase and 5c. a ton to the adoption of the eight-hour day. The Governor's letter follows:

"Now that the danger of a strike in the anthracite field is disposed of for two years, I would like not only to thank you again for your telegram of congratulation but to express my very great appreciation of your public approval of the terms of settlement which I suggested, and of the very valuable information which was supplied to me by the U. S. Coal Commission at your direction.

"Both miners and operators deserve great credit for their courtesy, their readiness to consider each others' points of view and their patient willingness to stay on the job. I emphasize the latter particularly because I doubt if any of them had the slightest expectation when they came to Harrisburg that the negotiations would last more than a day or two, or that the strike would be settled.

"A supply of anthracite to the consumer for the next two winters having thus been assured, the next question is that of price. The total legitimate increase in the cost of coal under the terms of the settlement is about 60c. per ton. Of this amount not less than 10c. should properly be taken up by all the operators; many of whom could absorb the whole of the 60c. increase and still make abundant profits.

"In fairness the remainder of the 60c. should never reach the consumer. It is certain, however, that this amount, and probably much more, will be exacted from consumers unless public action is taken to prevent it. Accordingly, since you were good enough to indicate that suggestions from me concerning anthracite would not be unwelcome, I am writing to suggest that real advantage to the public would result if the Interstate Commerce Commission would take up and consider anew the rates charged for the trans-

portation of anthracite coal, with a view to reducing them if justification for such reduction should be found.

"On my part, I propose to ask the Pennsylvania Public Service Commission to consider anew the reasonableness of all freight rates on anthracite within the borders of Pennsylvania.

"I realize that the action of national and state bodies having authority over freight rates on anthracite coal cannot alone solve the problem of fair cost to the consumer. Other factors also have weight, such as efficiency in operating the mines and reasonable profits in distribution. It would greatly assist the public in reaching sound judgments in these matters if the findings of the U. S. Coal Commission on profits and costs in mine operation and in wholesale and retail distribution were made public in great detail at the earliest possible moment. This information will be of the greatest use to me as to others in making plans to protect the public interest.

"The margins and profits of wholesalers, brokers, jobbers and retailers are mainly local matters, which must be dealt with as such. Accordingly, you will, I am sure, be glad to know that I am preparing to invite the Governors of all anthracite-using states to go into this matter with me.

"I am exceedingly glad to tell you that the mining of anthracite is likely to be resumed before the 20th of this month. You will realize as fully as I do the desirability of securing at the earliest possible moment whatever protection can be provided for the consumer against any undue and unnecessary increase in the cost of coal.

"Since the public is a deeply and properly interested party in this matter, and since public opinion will have so large an influence in securing justice, I have taken the liberty of making this letter public in the confident belief that I shall have your approval in doing so."

John L. Lewis, president of the United Mine Workers, sent a letter Sept. 10 to President Coolidge supporting the suggestion of Governor Pinchot that the Interstate Commerce Commission investigate anthracite freight rates. The Governor, Mr. Lewis said, has placed his finger with unerring precision "upon the method by which the consumers of anthracite may be given substantial relief from excessive prices, and the possibility of a future increase."

"The proposals of Governor Pinchot," Mr. Lewis added, "are constructive, reasonable and practicable, and you would be conferring a boon upon the people of anthracite-consuming states if the influence of your high office were directed in support thereof."

Union Leaders and Operators Accept Pinchot's Terms And Sign Two-Year Agreement

The anthracite peace proposal of Governor Gifford Pinchot of Pennsylvania was accepted at Harrisburg by the representatives of the operators on Sept. 6 and by the miners the next day. On Saturday, Sept. 8 the form of the agreement between mine workers and mine owners was drafted. The agreement was indorsed by the union scale committee shortly thereafter and Sept. 17, set as the time for the ratification meeting of the tri-district convention at Scranton.

It is now expected that the strike will formally end Sept. 19, when the men return to work, Sept. 18 being election day. It is probable that the contract which will be drawn upon the form of the agreement will be signed at Harrisburg in the presence of Governor Pinchot on Sept. 19 or 20, probably after mine operations have been resumed.

The contract will run for two-years and incorporate the twelve clauses of the agreement, which include the four Pinchot points and other points raised by the miners at Atlantic City. The four points of the Pinchot proposal are the eight-hour day, the 10-per cent wage increase for all classes of mine workers, recognition of the union through permission to have a union man at the pay windows to collect union dues and recognition of the principle of collective bargaining.

S. D. Warriner, chairman of the General Committee of the Anthracite Operators and spokesman during the conference for the operators, issued the following statement:

"The operators are relieved that a coal shortage has been avoided. While they are of the opinion that conditions did not justify wage increases with added burdens on the public and that the principle of arbitration should be the basis of public protection, nevertheless they were unwilling to assume the responsibility of a protracted suspension in the face of the Governor's proposal."

The drafting of the agreement was as tedious a job as the discussion of the four points of the Governor. On Sept. 6 the operators accepted the Governor's terms, abandoning their requests for a long-term contract if an uneconomic wage was to be provided and also the question of arbitration, temporarily and so far as the present strike is concerned. The following day the miners dropped their demand for the check-off and for an additional increase for day laborers beyond that of the 10 per cent increase for all classifications of mine workers. The miners submitted the question to the union scale committee which indorsed acceptance of the peace plan.

Operators' and miners' representatives, called in by Governor Pinchot in an endeavor to settle the anthracite coal situation, following a recess taken Sept. 1, resumed their efforts to smooth out their differences at the Capitol on Wednesday. The Governor, acting as intermediary, carried specific statements from the miners to the operators and from the operators to the miners. There was no joint session on Wednesday, or on Thursday.

Text of the Two-Year Agreement

Here is the full text of the new two-year agreement signed by representatives of the miners and operators:

"This agreement, made this eighth day of September, 1923, between Districts 1, 7 and 9, United Mine Workers of America, parties of the first part, and the anthracite operators, parties of the second part, covering wages and conditions of employment in the anthracite coal fields of Pennsylvania, witnesseth:

"The terms and provisions of the award of the Anthracite Coal Strike Commission and subsequent agreements made in modification thereof, or supplemental thereto, as well as the rulings and decisions of the Board of Conciliation, are hereby ratified, confirmed and continued for a further period of two years ending Aug. 31, 1925, except in the following particulars, to wit:

"(1) The contract rates at each colliery shall be increased 10 per cent over and above the rates established

under the award of the U. S. Anthracite Coal Commission in 1920.

"(2) The hourly, daily or monthly rates of outside and inside company men, working on the basis of an eight-hour day, shall be increased 10 per cent over and above the rates established under the award of the U. S. Anthracite Coal Commission in 1920.

"(3) The hourly, daily or monthly rates of pumpmen and engineers formerly working a twelve-hour cross shift, and changed to an eight-hour basis under the award of the U. S. Anthracite Coal Commission in 1920, shall be increased 10 per cent over and above the rates established by the Board of Conciliation in conformity with said award.

"(4) The hourly or daily rates of consideration miners and consideration miners' laborers shall be increased 10 per cent over and above the rates established, under the award of the U. S. Anthracite Coal Commission in 1920.

"(5) The rates paid contract miners' laborers shall be increased 10 per cent over and above the rates established under the award of the U. S. Anthracite Coal Commission in 1920, said increase to be paid by the operator and miner by adding 10 per cent to the portion of the rate now assumed by each.

"(6) Outside and inside company men working on the basis of a day in excess of ten hours, shall be placed on the basis of an eight-hour day. The rate of pay for an eight-hour day shall be adjusted in the same manner as rates were adjusted for hoisting engineers and pumpmen who were changed from a twelve-hour day to an eight-hour day in 1920, subject to the same increase of 10 per cent provided for other company men under clause 2 hereof.

"(7) Outside and inside company men working on the basis of a nine- or ten-hour day shall be placed on the basis of an eight-hour day. The rates of pay for the eight-hour day shall be the rates for the nine- or ten-hour day paid under the agreement of 1916, plus \$1.80 per day for outside employees and \$2 per day for inside employees, plus 17 per cent and subject to the same increase of 10 per cent provided for other company men under clause 2 hereof.

"(8) Monthly men coming under the agreement of Sept. 2, 1920, and working on a basis in excess of eight hours per day shall be placed on the basis of an eight-hour day. The monthly rates for the eight-hour basis shall be the monthly rates paid under the agreement of May 5, 1916, plus \$54 per calendar month for outside employees and \$60 per calendar month for inside employees, plus 17 per cent (except where modified by ruling of the Board of Conciliation) and subject to the same increase of 10 per cent provided for other company men under clause 2 hereof.

"(9) The colliery rate sheets of the different collieries shall be brought up to date, shall be signed by the company officials and the mine committees, and shall then be filed with the Board of Conciliation. In case of dispute as to the correctness of any rate the rate shall be determined by the board, after hearing. In such cases the burden of proof shall rest with the party taking exception to the fixed rate.

"(10) A grievance referred to the Board of Conciliation shall be answered within fifteen days and shall be heard within thirty days from date of filing with the board. Decision shall be rendered by the board, or case shall be referred to an umpire, within thirty days after hearing. In case of reference to an umpire, the decision of said umpire shall be rendered within thirty days from date of reference.

"(11) Rates for new work, such as opening a seam of coal, shall be made collectively as between the Mine Committee and the company officials on the basis of the standard recognized rates paid for similar work under similar conditions in the mine in question or adjacent mines. In case of disagreement the matter shall be adjusted through the Board of Conciliation in the manner now customary. Pending decision by the board, work shall proceed at rates set by the foreman and which shall not be less than the

standard recognized rates aforesaid. No contracts shall be made with individual employees at less than the prescribed scale rates or not in keeping with customary practices. This section shall not be construed to deny to the operator the right to change the method of mining.

"(12) The Board of Conciliation is hereby authorized to undertake and complete a thorough study of all wage scales before the expiration of this contract and submit the same to the next joint conference. If the Board of Conciliation shall, by unanimous vote, recommend the adjustment of any inequities or inequalities in wage rates during such study, the adjustment shall take effect on a date set by the board."

Coal Commission Issues Warning Against Pyramiding by Middlemen

Warning against the operations of speculative jobbers in the event of a cessation of mining Sept. 1 was given in a statement issued Aug. 29 by the U. S. Coal Commission. Investigations have disclosed, the Commission stated, that prices were forced up last winter by the multiplicity of transactions by middlemen, which resulted in a pyramiding of profits.

The Commission's statement was intended to put the public on its guard against runaway fuel prices if the efforts to avert a strike fail.

"The U. S. Coal Commission," said the statement, "believes it opportune to make public more details on the subject of pyramiding middlemen's profits, described in the July 5 report by only a single paragraph.

"The Commission's inquiry regarding the source of high-priced anthracite sold during the winter of 1922-23 leads to the conclusion that the speculative jobber or wholesaler was a prime cause of the extremely high premiums paid for anthracite during the recent shortage in New England, as well as in other parts of the country.

"Under normal conditions wholesalers have a proper place in the distribution of coal. They furnish an outlet for the coal of small mines whose total tonnage is too small to warrant the maintenance of a selling organization. In times of normal market, competition among wholesalers for the operators' available tonnage on the one hand and for the consumers' and retailers' trade on the other keeps margins and prices low and commensurate with the services rendered as distributors of coal. In time of a panic or sellers' market, however, the independent wholesalers tend to become speculators, and buy and sell among themselves, thereby pyramiding margins and advancing prices without rendering any equivalent service in bringing the coal nearer to the consumer.

"The wholesalers whose activities resulted in premium prices last winter are, nominally at least, not directly connected with the mines producing the coal, although there are a considerable number of cases in which operators and wholesalers, while separate and distinct corporations, are related through interlocking stock ownerships, interlocking directorates and interlocking officers. In some cases the interrelations extend to a chain of operators and wholesalers.

"In times of sellers' market anthracite is passed from one to another of these closely related interests, each taking a profit on the transaction with the result that wholesale margins are pyramided and the consumer pays extremely high prices and profits to a group of related interests. In other cases the pyramiding results from speculative buying and selling among wholesalers who are separate and independent. Many cases of pyramiding of margins both by related interests and among really separate and independent wholesalers have been traced by the Commission.

"Anthracite coal especially yields itself to speculation among wholesalers whenever there is an interruption of production due to strikes, railroad disability or any other cause. In tracing carloads of high-premium anthracite coal purchased by New England retailers last winter it was found that as many as four wholesale purchases and sales sometimes intervened between the mine and the retailer. More than half of the 750 cars of anthracite coal of domestic sizes traced passed through the hands of only one

wholesaler at margins varying from 20c. to \$3 per gross ton. Margins frequently taken were 50c., 75c., \$1.25, \$1.75 and \$2.50 per gross ton, the majority of margins being between 50c. and \$1.25 per ton.

"A considerable proportion of the cars traced, however, went through the hands of two wholesalers at margins varying from 25c. to \$4.75 per ton. In the case of the carload on which \$4.75 was taken the first wholesaler took 50c. and the second \$4.25 per gross ton.

"Total margins taken by wholesalers on cars passing through the hands of three jobbers ranged from 68c. to \$4.03 per gross ton. On two cars sold to the same retailer for which the total of margins taken was \$4.03, the first wholesaler took 15c., the second \$2.73, and the third \$1.15, and on a third car for which the total margin was \$4.03 the margins taken by three jobbers were respectively 15c., \$2.90 and 98c. per gross ton. A loss of 50c. per ton by the third wholesaler intervening in the sale of one carload, was the only loss reported by wholesalers on the 750 cars of domestic sizes traced.

"On a small number of cars passing through the hands of four jobbers, the total margins taken on individual cars ranged from \$1 to \$2.25 per gross ton. On the car for which margins amounted to \$2.25 per ton the first wholesaler took 25c., the second 40c., the third 35c. and the fourth \$1.25 per ton.

"Some mining companies were found to have had special arrangements with wholesalers by which the mine billed the coal to the wholesaler at the prices approved by the Pennsylvania Fair Practices Committee with the understanding that if the wholesaler sold the coal at a price above the mine price billed plus a stipulated wholesale margin or commission, the wholesaler remitted the balance to the operator. Other mining companies sold coal to individuals, in some cases their own officers, at prices agreed upon with the Fair Practices Committee. These individuals then sold the coal to other wholesalers at higher prices. Such practices applied especially to shipments to destinations outside the State of Pennsylvania, thus indicating the ineffectiveness of state regulation of prices at the mine over coal entering into interstate commerce.

"Should a stoppage of mining occur on Sept. 1, it will accentuate the already panic demand for anthracite and unless the buyer and the retailer representing him learn from past experience unscrupulous wholesalers will have another opportunity to repeat their speculative activities of last fall and winter on any anthracite coal that may be on the market after Sept. 1, as well as following the resumption of mining. In the absence of any definite regulatory powers over either mine prices or wholesalers' margins on the part of the state and federal authorities, the extent of such activities and the amount of premium added by wholesalers will depend largely upon the willingness of the retailer and the consuming public to pay the prices demanded. It is only with the retailer's consent that the middleman may receive as much in margin as the coal miner receives in wages from the same ton of anthracite."

THE COAL COMMISSION has been meeting daily both morning and afternoon working on its final reports which are to be submitted on or before Sept. 22, when the life of the Commission will expire. The final report of the Commission not only will be of particular interest to the bituminous industry but also will carry general conclusions and recommendations applicable to anthracite and bituminous alike. It is expected that the Commission will issue previous to its final report certain sectional reports bearing on specific phases of the problems on which it was directed by Congress to make inquiry.

SEVERAL BRIEFS WERE FILED with the Coal Commission last week by the Bituminous Operators' Special Committee. Among the most important was one regarding transportation of coal, in which it was stated that the problem of obtaining an even flow of coal with supply and demand cannot be solved merely by improving transportation machinery without controlling seasonal fluctuations in demand, interruptions of production through strikes, etc.

Miners' Union Attacks Civil Rights Report

In a statement issued Sept. 10 attacking the report of the U. S. Coal Commission on the subject of violation of civil rights in the coal-mining industry the United Mine Workers of America says the report reads like a well-prepared brief in behalf of the non-union bituminous-coal operators of West Virginia and northeastern Kentucky. "Those non-union operators should immediately hold a meeting and give a rising vote of thanks to the Commission for that report," says the statement. "In the first place, the Commission lacks but one hair of giving approval to the employment by these non-union coal companies of private armed guards, thugs and gunmen, in spite of the fact that these desperadoes roam at will over the mountains of West Virginia and Kentucky with a roving commission to assault, beat up, blackjack and shoot members of the United Mine Workers of America who dare to suggest that the employees of these companies join the union.

"The Commission denounces union organizers for daring to go into these non-union fields and ask unorganized men to join the union. In other words, the report clearly attempts to place upon the United Mine Workers of America the blame for what happens in these non-union fields. Why did not the Commission declare that non-union coal companies have no right under the law or the Constitution to use force and coercion to prevent their men from voluntarily asserting their right to affiliate with a labor union?"

"The Commission devoted much space to telling of crimes which it says were committed by union miners, but it did not even mention the scores of crimes of company thugs and gunmen that were brought directly to the attention of the Commission by the United Mine Workers. . . .

"One of the very significant statements in the report says that 'the United Mine Workers of America have paid more than \$400,000 in damages for the destruction of the Willis Branch Coal Co.'s mines.' The United Mine Workers of America never paid any such sum for damages for the destruction of the mines of the Willis Branch Coal Co. or any other company. If the Commission's fund of information upon which it based its conclusions is not more authentic on other points than it is on this one the report is not of much value from the standpoint of facts and the public is not going to get value received for the \$600,000 of the people's money which the Commission has spent."

U. M. W. Allege Communist Move to Control Unions and Overthrow U. S. Government

How the Communist International of Moscow, working through the Communist revolutionary movement in America, is trying to gain control of the labor unions, and by that means overthrow the Government of the United States, is set forth in a series of six articles made public by the United Mine Workers of America at Washington this week. They reveal the efforts made to wreck the trade union, particularly the Mine Workers organization, the purpose of the exposé being to inform the American people of the scope and purport of the "hostile and inimical movement being carried on within their midst."

The overthrow and destruction of the government, with the establishment of an absolute and arbitrary dictatorship, and the elimination of all forms of popular voice in governmental affairs, is being attempted in a more gigantic scale, with more resolute purpose, and with more crafty design, than at any time in the history of the nation, it is declared.

The organization in this country is composed of more than 6,000 active leaders and lieutenants, and approximately 1,000,000 members, adherents and sympathizers, scattered in every state and province of the United States and Canada.

Efforts of the Communists to get control of the miners' union have continued since last year's strike ended with the agreement at Cleveland. In the first two months of this year these efforts centered on the proposition of bringing about an "outlaw" strike on April 1; later to drive a wedge into the United Mine Workers through the advocacy of government ownership of mines, in connection with which

it is declared the miners' union has not approved or adopted any plan for nationalization of the mines but adds that a committee was appointed to make a report with recommendations at the next convention of the union to be held next January.

The Herrin massacre is elaborated upon by the miners' organization, saying it was engineered by Communist agents, who according to their own statements, were engaged for seven weeks in preparation for the outbreak.

The Communists have attempted to "bore from within" organizations wherever possible in order to further their ends, having been particularly active against the United Mine Workers, because, besides being the largest single labor organization in the country, it is the nearest approach, in their opinion, to a "one big union," which is their conception of a labor union and their objective for all labor unions. The same tactics have been used for four years to seize and control the American Federation of Labor, the railroad labor unions, and the various other trade groups.

Working partly in the open, the Workers Party of America, it is charged, is another revolutionary organization, created under instructions from the Communist International, by the Communist Party of America. It is known as the "legal" party and its primary purpose is to shield the "underground" or "illegal" party. The mission of this party, it is declared, is fundamentally the same as that of the Communist Party of America.

Another organization, assisting the two revolutionary parties, as one of their direct subsidiaries, is the Trade Union Educational League. This League, it is charged, is cultivated and promoted by the Communists and Workers Parties and is the direct instrumentality of Lenin and Zinoviev, of the Communist International, and Losovsky, of the subsidiary Red Trade Labor Union International, for amalgamating the labor unions into the world revolutionary movement of the Communists.

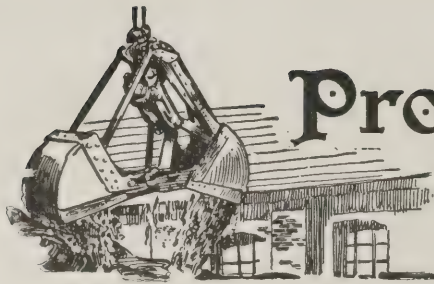
The Communists are hopeful that a nationwide strike of coal miners will take place next April, and with that end in view agents are working among the miners in Pennsylvania, Ohio, Indiana, Illinois, West Virginia and the Southwest.

Unconstitutional to Regulate Prices and Profits, Say Bituminous Operators

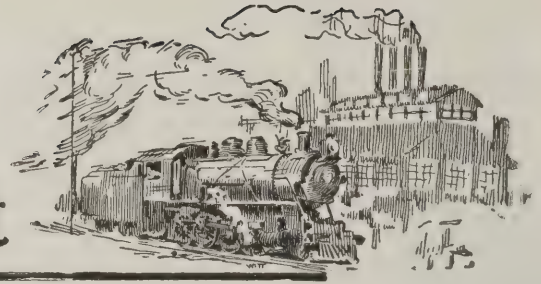
Regulation of prices and profits in the coal industry would be unconstitutional in normal times, according to a statement filed Sept. 1 by the Bituminous Operators' Special Committee with the U. S. Coal Commission. The Constitution of the United States, says the brief, forbids regulation of such a private competitive industry as coal mining, except in times of war or national emergency, citing in proof the decision of the Supreme Court on the Kansas Industrial Court Act, where Chief Justice Taft referred to coal mining as a business which could not be regulated.

The brief has special reference to a statement on accounting and finance filed with the Commission by the United Mine Workers last June. While this latter dealt with the anthracite industry in particular, the bituminous operators point out that the public is likely to make no sharp distinction between soft and hard coal.

The miners proposed plans for financing the coal industry that would involve eventual nationalization of the mines. Prior to this nationalization, it suggested that the mines be so regulated to give a 6 per cent return on the "investors' sacrifice." The operators contend that these proposals involve three fundamental fallacies: (1) That investors in coal properties are not entitled to profit by increase in the value of their property; (2) that regulation of profits in the coal industry is possible and desirable; (3) that accounting considerations may be made to govern in determining the facts of the industry. The first of these, according to the operators, is in reality a suggestion that the institution of private property be abolished, for the cardinal element of that institution is the fact that it allows the owner to benefit by increase in property value. Moreover, they propose that no compensation be given for possible loss and no reward for risks run, efficiency of management or good business judgment.



Production and the Market



Weekly Review

Settlement of the anthracite strike on the basis of Governor Pinchot's original four points is now assured and the wages and prices have been pegged up for two years. The coal trade is now waiting to see what the Governor can accomplish in cutting freight rates and distributor's margins.

With few exceptions, and then only in slight flurries, did the coal market in any part of the country show any improvement which could be attributed to the suspension of anthracite mining. Inquiry for soft coal increased in various sections, but prices were affected but little. For the third consecutive week *Coal Age* Index shows a slight advance in the average price of soft coal, registering 205 on Sept. 10, an increase of one point, with an average price of \$2.49.

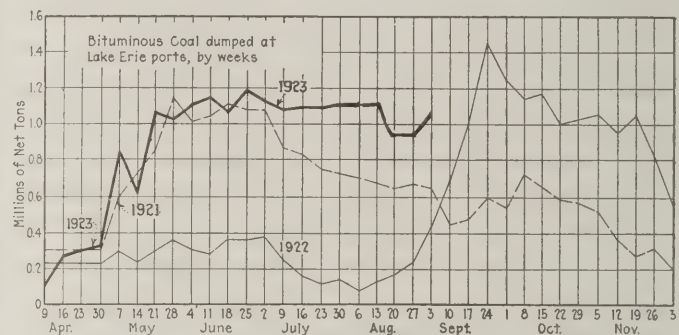
COUNTRY WELL PREPARED FOR STRIKE

The country was in excellent condition to forego the trouble which would have been occasioned by a much longer strike of the miners. There are upward of 57,000,000 net tons of soft coal in consumers' reserves and the output of anthracite during the coal year to Aug. 31 is estimated at 42,521,000 net tons, the largest production for any corresponding period since 1918. Production of hard coal in five days during the last week before the strike was 1,896,000 net tons.

Another high record for weekly output of soft coal was recorded during the week ended Sept. 1 with production amounting to 11,633,000 net tons, an increase of 250,000 tons over the previous week, which was the weekly record of that time. The output for the first 207 working days of 1923 was 368,706,000 net tons, which has not been exceeded since 1918, when it was 393,093,000 tons, and in 1917, when production amounted to 368,651,000 tons.

The ending of the anthracite trouble and the feeling that the danger point has been passed placed householders in the Middle West on easy street, with the result that there is no rush for any of the domestic

fuels. Buying is slow in New England and even retail dealers have plenty of coal on hand to meet a possible emergency. Shutdowns and curtailments in industrial plants are frequent. Inquiry for bituminous screened coals fell off somewhat. The week's idleness of the anthracite mines failed to create any considerable uneasiness among the dealers or consumers. It was estimated that approximately 75 per cent of hard-coal consumers had at least a part of their winter's fuel in their bins and that the balance could use substitutes. With the strike apparently settled wholesale and retail

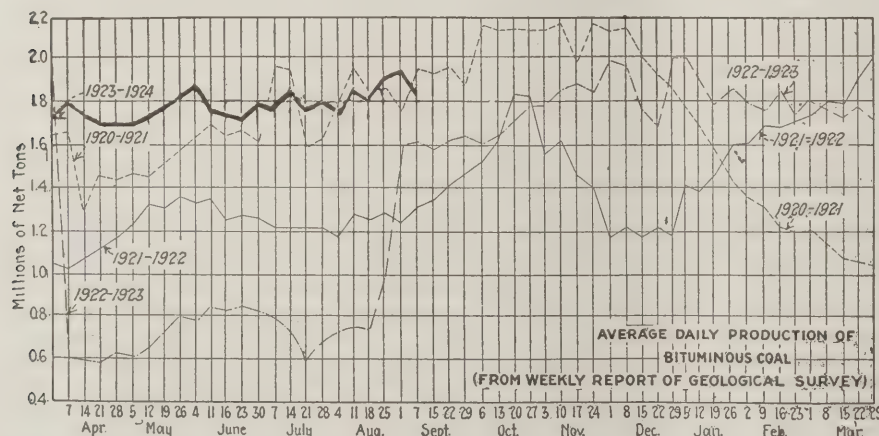


LAKE COAL DUMPED
(Net Tons)

	Week Ended Sept. 3	Season to Sept. 3
Fuel	977,385	18,859,934
Cargo	63,494	982,346
Totals	1,040,879	19,842,280

dealers expect that within a comparatively short time production will have been sufficient to supply all orders.

Inquiries for coke were numerous and considerable buying was reported by some producers. In some instances the larger sizes were asserted to be sold up. Inquiries of producers continued as far south as Birmingham, Ala. Buying of heating coke by Eastern dealers is fairly active.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Aug. 18	4,609,000	10,843,000
Aug. 25 (a)	6,736,000	11,383,000
Sept. 1 (b)	9,359,000	11,633,000
Daily average	1,560,000	1,939,000
Calendar year	232,918,000	368,706,000
Daily av. cal. year	1,122,000	1,939,000

ANTHRACITE

Aug. 18	38,000	1,858,000
Aug. 25	37,000	2,165,000
Sept. 1 (a)	37,000	1,896,000

COKE

Aug. 25 (b)	116,000	327,000
Sept. 1 (a)	138,000	322,000
Calendar year	4,223,000	13,173,000

(a) Subject to revision. (b) Revised from last report.

Chicago Trade Is Normal

Nothing has excited the coal trade in and around Chicago lately. The blow-up of the anthracite strike plus assurances from at least one official source has made householders feel that there is plenty of coal on hand, more ready to come, and nothing threatening to boost the price of most domestic coals much. The general result is that no rush is noticeable for any sort of domestic fuel. Yards are fairly well stocked with anthracite, Illinois and Indiana lump and Eastern smokeless at reasonable prices. Steam buyers are disappointed, as they have been counting on lump demand to lower the price of screenings.

Better conditions are noted in the retail call for coal in St. Louis, although this is not for anthracite, smokeless coal or coke. The greatest call seems to be for a high-grade bituminous purchasable below the top circular. The feeling prevails that coal is too high. Business is good in St. Louis only in spots and the demand is not general yet.

Louisville Retail Trade Wakes

The Louisville coal trade reported a stiffer market, due largely to the fact that domestic sizes are moving much better. Retailers, as usual, are buying on a rising market, and the anthracite strike drove domestic consumers to cover. Prices of prime lump and block coal are advancing.

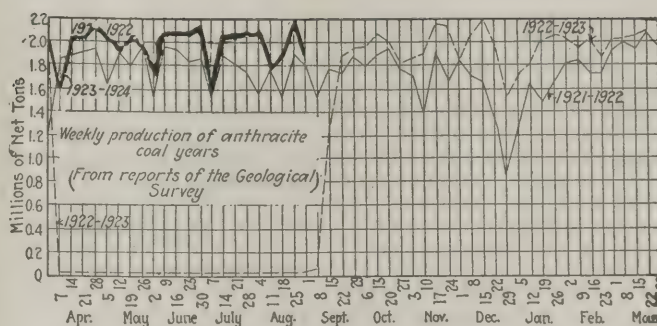
In eastern Kentucky the actual loading market appears at around \$3.50@3.75, with some coal quoted at \$4, while there are plenty of rumors of \$4.25 coal.

Most of the eastern Kentucky demand appears to be from retailers wanting domestic sizes. Industrials are taking screenings nicely. Mine-run is generally slow in movement.

While the western Kentucky coal trade is doing some kicking, the section is producing a lot of coal. From Aug. 25 to Sept. 1 inclusive the field produced 4,100 cars. The market is unsettled, but firmer.

Northwest Business Is Brisk

A record in shipments from the Duluth docks was established last month, when 23,914 cars were sent out. This compares with 18,911 cars in July and 20,313 in August



last year. Heavy shipments of anthracite, railroad and public-utility coal are going out now. On the whole selling is brisk. The Duluth market in both hard and soft coal is strong and shows every indication of higher prices soon. Shipments have fallen off slightly with only forty-five cargoes delivered last week, and of these only three were of hard coal.

The market is brisk in Milwaukee. Stove size anthracite is running a little scarce and the tendency on all coals is toward stiffer prices, though there has been no change in retail quotations on either coal or coke thus far this month. Dealers are not making contract prices, fearing an increase at the mines. Receipts to Aug. 31 were 601,000 tons of hard coal and 1,822,000 tons of bituminous.

Utah operators are finding it difficult to fill orders for lump owing to soft market for slack and intermediate sizes. Working time is around three days a week. A 50c. increase in retail prices is expected. The demand for domestic grades of Southwestern coal continues to stiffen as September advances. There has not, however, been a corresponding increase in demand for steam sizes. Few shut-down mines have reopened.

Ohio Markets Calm Down

There has been a demand for 4-in. and domestic lump coals at Cincinnati. It was hard to move steam run of mine and steam slack, but even with an oversupply there

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Sept. 11 1922	Aug. 27 1923	Sept. 1 1923	Sept. 10 1923†
Smokeless lump.....	Columbus....	\$6.40	\$5.85	\$5.95	\$5.75@ \$6.15
Smokeless mine run.....	Columbus....	5.75	3.00	3.00	2.75@ 3.25
Smokeless screenings.....	Columbus....	5.65	2.35	2.35	2.25@ 2.50
Smokeless lump.....	Chicago....	6.10	6.35	6.35	6.25@ 6.50
Smokeless mine run.....	Chicago....	6.00	3.35	3.35	3.25@ 3.50
Smokeless lump.....	Cincinnati....	7.00	6.10	6.25	6.00@ 6.50
Smokeless mine run.....	Cincinnati....	5.50	3.25	3.25	3.00@ 3.50
Smokeless screenings.....	Cincinnati....	5.50	2.75	2.50	2.00@ 2.75
*Smokeless mine run.....	Boston.....	8.35	5.05	5.10	5.00@ 5.15
Clearfield mine run.....	Boston.....	5.00	2.20	2.20	1.85@ 2.50
Cambria mine run.....	Boston.....	5.50	2.85	2.85	2.50@ 3.25
Somerset mine run.....	Boston.....	5.10	2.50	2.50	2.25@ 2.75
Pool 1 (Navy Standard).....	New York....	.....	3.25	3.25	3.00@ 3.50
Pool 1 (Navy Standard).....	Philadelphia..	.....	3.10	3.10	3.00@ 3.40
Pool 1 (Navy Standard).....	Baltimore....	.....	.....	.....	.....
Pool 9 (Super. Low Vol.).....	New York....	5.25	2.50	2.55	2.35@ 2.75
Pool 9 (Super. Low Vol.).....	Philadelphia..	5.60	2.55	2.55	2.45@ 2.75
Pool 9 (Super. Low Vol.).....	Baltimore....	6.10	2.50	2.45	2.40@ 2.50
Pool 10 (H.Gr.Low Vol.).....	New York....	4.80	2.25	2.25	2.10@ 2.30
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	5.30	2.15	2.15	2.00@ 2.35
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	5.75	2.25	2.25	2.25@ 2.30
Pool 11 (Low Vol.).....	New York....	4.35	2.00	2.00	1.90@ 2.05
Pool 11 (Low Vol.).....	Philadelphia..	4.85	1.80	1.85	2.00@ 2.30
Pool 11 (Low Vol.).....	Baltimore....	4.85	1.90	1.90	2.00

High-Volatile, Eastern	Market Quoted	Sept. 11 1922	Aug. 27 1923	Sept. 1 1923	Sept. 10 1923†
Pool 54-64 (Gas and St.)..	New York....	5.15	1.75	1.70	1.70@ 1.90
Pool 54-64 (Gas and St.)..	Philadelphia..	4.60	1.80	1.85	1.70@ 2.00
Pool 54-64 (Gas and St.)..	Baltimore....	4.60	1.85	1.85	1.75
Pittsburgh sc'd gas.....	Pittsburgh....	2.90	3.00	3.00	2.95@ 3.10
Pittsburgh gas mine run.....	Pittsburgh....	2.45	2.50	2.50	2.45@ 2.60
Pittsburgh mine run (St.)..	Pittsburgh....	4.65	2.45	2.30	2.25@ 2.35
Pittsburgh slack (Gas).....	Pittsburgh....	.....	1.55	1.55	1.50@ 1.60
Kanawha lump.....	Columbus....	6.40	3.05	3.05	2.85@ 3.50
Kanawha mine run.....	Columbus....	6.00	1.85	1.90	1.75@ 2.10
Kanawha screenings.....	Columbus....	5.75	1.05	1.15	1.15@ 1.25
W. Va. lump.....	Cincinnati....	7.00	3.50	3.60	3.50@ 4.00
W. Va. Gas mine run.....	Cincinnati....	7.00	1.75	1.80	1.65@ 2.00
W. Va. Steam mine run.....	Cincinnati....	5.65	1.75	1.80	1.65@ 2.00
W. Va. screenings.....	Cincinnati....	5.40	1.20	1.35	1.10@ 1.35
Hooking lump.....	Columbus....	6.25	2.75	2.75	3.00@ 3.25
Hooking mine run.....	Columbus....	5.65	1.85	1.85	1.85@ 2.00
Hooking screenings.....	Columbus....	5.40	1.10	1.10	1.15@ 1.30
Pitts. No. 8 lump.....	Cleveland....	5.75	2.65	2.65	2.35@ 3.00
Pitts. No. 8 mine run.....	Cleveland....	5.10	2.10	2.10	2.05@ 2.15
Pitts. No. 8 screenings....	Cleveland....	5.10	1.35	1.35	1.25@ 1.40

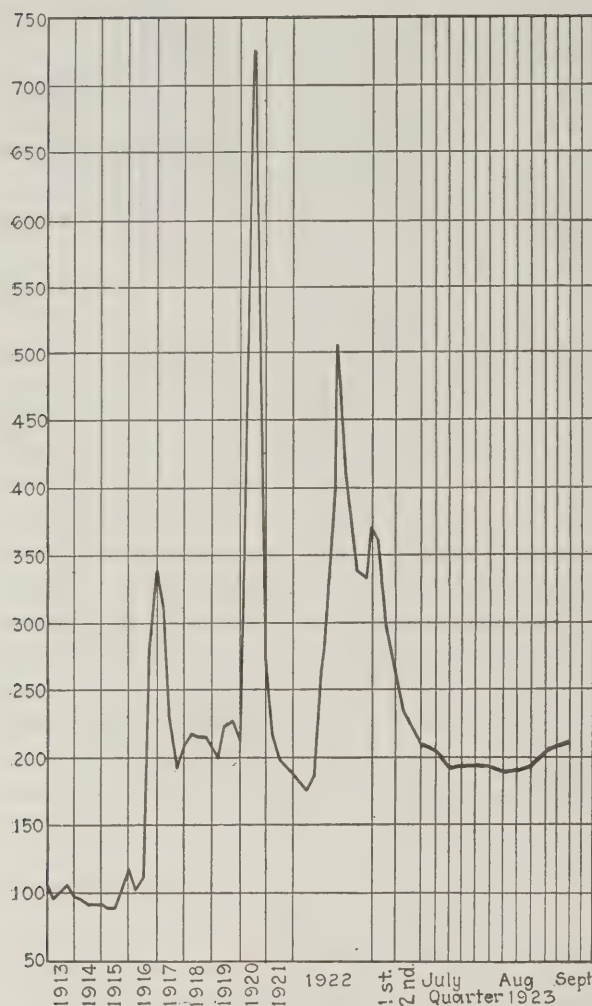
Midwest	Market Quoted	Sept. 11 1922	Aug. 27 1923	Sept. 1 1923	Sept. 10 1923†
Franklin, Ill. lump.....	Chicago....	\$5.40	\$4.20	\$4.20	\$4.00@ \$4.35
Franklin, Ill. mine run.....	Chicago....	4.75	3.00	3.00	2.75@ 3.25
Franklin, Ill. screenings....	Chicago....	4.90	1.65	1.80	1.65@ 1.85
Central, Ill. lump.....	Chicago....	4.95	2.60	3.10	3.00@ 3.25
Central, Ill. mine run.....	Chicago....	4.50	2.20	2.20	2.10@ 2.35
Central, Ill. screenings....	Chicago....	4.30	1.40	1.40	1.25@ 1.40
Ind. 4th Vein lump.....	Chicago....	5.25	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run.....	Chicago....	4.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings....	Chicago....	4.60	1.55	1.60	1.50@ 1.75
Ind. 5th Vein lump.....	Chicago....	5.10	2.75	2.75	2.50@ 3.00
Ind. 5th Vein mine run.....	Chicago....	4.65	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings....	Chicago....	4.40	1.40	1.40	1.30@ 1.40
Mt. Olive lump.....	St. Louis....	.....	3.00	3.10	3.00@ 3.25
Mt. Olive mine run.....	St. Louis....	.....	2.00	2.05	2.20@ 2.30
Mt. Olive screenings.....	St. Louis....	.....	1.50	1.35	1.40@ 1.50
Standard lump.....	St. Louis....	4.65	2.50	2.60	2.50@ 2.75
Standard mine run.....	St. Louis....	2.85	1.85	2.05	1.80@ 2.30
Standard screenings.....	St. Louis....	3.35	1.00	1.00	.90@ 1.00
West Ky. lump.....	Louisville....	4.75	2.40	2.55	2.50@ 2.75
West Ky. mine run.....	Louisville....	4.25	2.10	1.90	1.85@ 2.10
West Ky. screenings.....	Louisville....	4.00	1.05	.90	.90@ 1.05
West Ky. lump.....	Chicago....	4.25	2.75	2.75	2.50@ 3.00
West Ky. mine run.....	Chicago....	4.25	1.60	1.75	1.85@ 2.10

South and Southwest

Big Seam lump.....	Birmingham..	\$3.95	\$3.50	\$3.75	\$3.65@ \$3.90
Big Seam mine run.....	Birmingham..	3.30	1.95	1.95	1.75@ 2.15
Big Seam (washed).....	Birmingham..	3.80	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago....	4.25	3.10	3.10	3.00@ 3.25
S. E. Ky. mine run.....	Chicago....	4.25	1.80	1.80	1.90@ 2.75
S. E. Ky. lump.....	Louisville....	6.25	3.00	3.10	2.75@ 3.50
S. E. Ky. mine run.....	Louisville....	5.65	1.85	2.0	1.75@ 2.25
S. E. Ky. screenings.....	Louisville....	5.25	1.10	1.20	1.00@ 1.40
S. E. Ky. lump.....	Cincinnati....	7.00	3.25	3.75	3.50@ 4.00
S. E. Ky. mine run.....	Cincinnati....	5.50	1.70	1.80	1.50@ 2.00
S. E. Ky. screenings.....	Cincinnati....	5.40	1.15	1.45	1.00@ 1.65
Kansas lump.....	Kansas City..	6.00	4.50	4.50	4.50
Kansas mine run.....	Kansas City..	5.00	3.50	3.50	3.50
Kansas screenings.....	Kansas City..	2.75	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923	1922
Sept. 10	205	204
Sept. 1	204	202
Aug. 27	202	427
Sept. 1	202	427
Weighted average price	\$2.49	\$2.47
	\$2.44	\$5.17

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

were practically no concessions in prices. One upward flurry tells the whole story of the anthracite strike so far as that market is concerned. Conditions calmed down but the market has retained what it gained at that time. Smokeless lump and egg hold strong, and some producers and selling agents claim to be sold up for the month. The strike in the hard-coal fields resulted in a better tone in the Columbus market. Buying is more liberal and prospects are considered much brighter. The best feature is the retail demand, many householders coming into the market for their winter supply. Steam coal demand is also showing an improvement, some purchasers getting anxious and disposed to stock up. Railroad demand is fair and utilities purchase heavily. Operators and jobbers serving the Cleveland territory say that the flurry caused by the anthracite situation began to subside as soon as there were indications of a settlement.

The Pittsburgh market has been distinctly quiet as to actual business and inquiry. The reduced demand is matched by reduced offerings. Instead of buying as it were from hand to mouth, buying recently has been in larger quantities, with the result that operators now find themselves in comfortable positions, although they have the same customers as formerly and the rate of shipping has not changed materially.

Business Scarce in New England

In New England there continues a great dearth of spot business. Except for scattering purchases that amount to very little in aggregate tonnage there is almost a complete absence of buying. The large industries are in no different situation than during July and August.

Coals from central Pennsylvania share the general dullness. Buyers are frankly not interested and there is no real encouragement for September and October. More than a few contracts undertaken in May for delivery through the summer have suffered cancellation at the hands of the purchaser for no other reason than the fact that fuel consumption has fallen far below what was relied upon as a normal season.

At Hampton Roads there is only a light movement coastwise. Spot sales are few and far between.

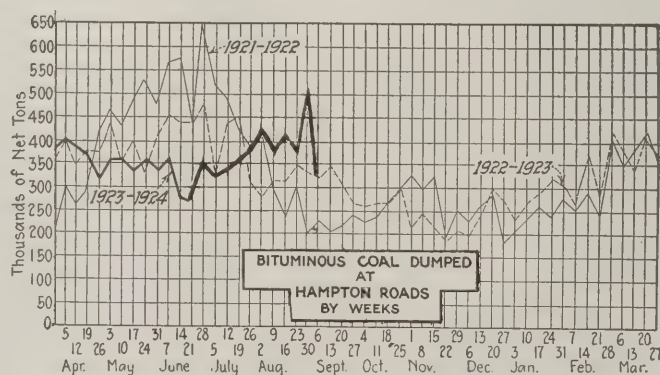
Seaboard Markets Unruffled

In the territory served by the New York market the idleness of the anthracite mines failed to create any excitement. Demand and inquiry remained dull. Inquiry for the bituminous screened coals fell off, but coke was in good call and prices generally showed advances. Conditions, so far as demand for soft coal is concerned, were similar in the Philadelphia market. Numerous producers expected better business, and while it is not visible there is a belief that there was a slight improvement. Consumers have come into the market and it is believed the autumn outlook is more than fair. Baltimore buyers are not inclined to buy heavily, now that the hard-coal strike has been settled, as it is not evident to them that soft-coal prices will change to any great extent. In West Virginia there has not been as much activity as might have been expected as a result of the anthracite mine suspension.

Anthracite Prices Fluctuate

The settlement of the strike in the anthracite mines materially changed the market so far as quotations for independent hard coals were concerned. Prices fluctuated considerably during last week, every day bringing new quotations based upon developments in the negotiations at Harrisburg. While quotations as high as \$14.75 for the domestic coals were reported on Thursday, these had dropped more than \$2 on Monday of this week and the indications pointed to further concessions. About the only coal offered in the New York market was in boats, and prices were quoted alongside. Washery egg, stove and chestnut sizes were offered around \$12.50 at loading points but there was little buying, dealers believing that the miners would soon return to work. There was some offering and buying of briquets at \$6.35@\$. There was considerable inquiry for Welsh anthracite, mostly from New England, although dealers from New York also asked prices. It is reported that two cargoes are due to arrive in New York in about ten days.

DUE TO THE SUSPENSION OF MINING in hard-coal fields and the practical stoppage of shipments from the mines, quotations are merely nominal, and are not printed. Coal Age quotations on anthracite will be resumed when the new prices are available.



Foreign Market And Export News

Storms Delay Loading of Welsh Coals; Output Gains Slightly

Increased stocks of the lower grades of coal, due to delays in loading because of recent storms, are reported from the South Wales market.

Output of coal in Great Britain's mines during the week ended Aug. 25 was 5,163,000 tons, says a cable to *Coal Age*. This compares with 5,124,000 tons in the previous week, and 5,148,000 tons in the corresponding week of last year.

Though more active than last week the coal market in Wales is comparatively quiet. As a general rule supplies are in excess of demand, except in the case of one or two special brands. European buyers are cautious due to the state of the exchanges. France, Belgium and Italy are holding back, and the German business is slow.

On the other hand European stocks are undoubtedly low, and this, combined with the gradual decline in the price of Welsh coal, leads to the belief that the Continental demand must revive before long.

The situation in the U. S. anthracite field was watched closely, and Welsh anthracite operators were preparing for a possible increase in demand.

The Newcastle market seems to be gradually going from bad to worse. It is hoped that September will see an improvement. Inquiries are at their lowest ebb and contractors are taking only minimum requirements.

There are several inquiries circulating in Newcastle which may lead to a temporary improvement.

Hampton Roads Market Dull

The situation at Hampton Roads was dull last week, with an appreciably dropping off in exports and with a number of vessels reported en route for cargoes failing to appear. The piers dumped on an indifferent schedule, purchasers appearing reluctant to come in the market under present conditions.

Shippers were anxiously awaiting the outcome of the hard coal miners' strike, with the general belief that some settle-

ment would be reached before the situation became serious. Contracts were not considered pending the outcome of this controversy.

Coastwise business showed some increase, as did the bunker trade, the export business alone falling off. Some leading shippers expressed the opinion this foreign trade would not be likely to increase this winter. The tone of the market was dull.

United States July Exports By Custom Districts

	(In Gross Tons)		
	Anthracite	Bituminous	Coke
Maine and New Hampshire.....		1	268
Vermont.....	1,677	615	1,099
Massachusetts.....	12		
St. Lawrence.....	136,143	159,742	881
Rochester.....	73,722	83,489	13
Buffalo.....	207,800	253,655	23,449
New York.....	11,196	4,092	168
Philadelphia.....	11,651	30,960	3,504
Maryland.....	2	195,296	
Virginia.....	4,274	433,956	270
South Carolina.....		11,671	
Florida.....		3,556	302
Mobile.....		1,793	31
New Orleans.....	5	258	2,534
Galveston.....		3	
San Antonio.....		401	255
El Paso.....	192	2,547	875
Arizona.....		3,534	2,790
Los Angeles.....	11	3	
San Francisco.....	2	150	5
Washington.....	132	343	
Alaska.....	4		
Hawaii.....	3,563		
Montana and Idaho.....		30	
Dakota.....		3,207	968
Duluth and Superior.....	1,795	1,059	133
Michigan.....	88	113,009	13,166
Chicago.....			9,751
Ohio.....	3,101	974,871	
Totals.....	455,370	2,278,241	60,462

French Mines Meet Demand

Output of French industrial coals are sufficient to meet the demand, although shipments from the mines are delayed. This condition is believed to be but temporary, as hopes are entertained for better deliveries from the Ruhr. Consumers are not inclined to

buy any more British coal than absolutely necessary, because of the high prices.

House coals supplies are low and if no improvement occurs before fall there will be insufficient stocks on hand to meet the winter demand. Inquiry is expected to increase during the month.

Export Clearances, Week Ended Sept. 8, 1923

FROM BALTIMORE	
For France:	Tons
Br. SS. Rathlin Head.....	7,600
Dan. SS. Yokohama.....	4,140
Fr. SS. Capiteinnode Masne.....	6,597
For Germany:	
Ger. SS. Porta.....	4,639
For Canada:	
Am. SS. Willfaro.....	999
Nor. SS. Havur.....	4,757
For Italy:	
Ital. SS. Aster.....	10,573
Ital. SS. Ida.....	6,182

FROM PHILADELPHIA

For Brazil:	
Br. SS. Rio Blanco, for Rio de Janeiro.....	—
For Cuba:	
Nor. SS. Stabell, for Havana.....	—
For France:	
Br. SS. Bankdale, for Marseilles.....	—
For Nova Scotia:	
Br. Schr. Arthur H. Zwicker, for Halifax.....	—

FROM HAMPTON ROADS

Philippine Islands:	
Amer. Schr. Rachek, for Manapla.....	702
Canada:	
Ital. SS. Stromboli, for Three Rivers.....	6,958
Amer. Schr. Velma M. Hamlin, for St. Johns.....	1,595
Canary Islands:	
Amer. Schr. Anandale, for Santa Cruz de Tenerife.....	2,189
Holland:	
Br. SS. Ethelwolf, for Amsterdam.....	6,582
Dominican Republic:	
Amer. Sch. Horace M. Bickford, for Santo Domingo.....	602
Cuba:	
Br. SS. Berwindvale, for Havana.....	7,388

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Aug. 30	Sept. 7
Cars on hand.....	1,259	1,403
Tons on hand.....	73,967	81,979
Tons dumped for week.....	145,847	108,351
Tonnage waiting.....	11,000	1,500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,791	1,904
Tons on hand.....	104,350	111,140
Tons dumped for week.....	121,460	107,952
Tonnage waiting.....	4,000	7,042
C. & O. piers, Newport News:		
Cars on hand.....	2,047	2,372
Tons on hand.....	107,265	120,688
Tons dumped for week.....	188,714	90,602
Tonnage waiting.....		6,005

Pier and Bunker Prices, Gross Tons

	PIERS	
	Sept. 1	Sept. 8†
Pool 9, New York.....	\$5.35@ \$5.75	\$5.35@ \$5.75
Pool 10, New York.....	4.75@ 5.25	4.75@ 5.25
Pool 11, New York.....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia.....	5.20@ 5.65	5.25@ 5.70
Pool 10, Philadelphia.....	4.60@ 5.10	4.65@ 5.25
Pool 11, Philadelphia.....	4.15@ 4.50	4.35@ 4.80
Pool 1, Hamp. Roads.....	5.25	5.25
Pools 5-6-7, Hamp. Rds.	4.60@ 4.75	4.35@ 4.50
Pool 2, Hamp. Roads.....	5.00	5.00

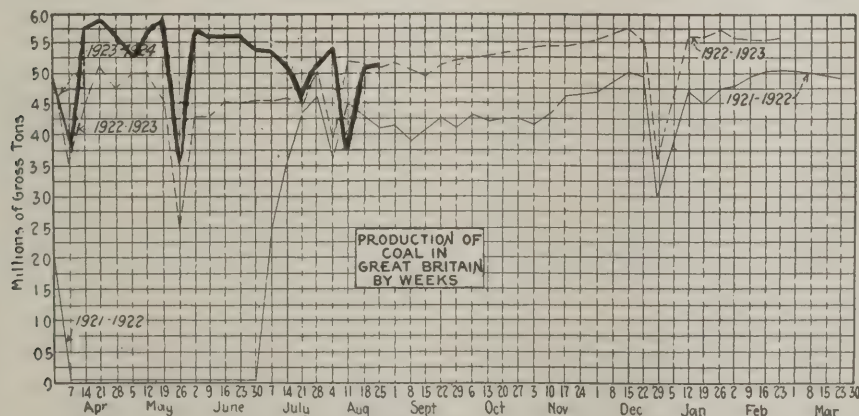
BUNKERS

Pool 9, New York.....	5.65@ 6.05	5.65@ 6.05
Pool 10, New York.....	4.75@ 5.25	4.75@ 5.25
Pool 11, New York.....	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia.....	5.60@ 6.00	5.60@ 6.05
Pool 10, Philadelphia.....	5.00@ 5.50	5.00@ 5.50
Pool 11, Philadelphia.....	4.50@ 4.95	4.65@ 5.00
Pool 1, Hamp. Roads.....	5.25	5.25
Pool 2, Hamp. Roads.....	5.00	5.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Sept. 1	Sept. 8†
Admiralty, large.....	29s.	28s.6d. @ 30s.
Steam smalls.....	20s. @ 21s.	20s.
Newcastle:		
Best steams.....	23s. @ 24s.	24s. @ 24s.6d.
Best gas.....	23s.6d. @ 24s.	21s. @ 24s.6d.
Best bunkers.....	22s. @ 23s.	22s.6d. @ 24s.



News Items From Field and Trade

ALABAMA

The Townley Coal Co. has been incorporated in Townley, with a capital of \$50,000, by M. K. Lang, R. Voight and others.

The Morrison Coal Co. has been incorporated in Birmingham by A. K. Foster, Vernon M. Brown and others.

ARKANSAS

Hiram Fuller, who resides on the Warren and Pine Bluff road about six miles from Pine Bluff, while digging water well on his farm struck a vein of peat at a depth of 90 ft.

COLORADO

The Boulder Valley Coal Co. plans to make extensive improvements on its property in Lafayette.

ILLINOIS

The W. G. Hughes Coal Co., Chicago, has just been incorporated with a capital stock of \$30,000, to deal in coal mines. The incorporators are C. I. Abbate, W. G. Hughes and K. R. Leva.

Appointment of W. H. Smithburne as general sales manager of the Great Lakes Coal & Coke Co. has been announced. Mr. Smithburne has been connected with the Bickett Coal & Coke Co. for sixteen years, during the last seven of which he was secretary of the firm. Previous to this he was associated with the Burlington R.R.

The validity of Chicago's bulk load weight ordinance, which has been the subject of much dispute, is soon to be settled. Following the unsuccessful attempt, recently, to secure an annulment of the law by means of an injunction, the matter is to be fought out in the courts on an appeal of a conviction. Although 123 firms and individuals have joined the fight, there are but two exclusive coal dealers included, most of the petitioners being dealers in building materials.

Shafts are swiftly sinking, a railroad is under construction and a town is laid out at Nason, in Jefferson County, where the Illinois Coal Corporation is building its new mine, planned to be a 10,000-tonner. The two shafts were down about 150 ft. on July 4 and three miles of the Jefferson & Southwestern R.R., owned by the corporation, were built. A recent sale of town lots disposed of considerable property.

INDIANA

In order to relieve the coal cars for commercial service during the coming months, the Fort Wayne division of Pennsylvania R.R. is storing its winter supply of coal at various points along the line. A total of 85,000 tons is allotted the division. Of this amount 45,000 tons will go to Fort Wayne, Ind. The fuel is being stored in the east yards and is being unloaded at the rate of 700 tons a day.

KENTUCKY

The See-See Coal Co. has been incorporated in Pineville, with a capital of \$75,000, by R. I. Cawthorne, E. R. Martin and others.

B. D. Williams and Adolph Woodruff, of Mannington, Ky., and W. W. Minter, of Memphis, Tenn., have organized the Jellicoe Coal Co. with \$500,000 capital for mining coal in the Whitesville section.

NEW YORK

Pattison & Bowns, Inc., of New York City, announce that as of Sept. 1 they succeeded the firm of Williams & Peters as sales agents for the Pennsylvania Coal Co. and affiliated companies, and have the exclusive sale of Pittston coal in the Eastern territory. They will conduct this business as their Pittston division. The unfilled orders of Williams & Peters will be entered on their books and unless countermanded by the parties who have placed the orders with them, will endeavor to make shipments subject to the usual terms and conditions. Pattison & Bowns have taken over the

offices and staff of Williams & Peters and, as far as possible, will conform to their sales policies. The business of the Pittston division will continue to be conducted from Room 1014, Whitehall Building, formerly the offices of Williams & Peters.

According to the New York State Committee on Public Utility Information, which has made a survey of the stocks on hand, the gas companies of New York State have in reserve more than 300,000 tons of anthracite, which is equivalent, on the average, to a five months' supply for those companies making gas from anthracite exclusively. In addition to this, plants using soft or "gas" coal have on hand, according to the latest information, a three months' supply on the average.

Harold C. Knapp, formerly of the Irving Bank-Columbia Trust Company, has assumed the position of trust officer of the Coal and Iron National Bank of the City of New York, succeeding Arthur A. G. Luders, resigned. Mr. Knapp was graduated from the New York University Law School in 1908 and, being admitted to the bar, practiced law until 1918. He then joined the Irving Trust Co. Mr. Knapp is a member of the faculty of the New York University School of Commerce and Finance and the co-author of a volume entitled "Wills, Estates and Trusts."

OHIO

The Tuscora Coal Co., Coshocton, has been chartered with a capital of \$25,000 to operate mines in the Tuscarawas field. Incorporators are D. E. Morris, W. H. Morris, Mathew Banks, Charles W. Banks, Albert F. Baier and J. G. Gamble.

Additional contracts for coal for various state institutions have been awarded by the Ohio Board of purchase as follows; Ohio Building, Columbus, 1,500 tons of Hocking nut, pea and slack, Burns Coal Co., at \$3.49 delivered; State School for the Blind, Columbus, 2,000 tons of Hocking nut, pea and slack, Burns Coal Co., Columbus, at \$3.49 delivered; State House, Columbus, 1,500 tons of Hocking mine-run, Burns Coal Co., Columbus, at \$4.24 delivered; Wyandotte Building, Columbus, 500 tons of Hocking mine-run, Burns Coal Co., Columbus, at \$4.24.

The Dominion Coal Co., of Columbus, chartered several weeks ago with an authorized capital of \$25,000, has been organized by the election of K. W. Rittenhouse as president and D. F. Shaffer as secretary and treasurer. The company will be exclusive sales agent for the Standard Coal Co., at Nelsonville, and will also engage in the general jobbing business. D. F. Shaffer is the owner of the Standard Coal Co. mines. K. W. Rittenhouse was formerly sales manager of the Consolidated Mining Co. of Columbus.

A series of accidents on Aug. 30 in Belmont County, across the river from Wheeling, resulted in one man being killed and four other injured in the mines.

OKLAHOMA

The Bull Creek Coal Co., of which A. D. Rushmart, Locust Grove, is manager, has 120 acres of coal land near Inola, under development and is installing a steam shovel and other equipment.

PENNSYLVANIA

Anticipating an increased demand for crushed coal as a domestic and heating fuel, two new crushers have recently been installed in the Connellsville field. The Reliance Coal & Furnace Co., at its Denbo plant in the lower Connellsville field, has its crusher well on the way to completion, while the Mahoning Coal & Coke Co. is making rapid progress with its crusher at the Peerless works in the Connellsville district. Other crushing plants which have not been in operation for some time are being overhauled.

The Clearfield Bituminous Coal Co. has awarded a contract for the erection of a new modern tippie at its Clymer mine to the Pittsburgh Coal Washing Co. It will be equipped with screens, picking tables, rock-handling conveyors, and will be able to load coal with the rock conveyor.

While the mine suspension is on officials of the Wolfe Coal Co. is working on plans to open up a stripping operation in close proximity to their mines at Lattimer. A valuable bed of coal will be unearthed as soon as the suspension is over. A large tract of timber land has to be cleared at the stripping site. The timber cut will be utilized in and about the mines when operations resume.

Cosgrove & Co., coal operators and shippers at Johnstown, have purchased the R. L. Sproat mine operations and coal holdings near Windber. With the purchase of the Sproat interests, a new firm was formed, which will be known as the Windber Standard Coal Co., with H. J. Meehan, an officer of Cosgrove & Co. and of the Cosgrove & Meehan Coal Corporation as president, and John C. Cosgrove, president of the Cosgrove & Co., as secretary-treasurer of the new firm. A charter for the firm has been applied for. The new owners have taken charge of the newly acquired operations and are making arrangements to increase the output. Modern equipment has been ordered and work on a new mine opening will be started at once, it is announced.

Graham Bright, formerly general engineer in charge of the coal and metal mining department of the Westinghouse Electric & Manufacturing Co., who has joined the firm of Howard N. Eavenson & Associates, mining engineers, of Pittsburgh, was the guest of honor Aug. 14 at a farewell dinner given at the Edgewood Country Club,



GRAHAM BRIGHT

Pittsburgh, by his friends of the industrial company with which he was connected for twenty-one years. Mr. Bright will give special attention to power-house systems, power-plant appraisals, transportation and transmission systems for coal and metal mines and general industrial power application.

The first skirmish to their battle for a lower and more uniform coal valuation was won recently by owners of Greene County coal lands who appealed the 1922 triennial coal assessment. Judge G. G. Sloan, president judge of the Clairton County courts, sustaining the objections of the Shannopin Coal Co. and other appellants, ordering the coal valuation returned to the 1921 figures and the refunding of the excess taxes collected by the county and townships from the appellant coal owners. Under the ruling of the court, however, taxes will be refunded only to those who joined in the appeal of the assessment. Altogether there were about 200 appellants, but the only hearing held was on the appeal of the Shannopin Coal Co., a holding corporation of the Jones & Laughlin Steel Co., which owns a block of about 14,000 acres of Pittsburgh coal in Greene, Perry and Dunkard townships. The coal owners complained that the county commissioners had not assessed the coal uniformly and that it was assessed at a higher figure in proportion to its value than the surface. The county commissioners in March, 1922, sitting as a board of revision, raised the coal valuation in every township and borough of the county, the increase ranging from 10 per cent to 60 per cent.

The Olyphant Coal & Coke Co., formerly controlled by the late Senator William E. Crow, on Sept. 5 was placed in the hands of receivers by Judge E. H. Reppert. W. W. Parshall, J. W. Abraham and W. L. Byers, of this place, were named temporary receivers. The liabilities were declared to be \$423,000 and creditors filed petitions de-

clarifying that a fair value of the property exceeds the liabilities and that overproduction of coal and the present state of the market made a receivership advisable in order to preserve the equity of the company. The company owns 500 acres of land north of Uniontown.

Possibility of a legal test of the law passed at the last session of the Legislature, compelling anthracite companies to furnish coal to schools, churches, hospitals and other public institutions where public health is endangered, may result from inability to obtain a supply of coal from local companies or dealers for St. Mary's German Catholic Church. The bill which compels the companies to furnish anthracite under penalty of a \$1,000 fine or a year in prison, was sponsored by Representative Thomas O'Boyle, and was the outgrowth of the situation in Olyphant last winter, when a shortage of coal resulted in the seizure by a body of citizens of several carloads which were distributed among the church and schools in that borough.

Twenty-one teachers of engineering from twenty-one widely scattered colleges and universities spent the month of July in the East Pittsburgh works of the Westinghouse Electric & Manufacturing Co. renewing their contact with industry in the interest of better teaching. This is the thirteenth consecutive season that a group of engineering teachers has gathered at the Westinghouse company, and during these years more than four hundred engineering teachers representing every engineering college in the United States and many of the leading institutions in foreign lands have participated in the conferences. Each man was assigned to the department or section of the works in which he would be in contact with the men who could best give him what he wanted. Several of the men went into various kinds of testing, others into engineering departments, and a few into the manufacturing sections. A similar program at which emphasis was entirely on steam equipment was conducted at the South Philadelphia plant of the Westinghouse company.

The executive committee of the Coal Consumers' Association of Philadelphia on Aug. 30 protested against a wage increase to anthracite miners in a telegram to Governor Pinchot as follows: "We regret to learn that the concessions proposed for settling the anthracite coal controversy include a 10 per cent increase to mine workers and what is equivalent to an acceptance of the check-off. This is not time for advancing costs. The public demands liquidation of all items making up the retail price, including royalties, wages, operators' margin, freight, brokerage and retailers' margin. We are convinced that these features of the proposed plan of settlement are without justification even from the viewpoint of political expediency and we protest against their acceptance."

TENNESSEE

The Crystal Ice & Coal Co., of Erwin, proposes building an addition to its coal tippie.

TEXAS

The Palestine Coal Co. has been incorporated in Palestine, with a capital stock of \$150,000, by R. McDonald, T. C. Richey and others.

UTAH

The Blazon Coal Co., through L. F. Rains, president, and A. H. Dennison, secretary, has filed an amendment to its articles of incorporation increasing the capital stock from \$200,000 to \$300,000.

VIRGINIA

William H. Moore, formerly with the Chesapeake & Ohio Coal & Coke Co., is now with the Fort Dearborn Coal Co. in the capacity of inland sales agent with offices at Norfolk. He is at present at the company's mines in West Virginia, studying conditions.

The Clinch River Coal Corporation, of Virginia, has purchased the properties of the Odle Coal Corporation. They are located at Coeburn, on the Pocahontas Division of the Norfolk & Western Ry. and consist of 634 acres. The new owners plan to increase the production of the mines, particularly the domestic sizes. William J. Jegen, of Edge Hill, Pa., is president of the Clinch River company.

WEST VIRGINIA

Coal loadings on the Chesapeake & Ohio Ry. surpassed all previous loadings for any

one day on Monday, Aug. 27, when a total of 4,354 cars was reached, equivalent to 217,700 tons based on an average of 50 tons to a car. The best record previously established was on May 8 of the present year, when a total of 4,136 cars were loaded. All monthly records were broken during August, when the company transported 73,700, or a total of 3,685,000 tons, an increase of 301,750 tons over July, when a new monthly record was established.

Notwithstanding the general dullness which has prevailed throughout northern West Virginia during the summer months, all the Pittsburgh vein operations in the Monongalia field and all but two of the Sewickley mines in the same field have been running virtually on a full-time basis. The output on Scott's Run is averaging something like 250 cars of coal a day. On the Morgantown & Kingwood mines are being operated on a part-time basis only.

Methods of organization and control of work in the coal mines with particular reference to discipline and supervision as compared with factory discipline are being investigated in West Virginia mines by Carter Goodrich, of Amherst College. Mr. Goodrich began his investigation in the Winding Gulf District of West Virginia late in August, being the guest of E. E. White, president of the E. E. White Coal Company and also president of the Winding Gulf Operators Association.

The Tildesley Collieries Co., of Charleston, has been launched by Charleston capitalists with a view to operating in the Kanawha field. The company has an authorized capital stock of \$100,000. The incorporators are E. W. Tildesley; V. G. Tildesley, S. S. Tone, P. M. Stone and A. M. Grabill, all of Charleston, W. Va.

The trial of Howard R. Harrah, foreman of the jury which was unable to reach a verdict in the trial of William Blizzard, and who was indicted by a Greenbrier County Grand Jury about a month ago, charged with having accepted \$700 to bring about a disagreement on the jury, has been set for Sept. 17 at Lewisburg. G. Clarence Hickey also will go on trial on that date. Hickey is alleged to be an agent of the United Mine Workers and is alleged to have made the payment of \$700 or about that sum to Harrah.

The number of coal companies organized in West Virginia in July was the smallest for the year, only seven, having an aggregate capitalization of \$215,000 being formed. In the list of new companies formed were the following: J. W. Powell Coal Co. of Charleston, \$15,000; Glen Valley Coal Co. of Wheeling, \$50,000; Big Coal Land Co. of Charleston, \$25,000; Sugar Creek Coal Sales Co., \$50,000; Dell Coal Co. of Charleston, \$50,000; Virginia Coal & Coke Agency, Inc., of Huntington, \$20,000; Pond Coal Co. of Charleston, \$5,000. Seven West Virginia coal concerns, as follows, surrendered their charters during July: Princess Coal Co., Richland-Brooke Coal Co., Gorman Coal & Coke Co., Springdale Coal Co., Flynn Coal & Coke Co. and Kildow Coal Co.

Contracts have been awarded by the Consolidated Coal Co. for a large number of new houses of modern design for the occupancy of miners at the Coalwood plant of the company, in McDowell County. Since the Consolidation took over the plant at Coalwood, which is the center of operations of the company's New River-Pocahontas division churches, school houses and club houses as well as many other dwellings have been constructed and innumerable improvements made in accordance with the Consolidation's policy of installing equipment necessary to insure efficiency. The Consolidation bought the mines in the Pocahontas district from the Carter interests some time ago and has been engaged in building up the property ever since.

Thomas Harding, in charge of the pumps at the Glen Rogers shaft mine of the Raleigh-Wyoming Coal Co. at Glen Rogers, of which Carl Scholz is vice president and general manager, is receiving high praise from mining men for an act of loyalty and fidelity recently performed. Late in August he was called from bed about 3 a.m. to learn that both the pumps at the bottom of the shaft of the mine were out of commission and that the sump was filling with water. When Harding arrived at the bottom of the shaft the pump operated by air was entirely submerged and the water was rapidly closing around a large electric pump. Although there was 18 ft. of water in the bottom of the shaft, Harding dived to the bottom four times in order to loosen the air pump and raise it to a higher level where it could be operated. His act saved the mine from flooding.

An attempt to destroy the tippie of the Preston County Coke Co. at Cascade, in

Preston, was made on Sunday morning, Sept. 1, when fifty sticks of dynamite was used which had been stolen from the company's powder house. Only crushing machinery was affected. A wash house near the dwelling of a boarding-house keeper also was dynamited a few minutes after the dynamite under the tippie was set off, one corner of the wash house being blown off. A 20 per cent reduction in wages was made on Sept. 1 but an official of the company had nothing to say as to whether he thought the wage reduction had anything to do with the dynamiting. Although the company has at no time had any labor trouble it has been operating on an open-shop basis since the Bethlehem Mine Corporation's strike following the adoption by that company of the open-shop plan.

The National Tax Association has invited everyone interested in taxation to attend, whether members of the organization or delegates or not, its sixteenth annual conference to be held at the Greenbrier, White Sulphur Springs, Sept. 24 to 28. Special emphasis has been placed on the invitation to men in the mining industry. The conference will discuss state income-tax amendments, including the proposals of publicity of income tax returns as provided in Wisconsin; classified against general income taxes, including double taxation. These and other kindred topics of interest to the mining industry are to come up for thorough analysis and it has been recommended that mine owners and operators who will be unable to attend the American Mining Congress conference on mine taxation to be held in Milwaukee, Sept. 24-29, obtain from the governors of their states appointments as delegates to the National Tax Association conference.

A suit for \$300,000 instituted in the Circuit Court of Raleigh County by the Summit Coal Co. against the Raleigh Smokeless Fuel Co., for alleged damages, was won by the defendant company. In its suit the plaintiff alleged that it had authorized the sales company to contract, for its account, on Jan. 2, 1920, for the sale of 2,000 tons of coal per month, for delivery between April 1, 1920, and April 1, 1921, at a stated price but that the sales company had made false representations to the effect that it had entered into such a contract and the plaintiff company accepting such representations in good faith had shipped the necessary tonnage to and through the agency. Evidence produced went to show that the coal company had given the agency the necessary authority and that the sales company had in fact sold the coal in accordance with instructions given it and at the price fixed in the instructions. It also was developed that the sales company had appraised the coal company as to whom the coal had been sold and that the sales company had furnished the coal as agreed upon. Under the circumstances the court directed a verdict for the defendant.

When the special convention of the United Mine Workers of District 17 was opened at Charleston Sept. 5, delegates were present from practically every organized coal field in West Virginia. The convention was called as the result of an agitation waged in northern West Virginia since early in the year for an opportunity to air disputes and grievances growing out of the last election of the United Mine Workers, irregularities being claimed. Insurgent members of the union also are demanding a better accounting of the funds paid into the district treasury. The fact that the sessions of the convention were executive and the fight made over a report favorable to the administration submitted by the committee on rules and order of business, disclosed just how serious is the internal strife between the district officers and the northern section of the district. It was sought by the committee on rules to prohibit the introduction of a motion except by unanimous consent. After protracted debate the report was recommitted to the committee and amended so as to provide that any motion not submitted to the proper committee before noon of Sept. 5 could only be introduced upon a majority vote of the convention.

WASHINGTON

To celebrate the opening of the Jordan Valley Coal mine at Everett, the public was invited to attend a basket picnic at the mine, located between Arlington and Granite Falls, on Sunday, Sept. 2. New machinery is being installed. The picnic featured the formal opening of the mine on a commercial basis.

Announcement has been made by the Quartermaster's Department of the U. S. Army at Seattle that pursuant to instructions received from the quartermaster supply officer, San Francisco General Intermediate Depot, Fort Mason, San Francisco,

Cal., no award will be made for the quantities of coal advertised for for Forts Casey, Ward and Worden, Wash., bids for which were opened July 25.

Bids will be opened on Sept. 20 at the Quartermaster's office in Seattle for furnishing and delivering 531 net tons of bituminous lump coal, over 2-in. screen for Fort Casey; 380 net tons bituminous lump coal over 2-in. screen for Fort Ward, and 1295 net tons bituminous lump coal, over 2-in. screen for Fort Worden.

WISCONSIN

Emmet J. Carrigan was appointed receiver for the Valley Coal Co., Milwaukee, by the Federal court in that city on Aug. 24. A petition by the Bickett Coal & Coke Co., of Chicago, alleges that the company admitted liabilities in excess of \$100,000, that it had made no sales in a month or more and that it had been keeping afloat on amounts received from past sales. The petition further alleges that the book value of the company is about \$67,000, while the actual value is only \$24,000.

WASHINGTON, D. C.

By direction of Secretary Work, of the Interior Department, the Bureau of Mines is planning to begin an investigation of the peat deposits of the United States. At the request of Senator Fletcher, this will include an inquiry to determine whether peat exists, and to what extent, under the soil of Florida. The bureau has on hand approximately \$50,000 from an appropriation for investigation of lignite and peat. Attention thus far has been devoted to lignite, principally in the Dakotas, the matter of peat having been delayed owing to inquiries into that subject by several European countries, to determine the value of their deposits for fuel and for extraction of byproducts, so that this experience might be available to this country as a foundation for its work. Details of the peat investigation will be worked out in the next few months and work will begin in the South, probably this winter.

CANADA

According to official announcement by the Ontario Government machinery for equitable and price-controlled distribution of fuel throughout Ontario will be continued during the coming winter season by the Provincial Government.

Frank Hodges, secretary of the Miners' Federation of Great Britain, who is in Canada, said at Montreal recently that with something like 1,500,000 persons practically permanently unemployed in Great Britain, immigration was of primary importance to the British. He added: "I have come with a view to help as much as I possibly can rather than to criticize and I propose to study existing plans." Mr. Hodges is a fraternal delegate to the Trades and Labor Congress of Canada, which meets in Vancouver this month.

Application has been made to the Montreal Stock Exchange for the listing on the unlisted department of the authorized issue of \$3,000,000 or 5 per cent first mortgage bonds due 1940 of the Cumberland Railway & Coal Co. In addition to the bonds the company has an authorized capital of 20,000 shares of common stock of \$100 par value, all of which is outstanding. Bonds may be called at \$105 on any interest date. Officers and directors of the company are: President, R. M. Wolvin; vice-president, Hector McInnes, Halifax; secretary, C. S. Cameron, Montreal; assistant secretaries, W. A. Doig, J. A. Kempton, Montreal; D. H. McDougall, Sydney.

Output for the month of August from the mines of the Dominion Coal Co. was one of the largest since March, 1916, when the grand total output of 379,254 tons was produced, while the output for the past month was 366,246 tons. During the month three of the collieries made new records, namely, Dominion Nos. 6, 11 and 24, while Dominion No. 10 Colliery (Reserve) produced only six tons less than its former record, made in June, 1912. Dominion No. 2, with an output of 72,248 tons, was the best since March, 1916, when the output totaled 74,095 tons. Dominion No. 16 (New Waterford) produced the high figure of 22,171 tons.

Anglo-Canadian Collieries & Refineries, Ltd., of Edmonton, Alta., with an authorized capital of \$1,500,000, has been incorporated by Prosper E. Lessard, Guy W. Marriott, Bryce J. Saunders, Sir George B. Farmer and others, of Edmonton.

It is stated that Cape Breton, N. S., companies are prepared to supply large quantities of coal to New England centres if a strike of anthracite coal miners causes a

fuel shortage there. For various reasons the Canadian market is at present not brisk enough to take all the coal that can be dug in Nova Scotia, and, consequently, there is a large surplus that can be diverted to the States.

In an address before the Canadian Gas Association in Ottawa, J. L. Landt, of the Dominion Fuel Board, advocated the use of coke in the home, stating that it was a cheaper fuel than anthracite and yielded good results in prepared sizes.

Alberta operators in session at Calgary took no official action on the proposition to sell Alberta coal in Ontario, taking the view that with the heavy crops to move there would be no cars available for any large quantities of coal.

Miners at the Newcastle and Western Gem mines, Drumheller, Alta., went on strike Aug. 30 on account of the employment of non-union men. A mob went to the Western Gem mine to prevent non-unionists from working and a riot broke out, in the course of which two police constables were seriously injured. All Drumheller mines were idle on Aug. 31. Robert Livett, international representative of the U. M. W., stated that the men had acted without consulting the union officials.

George E. Stringer, of Yorkshire, England, head of the British syndicate that has obtained a controlling interest in the Princeton Coal & Land Co., has arrived at Princeton and will start an active campaign for increased production. As soon as suitable men are available, the force at the mine is to be increased from its present strength of 125 to 500, with a view to increasing output to 500 tons per day. The mine has been in operation for several years under the superintendence of Francis Glover, who will retain the management of the property. The output of the mine for last year was 19,418 tons, against 13,966 in 1921. The new owners purpose erecting coal bunkers at Vancouver, for the purpose of bunkering ships.

Obituary

Morris L. Painter, for many years actively engaged as a coal operator at Greensburg, died Sept. 1 at his home. He had been ill for many months. Mr. Painter for a long time was vice-president of the Westmoreland National Bank of Greensburg.

Association Activities

Directors of the West Virginia Coal Association held a meeting at Charleston when it became inevitable that anthracite miners were going to suspend work. It was decided that inasmuch as West Virginia has the grade of coal best suited as a substitute for anthracite, the association take every possible step in expediting the mining of coal in order to save the country from distress which otherwise might ensue. A statement issued by the association closed with this paragraph: "We have the coal, we have the mines, we have the workers and we have the equipment to take care of almost any demand made upon us if only we are assured that sufficient railroad equipment will be provided to move the tonnage that we are able to produce."

Traffic News

An investigation into railroad freight rates on anthracite has been ordered by the Interstate Commerce Commission in response to a suggestion by the U. S. Coal Commission. Public hearings will be conducted by the Commission through Examiner Disque, at Pittsburgh, Pa., Sept. 24, at 10 a.m. in the Chamber of Commerce Building. The proceedings will embrace an inquiry into all phases of anthracite coal handling by the railroads including rates, changes, regulations and practices of the carriers.

Class 1 railroads of the United States, according to reports to the Interstate Commerce Commission from 193 roads representing a total mileage of 235,670, in July earned an annual rate of return of 4.93 per cent on their tentative valuation as fixed by the commission for rate-making purposes, including additions and betterments up to Jan. 1, 1923. This rate represented a net operating income for the month of \$84,591,400. In the eastern district the rate earned was 5.60 per cent; the southern dis-

trict, 5.26 per cent, and the western district 4.05 per cent. In July last year the same carriers earned a net operating income of \$69,321,000, which was at the annual rate of return of 4.12 per cent. In June this year the rate was 5.47 per cent.

The complainants in Docket No. 12,712—Hood Coal Co. et al. vs. Monongahela Valley Traction Co. (now Monongahela West Penn Public Service Co.) et al.—filed with the Interstate Commerce Commission Aug. 29 a petition for rehearing and leave to amend complaint, which alleged unreasonable combination rates on coal from mines in independent short lines within certain producing districts and rate groups to interstate destinations on trunk lines.

As a means of more efficiently handling the freight traffic through the Raleigh yards, the Chesapeake & Ohio is extending a new double track 2,000 ft. near the roundhouse and near Raleigh. The company also is installing four additional tracks near the Raleigh Coal & Coke Co. plant. In order to make way for the tracks the coal company is moving several houses for the new tracks, which will accommodate several hundred cars. In addition to the new trackage, the company is pacing a new coaling station near the roundhouse so that engines may be coaled without delay and within a short distance of the shops.

At a recent hearing of the carriers before the Alabama Public Service Commission on the proposed general coal and coke rates on interstate shipments, the argument was advanced by N. W. Proctor, of Louisville, representing all the interested railroads, that the burden of proof in proceedings before the Commission is not on the carriers where the justness of an existing rate is questioned by other interests, or a citation holding that the existence of a rate approved by the commission constitutes prima facie evidence that the rate is fair and reasonable. The adoption of this contention would serve to preclude, it is stated, any general schedule of reduced rates, but would confine adjustments to specific individual complaints from points where representatives held current rates to be unjust.

During the month of August 2,579,225 net tons of bituminous coal and 232,723 net tons of hard coal passed through the canals at Sault Ste. Marie. Of this tonnage 2,557,659 tons of bituminous coal passed through the United States canal, and 21,566 tons through the Canadian canal. Of the anthracite tonnage 222,741 tons passed through the United States canal and 9,982 tons through the Canadian waterway.

From Jan. 1 this year to Aug. 15 railroads of the United States placed in service 41,982 new coal cars, 41,712 new box cars and 13,149 new refrigerator cars. Of this number, 6,424 cars were placed in service during the first 15 days in August. On Aug. 15 the roads had on order 80,535 new freight cars, of which 31,946 were coal cars. The roads placed in service from Jan. 1 this year to Aug. 15, 2,364 new locomotives, of which 143 were delivered during the first 15 days in August. In addition they had on Aug. 15, 1,674 new locomotives on order.

The railroads on Aug. 15 had, out of 2,280,440 freight cars on line, 188,635, or 8.2 per cent, in need of repair. This was a decrease of 379 cars from the number in need of repair on Aug. 1, at which time there were 189,014, or 8.3 per cent.

Coming Meetings

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 N. Michigan Ave., Chicago, Ill.

Fifth annual general Western meeting, Canadian Institute of Mining and Metallurgy, Oct. 3-5, at Estevan, Saskatchewan, Canada. Secretary, G. C. Mackenzie, Drummond Building, Montreal, Que., Canada.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COALAGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 24

NEW YORK, SEPTEMBER 20, 1923

Number 12

It's a Thin Alibi

AND so the Herrin horror was a bit of communism! The able publicists of the United Mine Workers tell the world it is so—and back up the statement with certain proofs, such as they are. In view of the zeal with which the United Mine Workers organization hindered the progress of a so-called justice in Williamson County following the Herrin massacre of June, 1922, and in view of the spirit with which it leaped to the defence of the long list of Williamson County citizens finally indicted for murder, the union must have been quite sympathetic with communism at the time. Why the change now?

There are two reasons. The principal one is that communism offers a ready and popular alibi for everything. The publicists' picture of John L. Lewis patriotically battling the red influence that strives insidiously to undermine the honest labor of America is an heroic one. It is certain to exalt that labor leader in the minds of many Americans. And the United Mine Workers, as an organization, will enjoy a certain vicarious heroism by the same sign. The publicity which the miners' union is putting out and will continue to put out on the subject will be good publicity. Many an American, thinking along the surface of things, will accept it as true because he will not know any better.

The second reason for the alibi is an internal one. There are thousands of honest, sound, reputable citizens in the ranks of the United Mine Workers. They believe in good citizenship. They can see no reason why unionism should run counter to it. They have been unable to reconcile the attitude of their union at Herrin with the commonest rules of such citizenship. It is necessary to calm their fears for their organization. So union headquarters offers them the alibi. This alibi was late in coming, because it could hardly have been set up when the facts in the Herrin case were fresh in the country's mind, but it is better late than never, and better than nothing. It may be convincing to a lot of good union men anxious to be convinced. They must be pretty anxious, however.

Every man in the union knows the venom of the organization toward non-unionism. Every man knows that a foolish operator at Herrin deliberately defied the union at a time when it was on a strike and in fighting mood. Every man knows that in the heat of the Herrin situation President Lewis sent an inflammatory telegram bidding the union men of the region to treat the non-unionists in the strip mine as "common strike breakers," which was about as open an order for violence as a man in Mr. Lewis' position could issue. Every man knows that unionism carried out the order bloodily and then did everything within union power to prevent the punishment of everybody connected with the crime of butchering twenty-five men before the eyes of hundreds of citizens.

By buying the strip mine and then disposing of it as quickly and as surreptitiously as possible in order to satisfy damage claims against the organization the union's admission of responsibility was established if any proof were needed. So what basis is there for all this stuff about communism? It is a poor alibi, but, after all, better than nothing. And when John L. Lewis is put forward, in due time, as the logical successor to Samuel Gompers, it must not be said that he is a red. It is laudable for him to stifle communism if he can, but why blame communism for Herrin?

Perilous Winter

ALREADY we are approaching the perilous months when the mines dry out and explosions of dust are to be apprehended. It is said of the foreigner who enters our mines that he is careful for a year or so and then forgets and becomes "frequent deceased." It seems to have been just so with the coal industry. It heard, largely through the Bureau of Mines, the dangers of coal dust and it listened, learned the lesson, put it partly in practice and then—forgot or almost forgot what it had learned.

Let this be a reminder, for much remains to be done. Runaways must be avoided and wires must be protected or there may be another Dolomite; water-sprinkling pipes must be guarded against frost or there may be another disaster like that at Stag Canyon. Dust must be thoroughly wetted so that it will ball in the hand. Unfortunately water will roll in dust without wetting it, consequently the application should be drenching so as to move the dust where moisture can continue to affect it.

Air conditioning is an excellent way of preventing the drying of a mine or of wetting it when dried. Little technique has developed in regard to this subject but enough is known that the work can be done effectively if not with maximum efficiency and economy. Unfortunately the air usually is supplied by a pressure fan, and the wettest part of the mine is apt to be the return airway which is least likely to be in danger.

Furthermore, if damage is done to the return airway by excessive heat and moisture it is the very part that is least readily repaired. Where also the gas is by a plenum system of ventilation put under compression it is likely to come rolling out into the roadways as soon as the fan stops. However, so much can be said in favor of conditioning the air that it should be done wherever the roof will permit, even if it be necessary to protect the roof with concrete for some distance from the fan.

Now also is the time to take careful stock of rescue and self-rescue equipment. Hardly a large explosion occurs where men could not save themselves if they had some means of traveling for a short time through the poisonous mine atmosphere.

The Coal Commission on Strikes

THE Coal Commission has issued, so far, two reports having to do with labor relations in the bituminous-coal industry. The first was published in *Coal Age* in full last week; the recommendations from the second appear this week. These results of the Commission's study of labor relations are as disappointing as the subject is important.

The first report, despite its label as a study of the causes of strikes, is a discussion of the violation of civil liberties and as such is essentially concerned with the West Virginia situation. It is a rambling document, scrupulously disposed to deal the blows in equal measure to both parties; inconclusive on the big questions and leaving us no nearer the answer than before.

Murder, arson, assault, denial of free speech and liberty of person are the principal offenses against civil liberties and it is gathered from the context of the report that these are the matters under discussion. Herrin is elaborately described, treated as a study in mob psychology and charitably excused. The Commission "chooses to give . . . the benefit of the doubt as to criminal intent" to those non-union operators who have used force in keeping the union out of their mines, and to the union for its use of force in attempting to enter. Human passions, lax administration of the laws, racial characteristics, the "irrepressible conflict between the United Mine Workers and the non-union operators" are assigned as causes for strife, but not shown to have been causes of strikes.

The bone of contention in West Virginia, in parts of Pennsylvania, Utah and other soft-coal fields is the effort of the United Mine Workers to organize the miners, an effort opposed by the operators. Strife, not strikes, has ensued. These local affairs have had little or nothing to do with the stoppage of coal production; have caused no high prices or short coal supply to the public. For this strife and warfare the coal industry in these rich, unorganized fields has been haled before the bar of public opinion time and time again in the past. What the public expects from the Coal Commission, if it expects anything here, is judgment on these moot points. It is not vouchsafed.

The coal industry itself would welcome a solution of this perplexing problem—the non-union operators one that would keep the union out and let them work in peace; the union one that would let it in. The rights of each are stated, that of the operator to have no union men and that of the union to get in if it can, and then "the Commission believes . . . it is their [the operators'] patriotic duty to make some personal sacrifices in the interest of the common weal, a principle equally applicable to the United Mine Workers."

What sacrifices? What sort of thing are they to do? The non-union operator in West Virginia reading this remarkable document must be tormented by doubt. He is patriotic—what shall he do? Any sacrifice that he may make is to let the union in. And the union, it too is patriotic. What sacrifice can it make, save to forego its right to push its organization? Does the Commission see some middle ground on which, by making mutual sacrifices, peace may be had, and both satisfied, and if so, why not state it? All that the Commission has offered is that the law must be enforced, if necessary by the federal government. In other words, all that it offers as the solemn judgment of six men, after long study of this most vital question,

is the Marquis of Queensberry rules for a fight. That is why we say that its report is disappointing.

Turning to the second document, we find a detailed, scholarly, able study and discussion of labor relations and the causes of strikes. It is true that the civil liberties report slops over onto the subject of strikes at times and thus overlaps the second, giving evidence of independent preparation and subsequent lack of coordination. Incidentally, this second report contains, among its thirty-seven specific recommendations, several that should have been considered in connection with the problem of violations of civil liberty and peace in the non-union fields. The report on labor relations is as easy to follow as the other is difficult; the conclusions follow from the text. While everyone will not agree with these conclusions he has the opportunity of reading the evidence.

Arguing that charity begins at home, this report starts with causes of friction at their source and devotes nineteen, or half, its recommendations to suggestions for amelioration of those causes. With most of these no fair-minded operator or unionist can well disagree. The suggestion, for instance, that there should be a check weighman at non-union mines will not find favor with the non-union operator, not because he would be unfair to his men but because of his belief that such an innovation presages the union itself.

On the check-off the Commission straddles. Repeatedly urging the inherent right of a man to work without belonging to the union, it finds not that the check-off does not prevent the exercise of that right but that it should not. It recommends compulsory investigation before there be strikes, and voluntary arbitration, both sound as far as they go. It *regrets* that the United Mine Workers has given so little attention to fundamentals and *thinks* the union is facing a critical transition period, but in what direction it does not say. It doubts the value of incorporation of the union and is silent on the question of compulsory secret strike ballots.

Both documents have an abundance of sound reasoning in them, with ample preachments, plenty of platitudes, and little punch. The Commission has failed to grip the problem of the United Mine Workers as it now overpowers the coal industry and the public coal supply. Certainly it had ample evidence of the big strikes of 1919 and 1922, their causes and effects. Those are the kinds of strikes the public wants to know more about. Whether the responsibility was with the profit-seeking operator or the power-mad union official, the Commission should have dragged the offender forth by the scruff of the neck.

What is the Commission's answer to the challenge of the union that President Harding said had this country at its mercy? If compulsory advance investigation and publicity of accounts will stop a big strike, why didn't it stop the Sept. 1 strike in the hard-coal fields? If six commissioners, \$600,000 and six months' investigation isn't enough for the purpose, in goodness' name, how many millions must we have? What is the use of going out of its way to pillory a few jobbers for grabbing off a few hundred dollars extra profits in pyramided sales of anthracite in New England and then let the union and Governor Pinchot put millions on the whole output?

The Coal Commission's reports on labor are disappointing, not for what they say but for what they fail to say.



Village of Gamerco, N. M., with Navajo No. 5 in Rear.

Machine Shop, Bathhouse, Houses and Other Accessory Buildings at the New Gallup American Mine*

Arrangement of Repair Shop—No Overhead Crane—All Lifting Done by Chain Blocks on Trolley Track—Bathhouse Uses Overhead Hanger System—Reason for This Practice—Brick on Edge Used for Houses

BY H. B. COOLEY

General Superintendent, Allen & Garcia Co., Chicago, Ill.

LARGE plants like Navajo No. 5 of the Gallup American Coal Co. require an exceptionally complete shop equipment, especially when they are located, like that plant, over 200 miles from a town where a foundry and machine shop is available. This means that provision must be made for all the repair and maintenance work needed by the mine, tippie and power plant. All lathes and large shop tools have been selected with the view of providing for the special types of work which such a plant would require, and so far as possible individual motor drives have been installed. However, overhead line shafting is not entirely eliminated, and provisions were made in the design of the roof truss for its support and for that of the forge blowers and an exhauster.

Whether to combine the storeroom with the shop

*This is the fourth part of Mr. Cooley's article on Navajo No. 5 mine. The others appeared in *Coal Age*, Aug. 2, Aug. 16 and Sept. 13.

building is a question that usually requires close study. If the storeroom is planned with a view of housing general mine supplies such as machine parts, bolts, etc., and in addition bulk material such as lumber, cement, etc., its size usually runs to such large proportions as to make it difficult to combine it with the shop building. If, on the other hand, a separate building is erected the supplies and materials used in the shop are not being stored conveniently to the place of use.

It is believed that the arrangement adopted at No. 5 has the advantages of both. Referring to the general plan, Fig. 1, it will be seen that part of the shop building is devoted to storage purposes. This space houses the usual supplies and equipment that are used in the shop and mine. The storekeeper has offices in this building, and all materials, as well as shop tools, are issued by requisition. The convenient location and arrangement for issuing supplies makes this system ideal, as by it much time is saved and trouble avoided.

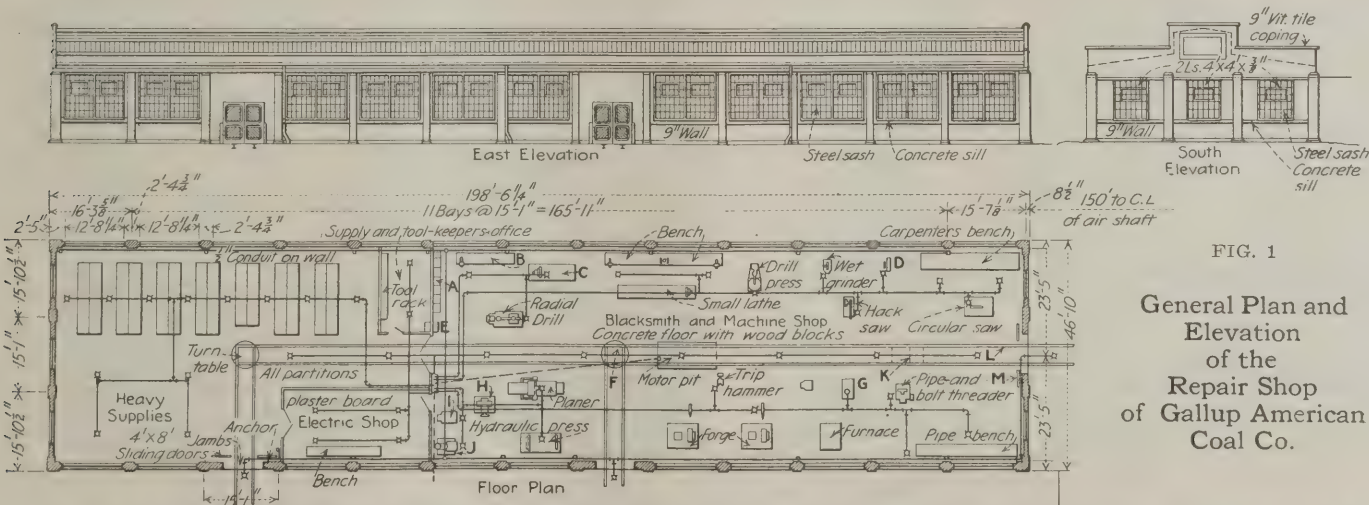


FIG. 1

General Plan and Elevation of the Repair Shop of Gallup American Coal Co.

The plant is equipped with trolley tracks instead of a crane. By means of hand-power hoists the parts can be lifted and moved along the trolley tracks on the lower

chord of the roof trusses. A is a steel locker; B is a bench; C, a large lathe; D, a grindstone; E, tool window; F, industrial track; G, a bending frame; H, a milling

machine; I, a shaper; J, a keyseater; K, track separators, 3 in. diameter set at 4-ft. centers with four bolts; L, 40-lb. rails set at 40-in. gage; M, 4 x 8 ft. sliding doors.



FIG. 4—WASHHOUSE AND MACHINE SHOP; AUXILIARY AND MAIN TIPPLE IN REARGROUND
The well-lighted machine shop attracts immediate attention, nearly all the walls being glass above bench level, the light being supplemented by sash in the monitor

prove that "per man" the locker system requires no more room than the hanger system. But observation has shown that congestion is much more apparent in a clothes room containing lockers than one where the floor space is clear except for benches. In fact in designing a washhouse it is well to see that the men have not only a place to put their clothes but enough room in which to change them conveniently.

The hanger room has 2,664 sq.ft. of floor area and the ceiling is arranged for carrying 510 hangers. This allows 5.2 sq.ft. per man, the hangers being spaced 2 ft. apart from center to center.

The washroom is placed at one side of the hanger room and contains twenty-eight showers. There are four rows of showers, spaced seven in a row, with 4 ft. 3 in. between each shower head and the next. A 2-in. wood partition covered with zinc on each side prevents splashing and serves as a carrier for the shower heads.

Hot water is obtained from a 500-gallon storage tank located in the basement, with a heating capacity of 1,500 gallons per hour. It has a thermostatic control, and the water temperature is maintained constant during the peak periods of its use. Steam at 175 lb. pressure is taken from the main steam line and reduced to 15 lb. by means of a reducing-pressure valve. This

steam is used to feed the coils of the water heater; and this condensate, together with that from the heating coils, is all returned to the boiler room.

At one end of the building is a modern first-aid room where minor injuries can be treated or where in case of serious injuries the patient can be given temporary care until the doctor arrives and the injured man is taken to the hospital. At the other end of the building is a bosses' shower and a change room which is amply large not only for the management but for the accommodation of visitors.

The same general type of construction is used for the washhouse as for the shop building, and provisions are made for increasing the capacity without changing the general scheme.

An essential part of the development of a mine in this field is the housing of the employees. The mining camps adjacent to the present workings of the company are well established, and their abandonment of course will be gradual. However, it is planned ultimately to consolidate the three old camps with the new town, and careful plans have been made for so doing. Fortunately, the surface adjacent to the mine site lent itself admirably to a town plan. The entire town site is on high ground overlooking a broad valley, with just



FIG. 5—INTERIOR OF MACHINE SHOP

The lower chords of the trusses are arranged to act as overhead trolleys for handling material. Thus the space is not interfered with by the presence of a crane. Many of the drives are electrical, but, as will be noted, some are through belting.



FIG. 6—INTERIOR OF HANGER OR DRESSING ROOM

Hangers are spaced at 2 ft. centers. Lockers are used only in bosses' dressing room, the overhead hangers being advocated as giving freer space for dressing. Rapid drying of clothes, which this method favors, is not needed at mines so dry as this.

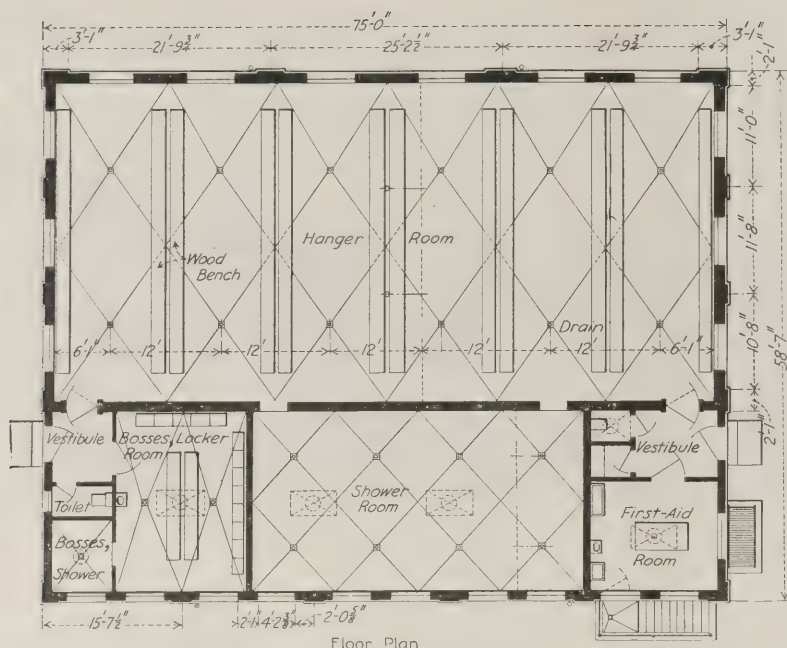


FIG. 6—PLAN AND CROSS-SECTIONAL ELEVATION OF BATHHOUSE

The bossers' shower is separated from the bossers' locker room by a canvas curtain. The interior of the hanger room is 35 x 72 ft. 2 in. The shower room is 20 x 36 ft.; the bossers' locker room 14 ft. 3 in. x 20 ft. and the first-aid room 12 x 14 ft.

enough variation in surface contour to relieve the monotony and provide excellent drainage.

The street layout, the pole lines for lighting, the sewer and water lines have all been planned and the construction program arranged along definite and predetermined lines, so that the ultimate development will present a systematic and practicable arrangement.

One of the features to be considered in this field is the diversity of races. In addition to the usual nationalities common to the average mining camp, we find the Mexicans in large numbers and the Navajo Indians ranging in number from 1 to 5 per cent of the total. The Mexicans prefer to live in more or less segregated quarters, and a Mexican village has been started somewhat apart from the main camp. The Navajos build their own "hoogans," and the solution of their housing problems does not rest on the mine owner.

An entire block has been reserved for school purposes. All the frontage on Navajo Ave. from First to Fifth Streets is reserved for company buildings and houses. A clubhouse, a hospital, executive offices, etc., are some of the buildings that have been erected on that reservation. All of these facilities are now located either in the other camps or in the town of Gallup, and mention will be made of them later.

A government post office was established early in the development period and the name Gamerco (Gallup AMERICAN COal) was used to christen the town and post office. A rooming house accommodating 40 men and a boarding house for about double this number were the first buildings erected on the new town site. These buildings have all modern facilities, steam heat, electric lights, toilet and bath, and are maintained under excellent management.

The standard type of miner's house is shown in Fig. 10. The question of what material to use in their construction was only decided after the building of several "experimental" houses. The use of adobe brick is not unsuccessful in this climate and is quite generally used among the natives. Buildings of this material are far from being vermin proof, and it was this objec-

tion that eliminated the use of adobe. Concrete block construction was too expensive and the experimental houses were built, one of frame and the other of brick with stucco coating.

The local brickyard was manufacturing a rather porous and comparatively inexpensive building brick. Standard brick from this yard were laid up on edge instead of flat, using the "Ideal" method of erection. This type of wall reduces the number of brick required approximately one-third and gives a hollow wall which can be plastered without the use of furring. After comparing initial cost, maintenance, depreciation, etc., the brick wall with stucco interior was adopted.

With the consolidation of the mining work, houses will be available at the other camps, and these are being moved to Gamerco. The entire Heaton camp has already been transferred to the new town site by means of two 5-ton auto trucks and a specially built carriage. The average distance the houses were moved was two miles, and the rate of moving was two houses per day.

At present there are approximately one hundred houses available at the new camp, all equipped with electric lights and modern conveniences. As yet there are not sufficient dwellings at Gamerco to house the employees at Mine No. 5, and those who live in the other camps are taken to and from their work in busses which are provided without expense to the employees.

Excellent school facilities are provided for all children under high-school age. A modern kindergarten is maintained at the Gibson camp and the bungalow type of school building has been adopted at Gamerco. Fig. 12 shows one of two such buildings now in use, it having been deemed more advisable to build the schools in small units of two or three rooms each, as needed, rather than to have one large building. After the students finish the eighth grade it is necessary for them to go to Gallup to attend high school. The distance is about $3\frac{1}{2}$ miles, and bus service is maintained by the coal company without charge to the students or their parents. Athletic sports are encouraged and playground facilities are being provided.

Despite the difficulties and cost of obtaining water, which as has been mentioned, is pumped from deep wells, an ample supply is furnished for camp use. All of the newer tenant houses are provided with running water, toilet and bath. This is also true of the board-

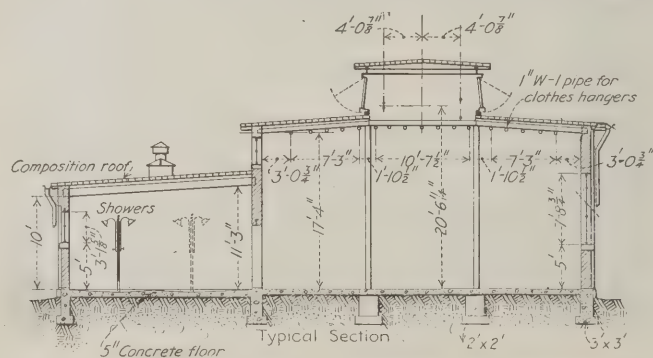


FIG. 8—CROSS-SECTIONAL ELEVATION OF BATHHOUSE

The floor consists of 5 in. of concrete, laid on a 1 in. bed of cinders. In order to make the surface smooth for the barefooted a surface of cement 1 in. thick covers the concrete as a finish.

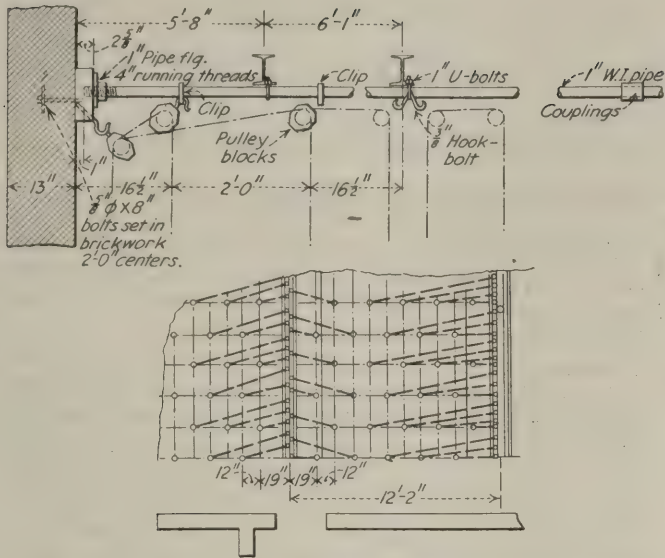


FIG. 9—DETAIL OF CLOTHES SUSPENSION METHODS
There are 85 hangers in each bay and 68 I-bolts in the back of each bench. The benches are 29 ft. 1 1/2 in. long.

ing houses. The miners' washhouse is freely used. Insofar as possible, wastefulness of this fluid, so precious in the desert country, is discouraged, but no attempt is made to curtail the supply. An outdoor swimming pool 35x75 ft. has recently been constructed of reinforced concrete. This is a convenience which is greatly enjoyed, not alone by the children but by the grown folks as well. The use of the tank is free to employees and their families.

Sewage disposal is taken care of by septic tanks placed in convenient locations with respect to the drainage lines. The effluent from these tanks all flows to a deep arroyo some half mile from the town site, and it is surprising how quickly the water disappears in the soil of the desert "washes."

The mine safety station is equipped with eighteen Draeger helmets, twelve of the large two-hour type and six of the small half-hour type. It is planned in the immediate future to change the large Draeger helmets for other equipment. The auxiliary apparatus is quite complete and includes a pulmotor, inhalators, an electrically driven oxygen pump, large supplies of regenerators and oxygen, a portable mine-rescue telephone, safety ropes, fire hose, safety lamps and flashlights.

The station also is equipped with apparatus for the collection and analysis of samples of mine air and gases. Large supplies of material for first-aid work are kept and frequent instruction is given to classes in first aid to the injured. A large number of men have been trained both in mine-rescue work and first-aid, which training is being carried on as deemed necessary. Regular and systematic inspections of the mines are made with a view to avoiding accidents, and safety committees have been organized among the employees and foremen.

The first-aid and helmet station is under the direction of L. Kuhns, who has shown unusual ability not alone in the management of the rescue station but in the training of first-aid teams and the organization of safety-first movements. Mr. Kuhns' work has been recognized throughout the State of New Mexico, and the U. S. Bureau of Mines places his work at the head of the list in that state.

In the list of equipment a portable mine-rescue telephone was included. This is indeed a unique piece of

apparatus. It consists of a complete self-contained telephone system, the entire outfit being housed in a chest much smaller than the ordinary steamer trunk. The main cable is on a reel built integral with the housing. The portable cable is on small reels about 4 in. in diameter and 8 in. long. These carry about 700 ft. of wire.

In order that they may be used in connection with helmet apparatus, special transmitting and receiving apparatus have been designed. The transmitter, instead of gathering the vocal impressions from the mouth, is arranged for attaching to the throat exactly over the Adam's apple. An interesting use for this apparatus was discovered by the engineering force during the progress of a mine fire.

In one of the older portions of the mine a fire in the upper coal measures suddenly developed in such proportions as to make it necessary to abandon one of the main entries. To drive a new entry required a survey running through this smoke-filled territory. By the use of helmets and with the aid of the portable telephone the survey, with necessary elevations, etc., was easily completed and all the data obtained for driving the new entry.

In fairness to the present management it should be said that no survey under such difficult conditions will have to be made at any time in the future, as all roadways are projected well in advance and, moreover, elevations are recorded in all parts of the mine.

The coal company maintains a movie theater, where

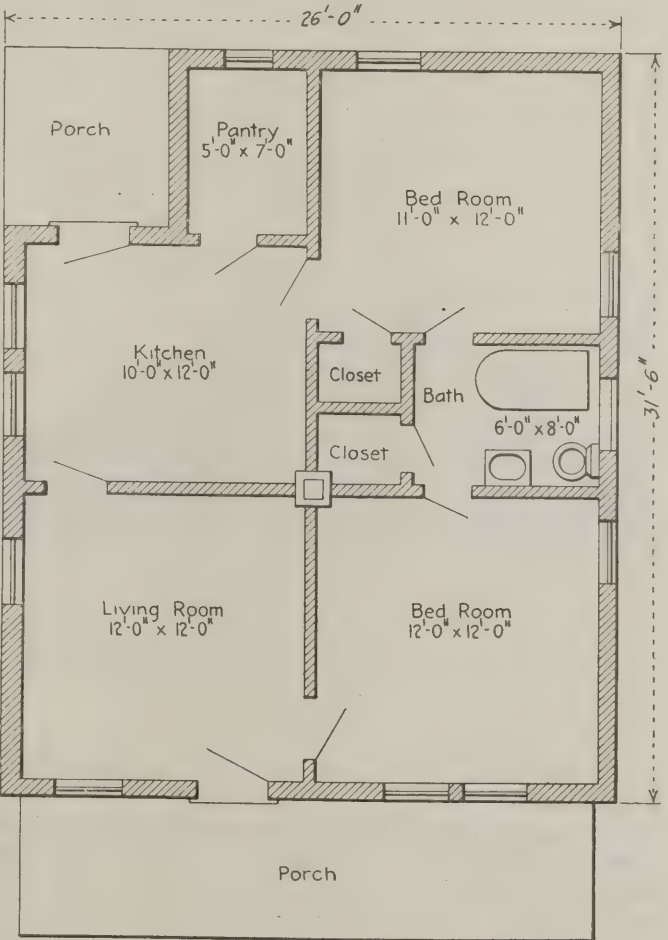


FIG. 10—PLAN OF THE STANDARD MINER'S HOUSE
In this dry region with no water till immense depths are reached and then not a copious supply, it is pleasing to see such complete bathrooms. The houses are of brick. Note also the generous closet room and the pantry. The West certainly sets standards of living. The pioneers are not long in getting back to "creature comforts."



FIG. 10—HOUSES LIKE THOSE SHOWN IN FIG. 9

The brick walls are covered on the exterior with stucco. Note the trusty electric poles in contrast to the twisty native growth so characteristic of arid regions.

first-run films of the better class are shown three times a week. This building also is available for dances and other public gatherings. Outdoor sports are encouraged and the Gamerco baseball team is surpassed by few in the state. An excellent ball ground is maintained by the coal company and concrete tennis courts have been built for employees' use.

Horse races and other sports also are held at the ball park, the Navajo Indians taking no small part in these diversions. Clubhouses equipped with pool tables have been erected at the Gibson and Navajo camps. Soft drinks, ice cream, etc., also are sold at these clubs. They are operated by a concessionnaire under the general supervision of the company.

To Horace Moses, general superintendent; J. E. Hanes, assistant superintendent, and C. E. Williams, electrical engineer, is due most of the credit for the handling of the construction work and the approval of the engineers' designs. J. M. Sully, managing director of the Chino Copper Co., had no small part in planning the original layout and greatly assisted in the solution of many of the engineering problems. E. J. Franklin, consulting mechanical engineer, deserves much credit

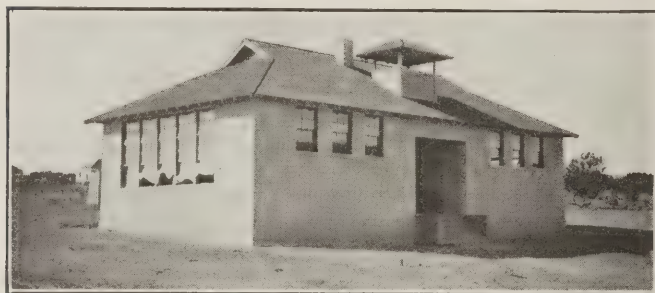


FIG. 11—BUNGALOW "UNIT" SCHOOLHOUSE

The "unit" type of schoolhouse has been favorably received in the West though some still advocate large schoolhouses of many rooms. It will be seen that this schoolhouse though small is substantial and cheerful with the windows becurtained—a self-respecting place in which to learn the duties of good citizenship and to obtain sound learning.

for his advice and assistance in the planning of the power plant. All of the material used was purchased direct by the company's organization, R. E. Clark, of Salt Lake City, having handled practically all of these matters. The engineering work was done by the Allen & Garcia Co., Chicago, Ill.

E. D. GARDNER, MINING ENGINEER OF THE U. S. BUREAU OF MINES, recently spent several weeks in the vicinity of Denver, Colo., conducting tests with liquid-oxygen explosives. Besides making field tests, considerable work has been done toward developing a new low-cost cartridge as a carrier for the liquid oxygen.

Book Reviews

Mine Examination Questions and Answers

CATECHISMS are always interesting to a large section of the reading public. Psychologically they have the great advantage that they attract the attention of the reader. Asked a question one is spurred to find an answer, which in a catechism one does by reading further. When merely confronted with a title or caption one is not faced with the apparent necessity for making a reply or of taking a measure of one's mental ability, and not being convicted of any defect of knowledge is not intrigued to read the solution presented. In many instances a question leads almost two-thirds of the way to knowledge, and the man who knows how to question is likely to be well instructed because he has set in motion impulses to thought and to inquiry. The bulk of any man's knowledge, especially the more worthwhile part of it, comes from questions asked and answered, whether of himself or some other man or of a book.

A book has just been published containing three volumes of questions—not propounded by the author but put for the puzzlement and bedevilment of those who seek to be mine foremen and answered by James T. Beard, who has a happy faculty for expression and a power of simplicity in explanation. The question and answer method being the best method of teaching and the teaching being kept strictly within the domain of questions already asked of candidates for mine inspector, mine foreman, assistant foreman or fireboss, the book is eminently practical.

All of these qualities might have been spoiled if the questions had not been properly grouped. Attention has been given to this point. A series of questions relate to air, another series to the chemistry of gases, a third to specific gravity and weight of gases, and so forth. Thus we have a veritable textbook arranged in as orderly a manner as if the questions in the catechism as well as the answers had been written by the author instead of culled with infinite pains from the many actual examination papers which inspectors and others prepared for the quizzing of postulants for places of authority in the mines of the various states and provinces of North America. There are 2,975 questions in the three volumes. The presentation of them and of their answers takes 846 pages measuring 5½x8½ in. This is followed by an index of 26 pages, making it easy to find any kind of information covered.

The minds of all of us need restocking. As time goes on information of earlier years slides gently from the brain cells in which we had it confined or becomes encysted so that it is no longer of any use. This book will be of help to the superintendent who wants to refresh his memory with the fundamentals of mining problems or who was graduated to his position without either college education or the experience and "booking" that a mine foreman receives. It has a yet more vital interest to those around the mines who desire to obtain certificates of competency.

The book which is bound in cloth, is published by the McGraw-Hill Book Co., 370 Seventh Ave., New York City.

What Equipment Should Be Provided for Hoisting Men And Ventilating Mine When Electric Power Fails*

Discarded Boilers Should Not Be Used for Such Purposes, as Maintaining Steam Pressure Is Too Costly—Gasoline Engines Preferable—Small Engines Fit Slow Speed and Light Hoist Loads in Raising Men

BY GRAHAM BRIGHT

Pittsburgh, Pa.

BEFORE the advent of central stations all coal and metal mines generated their own power, and in many cases these isolated power plants gave a fair continuity of service, which central stations with their long transmission lines often failed to do. In coal mines that produce much gas, it is essential that power be available at all times for operating the ventilating fan and also, wherever the mine is of the shaft type, for driving the hoist. With an isolated power plant and gaseous shaft mine even if trouble should develop with the fan a disaster is not inevitable, for the men can be hoisted quickly. On the other hand, if trouble develops with the hoist, the fan can be kept in operation, and there will be no necessity for haste in getting the men from the mine.

Central-station power is now being used extensively for mine plants and the discontinuity of the service which is sometimes in evidence with power of this kind has unusual importance for the operators of gaseous mines. Inherently the central station is much more reliable than any isolated plant, but trouble may occur on the transmission lines and in consequence no power may be transmitted for a long time.

For this reason some mines have kept their steam equipment intact and ready for operation in case purchased power should fail. This is an expensive procedure, for the boiler plant must be kept fired at all times so that emergency power will be quickly available.

GASOLINE-DRIVEN GENERATORS OFTEN USED

In many instances generators driven by gasoline engines have been installed to furnish emergency power for the service hoist. As most of these are of the alternating-current type the generator of the set thus driven usually is of the same type and is arranged to drive the service hoist motor at full speed, or an extra motor is provided that can be thrown into gear on either the main or service hoist and the hoist operated at a greatly reduced speed. This latter arrangement is used because large gasoline-engine driven units are difficult and expensive to obtain and install.

I recently developed a plan by which the main hoist and the fan can both be operated at reduced speeds, in case the power from the central station fails. In this plan the gasoline-engine driven generator operates at a reduced frequency if alternating current is used, and at a reduced voltage if on a direct-current system.

With alternating current the engine speed and generator are arranged to give a frequency of approximately one-half the normal frequency, but this can be varied to meet the particular conditions at any mine. In case

the generator operates at 30 cycles the voltage will be 1,100 if the hoist and fan are operating on 2,200 volts, 60 cycles. The motors will then operate at one-half speed with the same control and will give a fair power factor and efficiency, for the voltage has been reduced in the same ratio as the frequency. In operating the main hoist in many cases the load of men will be about one-half of the load of coal or ore. As, in addition, the speed is reduced one-half, the power required will be about one-fourth of that necessary when hoisting coal or ore.

When the fan is operating at one-half speed it will supply sufficient air to keep the mine clear for a short time and will require from one-fifth to one-sixth of the power necessary to operate at full speed. By adjusting the engine speed and voltage the fan speed can be increased to 60 or 70 per cent of the full speed, if this is necessary.

Let us assume that during normal operation the main hoist will require a maximum of 600 hp. and the fan 150 hp. Assuming that the load of men will weigh one-half as much as the load of coal or ore, the power required for the hoist at one-half speed will be approximately 150 hp., and the power for the fan 30 hp., making a total of 180 hp. This power could be readily supplied by the gasoline-engine driven unit having an engine of approximately 250-hp. and a generator of about 150-kva. capacity.

Should it be desired to operate the service hoist, a

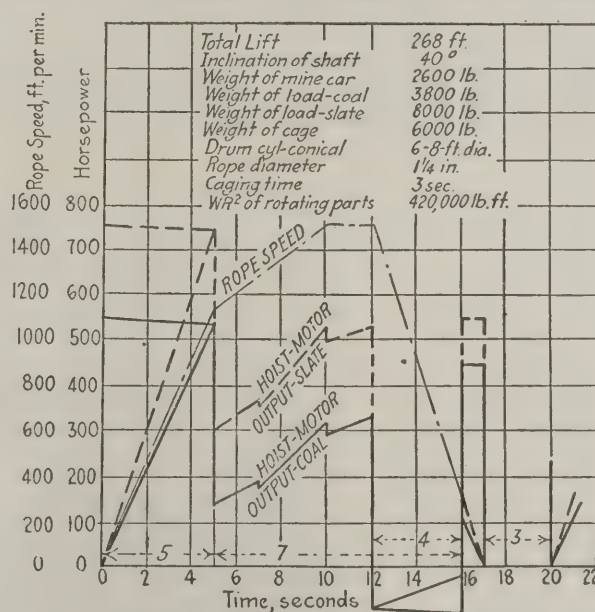


FIG. 1—APPROXIMATE HOIST CYCLE, MANIFOLD NO. 2.

The power at this hoist in normal running is 60-cycle alternating current at 2,200 volts. That is only necessary when the hoist is under the normal load, that is, lifting coal or rock and running at maximum hoisting speed.

*Paper prepared for the field meeting of the American Institute of Mining and Metallurgical Engineers and for lack of time presented by title only at the session of Aug. 30, held in Montreal, Que.

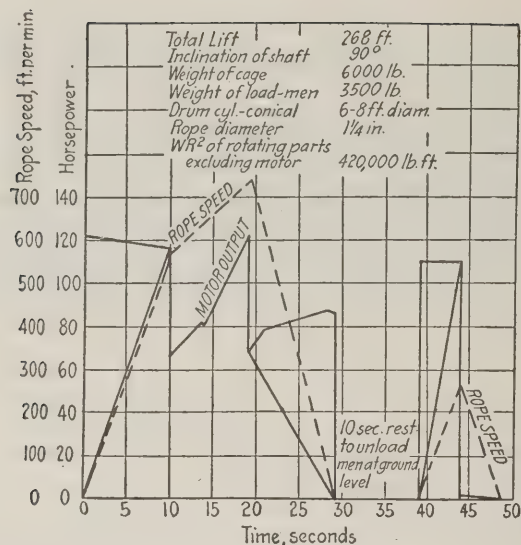


FIG. 2—APPROXIMATE HOIST CYCLE AT SAME MINE.

Here the hoist is raising only men and doing it at about half the normal running speed, the power being reduced in proportion to the reduction in load and velocity. Note that the scale of this illustration in seconds, horsepower and rope speed is greater than in Fig. 1, thus disguising the relative magnitude of these factors.

reduction of about 25 per cent would possibly be more desirable than 50 per cent in which case both fan and hoist would be operated at 75 per cent of full speed.

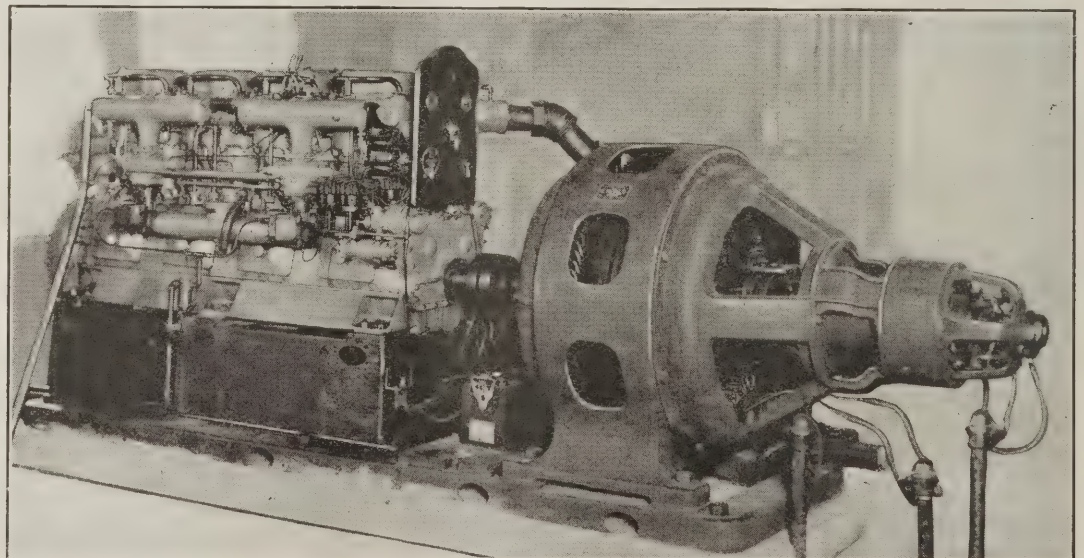
The operation of this system would be very simple, in that no change would be required in the control system of either the hoist or the fan motor. In case of failure of power the gasoline-engine driven set can be started by means of a push button and when a double-throw switch is thrown, power at reduced frequency is available for either the fan or the hoist. If the fan has automatic control it can be placed in operation within 30 to 60 seconds after the power fails.

An outfit similar to that described will soon be installed at one of the mines of the Youghioghenny & Ohio Coal Co., near Pittsburgh, this mine having shafts fairly close together, each equipped with a 400-hp. 2,200-volt three-phase 60-cycle hoist motor and a 150-hp. 2,200-volt three-phase 60-cycle fan motor. Fig. 1 shows the normal cycle when hoisting both coal and slate. Fig. 2 shows the hoisting cycle when handling men and using power from the gasoline-engine driven generator at 30 cycles. This cycle indicates that about 140 hp. would be the maximum demand on the generator for hoisting.

FIG. 4

Gasoline-Driven Alternator

A generator run by a gas engine would avoid the necessity for keeping boilers under steam at all hours ready to take up the work should the purchased power fail. This illustration shows a 175-hp. gasoline engine driving a 100-kva. alternating-current unit.



Both hoists could be operated from an engine-driven set of sufficient capacity to operate one hoist if it is arranged that both hoists are not operated at the same time. This could be taken care of by a signal system, which would permit one hoist being operated while the other hoist was loading and unloading. As each fan would require about 25 hp. at one-half speed, one gasoline-engine driven generator could supply power for both fans and both hoists.

The capacity of the set being installed is 250 hp. for the gasoline engine and 175-kva. 1,100-volt three-phase 30-cycle generator operating at 900 r.p.m. This generator will be equipped with a voltage regulator, which is essential when using an alternating-current generator with this type of drive. Fig. 3 illustrates a gasoline-engine driven generator of the direct-current type. The speed of 900 r.p.m. is a little low for a high-grade gasoline engine, but was selected largely because a two-pole generator was not available.

With a two-pole generator the speed could be 1,800 r.p.m. This speed may be somewhat high, but if it

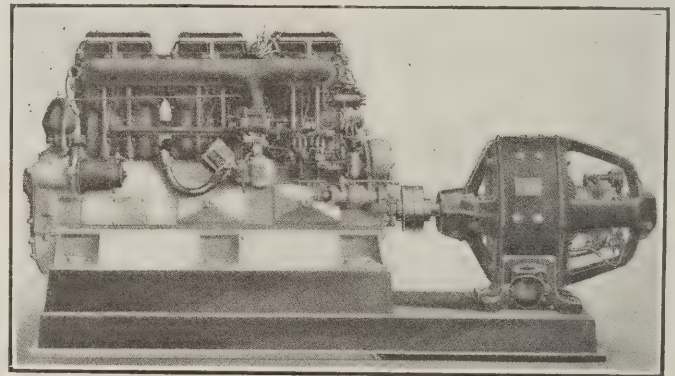


FIG. 3—GASOLINE-ENGINE DRIVING MOTOR.

This motor is of direct-current type. If direct current is used with field control on the hoist motor an engine of higher speed can be selected, thus reducing its cost and weight.

could be obtained would greatly reduce the cost of the gasoline engine. The two-pole generator, however, does not lend itself to increase in speed over 25 cycles, which may in many cases be desirable. With a speed of 900 r.p.m. the gasoline engine is capable of operating up to 1,200 r.p.m. if conditions at the mine warrant this increase in speed and frequency.

If direct current is used at the mine with field control on the hoist motor, an engine of higher speed can

be selected, which will reduce the cost and weight of the gasoline engine. This is important, as the engine is much more expensive than the generator. By means of field control, heavy torques for starting can be obtained with little power required from the engine itself. The engine can be worked up to its full capacity by selecting the proper voltage for the generator. If necessary, the generator can be equipped with a differential compound field which will automatically prevent overloading the engine. The control of this equipment would be simple and would not require any change in the control equipment of the main hoist or fan.

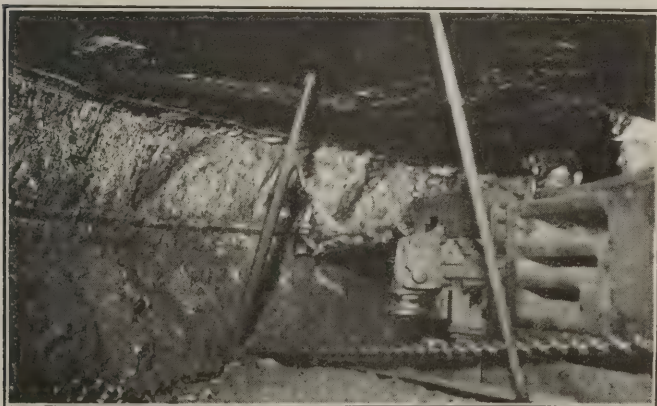
Using a gasoline-engine driven generator at reduced frequency on reduced voltage is much less expensive than retaining the old steam equipment and keeping it ready for emergency use at all times, or using gasoline-engine driven generators at full frequency and full voltage. By selecting a high-grade engine and generator, the equipment should be ready for instant service and should take satisfactory care of the supply of emergency power in case the power from an outside source should fail.

Standard Mining Machine Readily Adapted To Conditions at Spadra, Arkansas

THE peculiar conditions under which semi-anthracite is mined in the Spadra field, Arkansas, has already been described in *Coal Age* in the issue of March 15, 1923. They have been met by the construction of a mining machine especially adapted to the needs of that region. At Spadra is found a bed of coal 40 in. thick and characterized by a center band ranging from a hairline to 4 or 5 in. in width. The solid shooting which formerly prevailed broke 70 per cent of the coal to screenings, for which ordinarily there is little market.

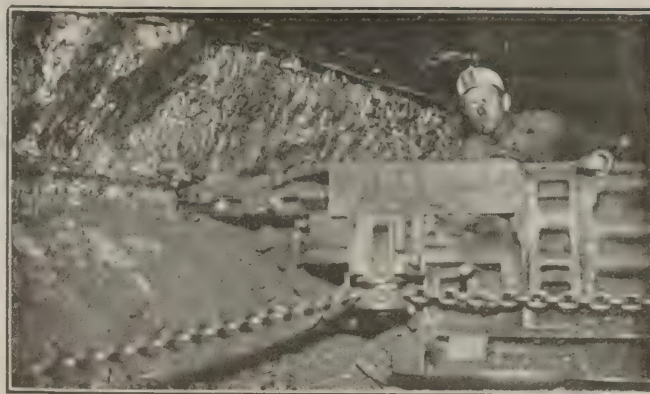
After a long battle with the miners' union, a scale was adopted for the operating of machines and the introduction of these has since reduced the proportion of screenings to less than 40 per cent of the whole output. Unfortunately the market has not absorbed enough coal this summer to raise the average running time in Arkansas the 20 per cent expected. However, in the Spadra field and in that alone the running time has been somewhat improved over that prevalent when coal was mined by solid shooting.

Though the field is small, ten of its mines already are using machines. One of these employs continuous undercutters working along the bottom of the seam



MAKING SUMPING CUT IN CLAY PARTING OF SEAM

The machine adapted for the Spadra field is only 19 in. high, but, mounted on a skid, it can be raised or lowered to bring the cutter bar into position. The uniformity of the parting makes this an easy matter.



CUTTING ACROSS THE FACE OF THE ROOM

The machine, making a 5-in. kerf, practically cleans the Spadra coal, for the parting is seldom thicker than the cut and there is little other removable impurity in the whole seam.

but the other nine mines operate a continuous overcutter called the Sullivan CE-11, which is an adaptation of the manufacturer's CE-9, a combination low-bed room-and-pillar and longwall machine. Because the Spadra characteristic parting is found from 13 to 24 in. above the floor, the cutter bar of the original type of undercutting machine was swung around 180 deg. on its hanger so that the bar would be in line with the top of the machine frame instead of at the bottom of it.

When not resting on skids the machine is 19 in. high and when mounted on a standard self-propelling truck stands 30 in. high above the track. A drop axle also is available. This reduces the height of the cut to 24 in., thus varying the level at which the machine makes its cut. Consequently by care in operation it



SOLID SHOOTING PRODUCED NO LUMPS LIKE THESE

One of the Spadra field's many handicaps was that before the adoption of machines the slack proportion ran as high as 80 per cent in places, though the market for screenings usually was poor. The machines have reduced the proportion to less than 40 per cent. Augers have been placed on top of the coal to show that the coal has broken neatly from the roof.

can be made to excavate its 5 in. in the dirt parting wherever that may happen to be. The cutting process cleans the coal before light shots, placed in the top and bottom, loosens it in big lumps. The location of the parting is so uniform in each mine that a non-adjustable type of skid was adopted. Slight variations are satisfactorily met by skidding the machine up on props or cap pieces.

Even though, in modifying the older type of machine for Spadra conditions, the cutter bar was reversed from bottom to top, the drive sprockets and gearing were so reconstructed as to permit the operation of the chain in the normal direction. In other respects the machine is the same in handling and in mechanism as the standard undercutter. It works equally well in room and longwall faces.

New Equipment

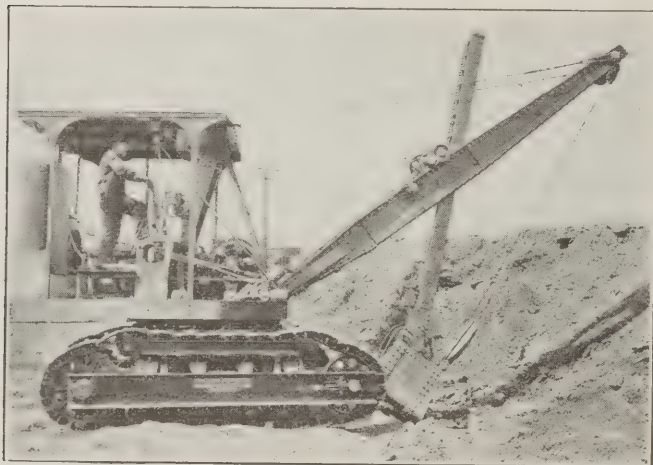
A New Gasoline Dipper Shovel

A GASOLINE-DRIVEN power shovel operated entirely with gears and shafts is the latest improvement in this type of machinery announced by the Orton & Steinbrenner Co., of Chicago, Ill., and Huntington, Ind.

On account of the development of the gasoline motor various schemes have been put forward during the last few years in the attempt to adapt this form of power to a dipper shovel. The principal difficulty was that it became necessary to provide an arrangement to take the place of the independent source of power for the reversible crowding motion of the dipper stick.

The positive gear drive on the Orton & Steinbrenner Co. shovel is simple and the number of parts few. At the bottom of the boom connection is a shaft carrying double steel bevel gears and bronze friction clutches. This shaft is concentric with the pivot of the boom and consequently is independent of its position. The boom can be used at any angle to suit the exigencies of the work. A practical shovel-man can readily see the great advantage of this arrangement.

Along the boom is a steel shaft carrying two bevel pinions, one meshing at the bottom with the gears on the horizontal shaft, and the other at the top meshing



GASOLINE ENGINE DRIVEN SHOVEL

The main advantage of this shovel is that it includes its own power plant and drive; no boilers or power house being necessary.

with gears on a countershaft located about half way up the boom. This latter shaft carries a brake and "slip friction," and is geared directly to the cast steel rack on the dipper stick.

With this method a minimum number of levers are required, the operator being at ease all the time and not subject to fatigue. The simplicity of parts also is of great advantage in converting the shovel into a clamshell outfit, dragline or skimmer rig.

The power is supplied by a heavy-duty 4-cylinder "Climax" motor, which is designed with a view of economical use of gasoline.

Another exclusive feature of the machine is the flexible crawling tread. Full advantage has been taken of the experience gained in the design of tanks used in

the World War. It was proved conclusively that flexibility and lubrication of the tread and tread rollers was absolutely necessary to their operation. Experiments and developments during the last few years prove the absolute soundness of this type of construction. These flexible treads adjust themselves readily to the ground surface, equalizing the weight of the machine and distributing it over a considerable length of tread, instead of concentrating it on one roller or tread casting.

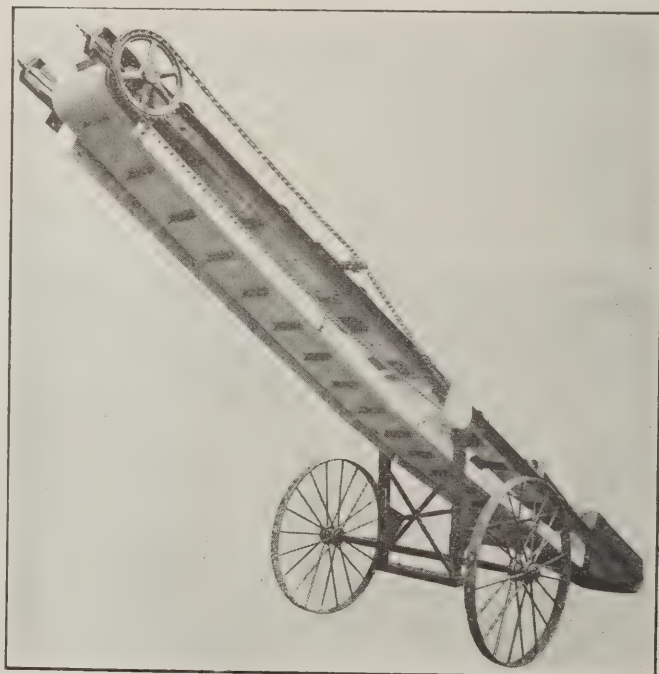
Alemite fittings are used exclusively in lubrication. These provide the quickest and most effective means yet devised for getting the grease into the bearings. Steering is accomplished by one man in the cab. The drive is by means of steel shafting and bevel gears throughout.

On the main horizontal drive shaft are two brake wheels by means of which each tread may be operated independently or both may act together. The mechanical differential arrangement is exactly similar to that used on automobiles.

To use it as a crane it is only necessary to take off the shovel boom and attach the crane boom; the crowding frictions for operating the dipper, being carried by the shovel boom and an integral part of it, are removed with it. When furnished with double drums the shovel can be used interchangeably with the crane. With the crane boom attached, any of the various types of buckets or scoops can be used, such as clamshell, dragline, skimmer scoop, or trench hoe; pile driver leads may be swung from the tip of the boom.

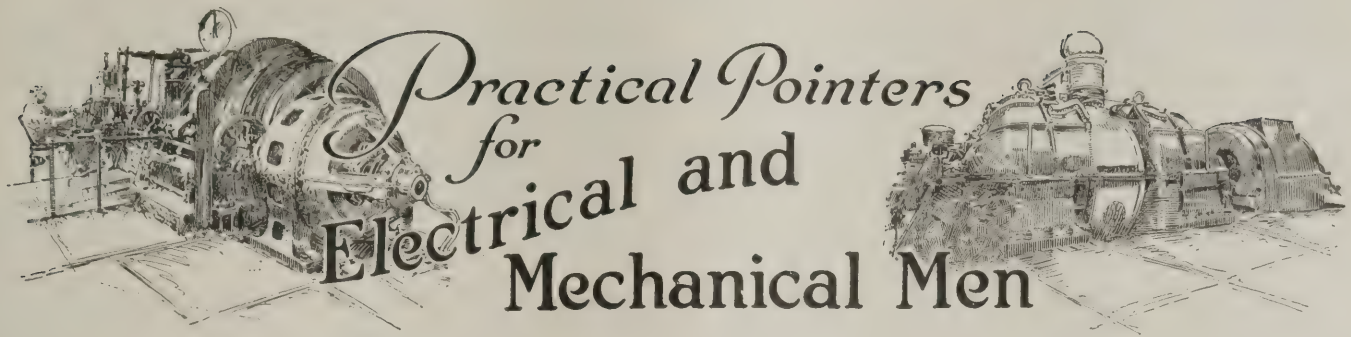
Portable Coal Loader

A PORTABLE belt conveyor particularly applicable to the handling of coal is shown in the accompanying photograph. Shippers and coal dealers are effecting large savings through the use of mechanical loading devices. Therefore this particular conveyor doubtless will find a large field for application in coal handling. This conveyor, known as the "Cub" portable loader, is manufactured by the Link-Belt Co. and is furnished at a moderate cost.



LINK-BELT CO. "CUB" CONVEYOR

Portable conveyor 21 ft. long complete with underneath lowering mechanism.



Axle Collar for Keeping Gear and Pinion In Alignment on Locomotives

THE stress and strain to which electric locomotives in mining service are subjected necessitates some means for keeping the pinion on the motor shaft properly meshed and in alignment with the gear on the driving axle. Unless the gear and pinion are in alignment the teeth will not wear uniformly over the entire width.

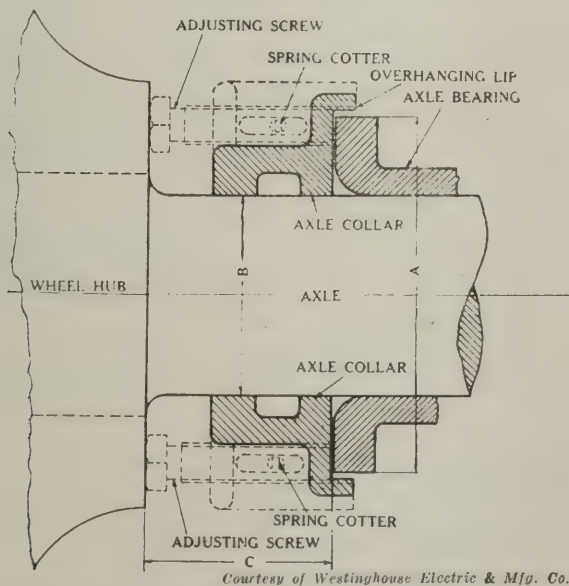
The function of an axle collar therefore is to keep the motor properly located on the axle so that the center line of the pinion on the motor shaft will line up with the center line of the gear on the axle. The length of axle collars is determined, first, by the distance between wheel hubs, which will vary on different cars, depending upon the track gage and the shape of the wheel at the hub; second, by the location of the gear on the axle, and third, by the over-all length of the motor at the axle bearings, which differs with the various sizes of motors. It can readily be seen that to meet these conditions will require a wide range of collars of varying lengths. Further, these different lengths of collars must be arranged with a number of bores made to fit the different sizes of axles found on the great variety of car equipments.

In the earlier equipments, non-adjustable collars that would just fill up the space on the locomotive axle were used. This type of collar was very satisfactory when the equipment was first put in service. However, as no

provision was made to take up the wear on the axle bearing flange, the motor soon developed considerable end play on the axle, resulting in rapid wear of parts and a tendency for the gear to cut through the side of the gear case. With this type of collar the end play could be taken up at least temporarily by releasing the clamping bolts and moving the collar over against the axle bearing and then tightening the bolts securely.

To provide a more positive and permanent means of taking up the end play due to wear, an adjustable collar was developed which was provided with an adjusting bolt, the head of which was backed up against the wheel hub. This bolt can be backed off the required distance to make the collar long enough to take up the maximum allowable axle bearing flange wear, after which the worn bearings should be replaced by new ones. This feature has been found to be of such value in keeping the motor properly located on the axle at all times that it is now being almost universally used in connection with all railway equipment.

The earlier axle collars were made of cast iron and fitted with a single adjusting bolt. They were made very heavy, being designed with a large factor of safety. During the campaign for light-weight equipments, the pressed steel axle collar was developed with double adjusting rods, and having the rubbing face reinforced with hard fibre rings to reduce the axle bearing flange wear. The experience of a number of operators indicated that the pressed steel collar was too light for this service and it was replaced by a heavier collar as shown in the figure herewith.



SECTION THROUGH ADJUSTABLE AXLE COLLAR

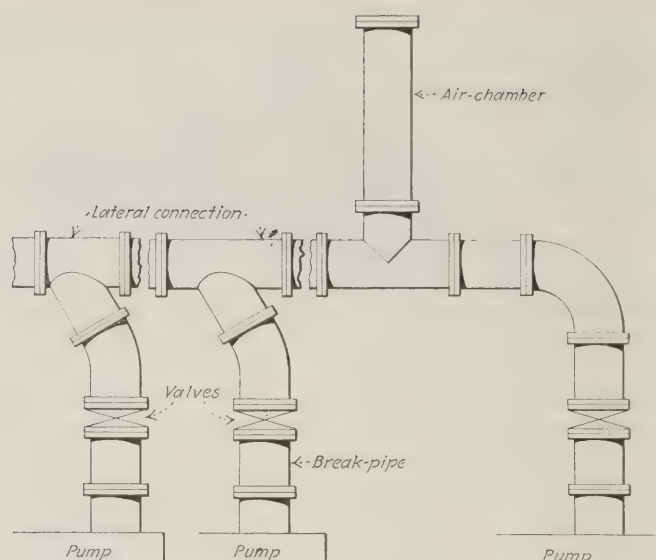
A, diameter of axle bearing flange; B, diameter of axle; C, space to be filled.

Use of Air Dome Prevents Breaking of Column Line Connection Pieces

BREAKS occasionally occur in the column lines of pumps in coal mines as in other industries. Under some circumstances these breaks have serious consequences, especially when the mine workings are making much water and the pumps are just about able to handle the large volumes which are continually running into the sumps. When the mine water is pumped to the breaker or washery for coal preparation, shutdowns to the pumps become more serious because the outside operations must also stop, thus throwing hundreds of men idle waiting for water. Even short delays are serious because the payroll does not stop when the pumps stop.

The illustration herewith shows the arrangement of three reciprocating pumps at the Cranberry Creek Coal Co. at Hazleton, Pa., which were used for the double purpose of dewatering the mine and furnishing a supply for outside consumption.

Occasionally some difficulty would arise with a pump



AIR DOME ON COLUMN LINE PREVENTS BREAKAGE OF CONNECTION PIECES

The air dome acts as a cushion to the surges in the line and saves the column line and connection pieces from breaking under the strain.

valve and a pump would miss a stroke and cause a surge or hammer in the column line. When this happened the surge sometimes was severe enough to break one of the laterals, resulting in the necessity of shutting down all the pumps, with delays to the outside force of men working on the preparation of coal.

To avoid the necessity of shutting down all the pumps when these shocks occurred, break pipes—pipe sections much thinner than the metal in the laterals—were placed between the valves on the discharge line from the pump and the pump itself, the idea being to have the break pipes break under the shock rather than the laterals. The break pipes were of metal $1\frac{1}{2}$ in. thick while the laterals were of metal $1\frac{1}{2}$ in. thick. Nevertheless, the laterals continued to break whenever a heavy surge occurred.

The difficulties were effectively overcome when the master mechanic, T. D. Stockdale, placed in the column line a T-connection to which was jointed a 10-ft. section of pipe the end of which was covered with a blank. This attachment is essentially a large air dome which is filled with compressed air from a compressor in the pumping station and whenever a surge occurs the air in the dome acts as a cushion for the water.

Neither laterals nor break pipes break with this large dome on the line and whenever the pump runner hears the least sound of any water-hammer he starts up the compressor and keeps the dome properly filled with air.

Motor Sizes on Electric Mine Locomotives

PLEASE explain in the columns of *Coal Age* how the horsepower of mine locomotives is determined. I also would like to know what would be the weight of a locomotive capable of developing a drawbar pull of 2,000 lb. What would the horsepower rating of each motor of such a locomotive be?

J. H. BLAIR,

Moundsville, W. Va.

On page 973 of the June 14 issue of *Coal Age* is an article entitled, "How Big a Load Can a Locomotive Haul." In the table on the same page it will be noticed that a locomotive capable of developing 2,000 lb. draw-

bar pull on the level would weigh 4 tons. The haulage capacity on the level would be 70 tons. On different grades the haulage capacity and drawbar pull of the locomotive decrease with increase in grade, as shown in this same table.

This table has been constructed for locomotives equipped with wheels having steel treads, for locomotives having cast iron wheels the values in the table must be reduced to 80 per cent of those shown in the table.

The standardization rules require that locomotive ratings shall be based on the running drawbar pull in pounds on the level, and speed in miles per hour that the motors will develop as determined at rated voltage.

From the above it is clear that the motor rating is a function of the speed of the locomotive when developing its rated drawbar pull on a straight, level track with dry rails. Therefore to determine the horsepower of the motors one must have data with reference to the speed.

However, for two-motor trolley locomotives running about 7 miles per hour at full rated drawbar pull the manufacturers are equipping the locomotives with motors which are rated so as to total about 8 to 10 hp. per ton of locomotive weight. From this it is apparent that a 4-ton 2-motor trolley locomotive would be equipped with motors capable of developing about 16 to 20 hp. each.

Locating Electric Switches in the Mines by White Markers

IN WORKING for a large anthracite company and by visiting the various collieries of the company I frequently observe different methods of doing the same thing. Some ingenious mind often invents a contrivance or hits upon an idea which accomplishes a given result much more efficiently or safely than it was ever done before. One of these ideas I am now passing on to the readers of *Coal Age*.

At one of our mines we have all our electric power switches indicated by two fairly long arrows, one parallel to the trolley wire itself, the other at right angles to the wire. The arrows are painted white so that they will stand out conspicuously against the black background. In case of an emergency, anyone, even a person unfamiliar with the location of the trolley switches, can readily see these markers and throw off the power. I believe that this simple idea will save the life of many a man and many a mine mule.

This is in line with the general safety measures which require that caution notices and warning signs shall be posted at points where such warnings and instructions will be most effective in reducing the hazard of danger from electric power lines.

We also have posted in every surface and underground station, and at the entrance to each mine, instructions for the restoration of persons suffering from an electric shock.

All employees who work with or on electrical apparatus should know how to carry out these instructions without delay.

By carrying on a campaign of Safety First we hope to reduce materially the number of accidents resulting from persons coming in contact with electric conductors switching equipment.

ANTHRACITE STUDENT.



Problems of Operating Men

Edited by
James T. Beard



Safeguarding Slope Mine from Seasonal Floods

Conditions Regarding Quicksand Warn of Danger—Two Plans Suggested—Another Mine Inundated for Lack of Needed Precautions

CONSIDERING the conditions described by Joseph Magdalena, *Coal Age*, Aug. 23, p. 291, regarding the seasonal flooding of his slope mine, I am impressed with the thought that he failed to recognize the imminent danger that surrounded the undertaking by reason of the presence of the bed of quicksand, which he says was 30 ft. in thickness.

The correspondent states that the slope was started in this bed of quicksand. His experience in that event, should have acquainted him with the conditions that prevailed and that should have been sufficient warning that trouble would be encountered later in the development of the mine. In view of the conditions described, it seems to me that the most practical method of lining this slope, to prevent the inflow of water and insure the best results, has not been adopted.

BARREL ARCH AS SLOPE LINING

It appears that, inasmuch as the quicksand was known to exist, a more efficient means should have been employed at the start. From my own experience, I would say the condition should have called for a barrel arch being constructed and carried the entire length of the slope, from the entrance or mouth to where the road reached the coal. The same construction should have been extended well into the coal, to make a good job.

It is my opinion that a 9-in. brick arch, or one of reinforced concrete, if properly constructed so that the lining completely covered the roof, sides and floor in the shape of a barrel, would have eliminated all future fear of trouble by reason of water finding its way into the mine.

Had such a form of construction been used I believe there would be no necessity now of considering the building of a steel door at the foot of the slope, in order to protect the mine from inundation during the wet season or in the event of a cloudburst.

OBJECTIONS TO DOOR AT FOOT OF SLOPE

The objection to building a door at the foot of the slope to keep the water out of the mine is twofold. In the first place, assume that such a door has been built and is closed in anticipation of a flood and that the slope is filled with water. In that case, the mine must be shut down for days or weeks, before the water can be baled out and the door opened for the resumption of work.

Again, a sudden cloudburst, or an increased inflow of water that is unexpected, may occur at a time when

no one is around that can close the door and the mine would then be flooded the same as if the door had not been provided.

In addition to the plan that I have already suggested, let me say that it might be good policy, in the present emergency, to sink a shaft at some point higher on the surface, while continuing the uninterrupted development of the mine through the slope opening. When the shaft has been completed and operations transferred to that location, a strong bulkhead can then be built at the foot of the slope, which would completely shut out the water coming from that source.

FAILURE TO PROVIDE PROTECTION CAUSES LOSS

The hazards that attend all such situations are too great to take any chances with human life and the destruction of property, to say nothing of the loss of valuable time and the needless expenditure of money. Failure to provide the necessary security where conditions prevail such as have been described, is nothing short of furnishing a mantrap that may some day prove fatal. Financially it is a losing proposition.

Before closing, permit me to narrate briefly what occurred at one mine of which I had charge. The company operated two mines located on opposite sides of the narrow-gage railroad running from Castle Shannon to Pittsburgh. I had charge of No. 2 mine. The slope dipped 3 per cent to reach the coal, while the mouth of the slope was not more than 30 ft. from the creek.

Having often pictured to myself the possible situation of my men at work in the mine at a time when the creek might suddenly overflow, I had a heavy folding door built just inside of the slope mouth. The work of building the door was nearly finished when the big boss happened around and wanted to know my idea in building such a strong structure.

APPEAL UNHEEDED BRINGS DISASTER

The need did not appeal to him and my suggestion that he do the same at No. 1 mine brought the reply, "Not on your tintype." The sequel can be told in a few words. A week or so later I was called from my bed at 2 o'clock in the morning and told that the creek was rising rapidly. Water was even then trickling down the slope.

It did not take me long to reach the mine and close the emergency door. Having done this, I started to get the men out through the fandrifft. There were twenty men at work in the mine at the time. Much to my surprise on reaching the surface, I found the water halfway up on the door that I had closed.

However, my work was ineffectual because of the superintendent's failure to protect the mouth of No. 1 mine in like manner. The water flowed into that opening and flooded both mines through the connecting entries driven between them.

Gans, Pa.

R. W. LIGHTBURN.

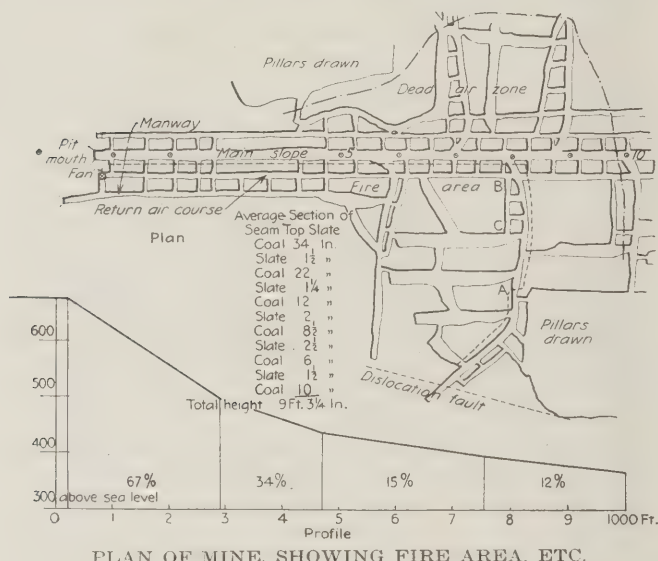
Fighting Mine Fires with Carbon Dioxide

Attempt to extinguish fire with water under high pressure fails—Mine then sealed and carbon dioxide forced into the workings proves successful.

READING the interesting article relating to the use of carbon dioxide in fighting mine fires, *Coal Age*, July 26, p. 132, calls to mind an instance where this gas was used to extinguish a dangerous fire in one of the mines of this district. The record file of this fire is missing and cannot be located; but I remember how the work was successfully performed and the fire finally extinguished. The following brief account will probably be of interest.

The fire was discovered on the morning of Feb. 13, 1905, about 7 o'clock. On being notified of the fact, I hurried to the mine and found it burning briskly at three points marked A, B, C, in the accompanying figure.

No time had been lost in taking steps to get water to the fire. A stream under high pressure was used in the



attempt to check the blaze in the air-course, at B; but as the supply of water was quickly exhausted, efforts in that direction had to be abandoned. Owing to the pitch of the seam, which is shown by the profile in the lower portion of the figure, the fire was spreading rapidly.

FLAMES REACH SURFACE, SHOOTING HIGH IN AIR

It was soon evident that more drastic efforts must be made to quench the flame or the mine would be lost. Work was then started in an effort to seal off the entire area; but this also proved ineffectual and, in fifteen hours after the fire was first discovered, the flames had reached the surface, at the mouth of the manway and the air shaft, shooting upward from 20 to 30 ft. in height and destroying the fan in a brief period of time.

The mouth of the main slope was now tightly sealed; but, by making certain changes, it was possible to circulate sufficient air to continue the work of building solid brick stoppings outside of the wood brattices separating the other manway from the main slope.

When the "fire area," marked by a dotted line in the figure, had been thoroughly sealed off, in this manner, the work was commenced of building wood brattices in all entries in that portion of the mine from which the circulation had been cut off and which is marked as the "dead-air zone" in the figure.

The work of sealing off the fire was completed about Feb. 27, or fourteen days after its first discovery. In the meantime, preparations had been going on to enable the manufacture of carbon dioxide. For that purpose two old boiler shells, 42 in. by 28 ft., had been secured and erected near the mouth of the slope. These were connected with a 10-in. pipe line passing through the seals. Also, a tramtrack had been built leading to an unloading platform at the railroad siding.

CONTINUOUS SUPPLY OF CARBON DIOXIDE

The purpose of these arrangements was to furnish a continuous supply of crushed limestone and sulphuric acid to be used for the production of carbon dioxide in the boiler shells previously mentioned. These shells or tanks were to be used alternately so that the operation would be continuous. While the gas was being generated in one tank, the other was being cleaned out and a fresh charge of limestone introduced in readiness for the acid, which was supplied to the tank when the other became exhausted.

In order to ascertain the progress of the work, an 8-in. pipe had been placed in the seal, at the air shaft, and pyrometric observations and samples of gas for analyses were taken daily. This was continued until the samples contained 20 per cent of carbon dioxide.

VOLUME OF CARBON DIOXIDE PRODUCED

Estimating on a production of 3.4 cu.ft. of gas, per pound of limestone consumed, the engineers figured that approximately 200,000 cu.ft. of the gas had been forced into the mine. After careful consideration, about three months later, it was decided to reopen the mine. Every accessible portion of the workings was then examined and the fire found to be completely extinguished.

The work of recovering the mine was then started and operations were again resumed and continued, until 1919 when the place was finally abandoned. It should be stated, however, that the coal in the fire area proved defective and the brick stoppings built to shut off that section of the mine were never broken or disturbed.

Birmingham, Ala.

ROBERT HAMILTON.

Drawing Mine Timbers

Blasting destroys timber and wastes dynamite—Practical method of knocking out timbers when chain post puller is not available.

LOOKING over the issue of *Coal Age* for July 5, my eye rested on the inquiry of a Tennessee mine foreman, page 20, who asked for the most practical way of withdrawing mine timbers. He explains that he has used different methods of pulling timber but seems to lay particular emphasis on the practice of blasting out timbers that cannot be removed with safety by other means.

He states that a small stick of dynamite is inserted in a hole drilled in the post, about 10 in. below the roof. While acknowledging that the practice destroys the timber and makes it unfit for future use, he says that they have had comparatively few accidents, though the method has not been altogether satisfactory.

Being a neighbor of mine in Tennessee, I feel interested in saying a word on the subject. As a practical mine foreman, my friend will allow that the first consideration is the safety of the men employed in the work. No doubt he chooses the most practical and experienced men for the purpose. Allowing all this,

let me suggest that there will be greater safety and economy in putting his dynamite aside for other use thereby saving both timber and explosive.

While I fully agree with the editor who advocates the use of the chain post puller when drawing timbers, I want to take this opportunity of mentioning another method that we have found most practicable and that can be used with safety when the chain puller is not available, which is frequently the case. In this method, nothing is required but a strong rope and a good 8-ft. timber to serve as a battering ram.

The plan is a simple one. The two ends of the rope are securely tied to convenient posts, allowing a certain sag in the rope. The 8-ft. timber which is to be used as a ram, is then hung from the center of the rope in such a position that it can be swung to and fro.

After making sure that he stands in a safe place, the man operating the ram swings it backward and forward, striking the timber he wishes to knock out with a sharp blow. By the use of this method, I have knocked out posts and double timbers as well, with the greatest degree of safety. Where there is danger of the post being covered by the fall of roof and lost, it may be possible to attach a rope to the post, which can then generally be drawn clear of the fall.

Let me add in closing that the first thing to be considered, in the operation of a mine, is the safety of the men employed in the work. Next to this comes the cost of getting out the coal. Every reasonable effort must be made to reduce the cost-sheet if the mine is to be operated successfully and on a paying basis.

Wilder, Tenn.

OSCAR H. JONES.

Inquiries Of General Interest

Leaky Joints in Air and Water Pipe Lines

Trouble from Leaky Joints Quickly Overcome
by New Method—Saving Effected in Cost
of Maintenance — Advantages of System

AT OUR mines, which are equipped with compressed air for operating the drills, we have experienced a considerable loss of power from leaky joints in the pipe lines, which are carried a distance of 6,000 ft. before reaching the point where the power is distributed to different portions of the working face.

For a time, the matter was not given the attention that it should have received, owing to the fact that the leakage of the air from the pipe line greatly improved the ventilation on the main road, which was the return airway for the mine and badly in need of better ventilation.

However, with the development of the mine and the installation of more drills, the demand for power increased and investigation showed the need of repairing the leaky joints, putting in new gaskets and lining up the pipe by supporting it where it had sagged. This work has made a considerable item in our cost-sheet and opened our eyes to the need of using more effective measures of maintaining airtight joints in the pipe lines. Somewhere we have seen or heard of a new method of making these joints airtight in long pipe lines. Any information that *Coal Age* or its readers can give that will assist us in overcoming our present difficulties will be greatly appreciated.

—, Ill.

MANAGER.

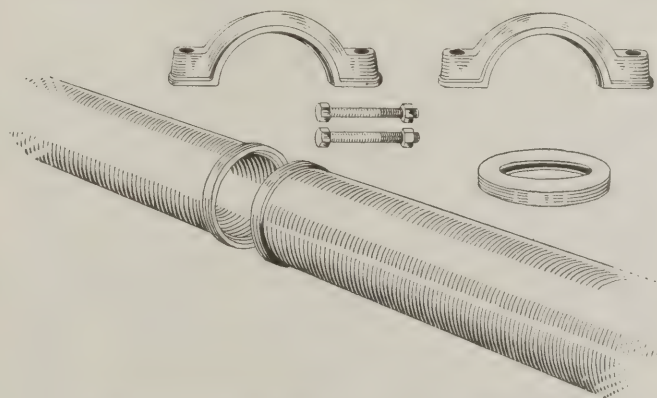
Many readers will recognize that this correspondent has voiced a common difficulty encountered in attempting to transmit power by compressed air through a long pipe line. Unless given careful and constant attention, leaky joints are bound to develop and a corresponding loss of power is invariably the result.

Speaking of leaky joints, however, the trouble is not confined to airpipe lines. The same difficulty is experi-

enced in maintaining tight joints, in an extensive spraying system, where the pipes are extended long distances underground. The trouble is much increased in a long siphoning system, where leaky joints greatly impair the efficiency of the siphon, which eventually will run dry, because of the leakage of air into the pipe line. Leaky joints also give much trouble in column pipes when supported in deep shafts where the pipe is subject to vibration due to hoisting and other severe conditions.

A new method of securing practically airtight and watertight joints in pipe lines has been extensively introduced in English collieries and is claimed to give good satisfaction. In one instance that has come to our knowledge, from six to eight men were kept constantly employed repairing leaky joints, in a large mine equipped with compressed air where ten miles of pipe had been installed, the pipes ranging from 2 in. to 10 in. in diameter. The application of the so-called "VICTAULIC" system to these pipes made it difficult to find a single leaky joint.

The device is exceedingly simple. As shown in the accompanying figure, it consists of two metal housings



DETAILS OF WATER- AND AIR-TIGHT JOINT
VICTAULIC SYSTEM

that can be bolted together around the joint and are made to inclose a leakproof ring which is flexible. The entire makeup consists of but five parts. The flexible ring seals the joint in the same manner as a U washer.

As the pipes do not butt together and as moreover there is clearance on each side of the shoulder the pipe line has ample room to expand. In consequence where these joints are used no other provision need be made for expansion. The flexibility of the joint is an exceedingly interesting feature in mining work, where rigidity in a pipe system is so frequently objectionable in striving

to make an installation conform to the irregularities of the mine passageways.

The fitting of a single joint, in the Victaulic system requires no skilled labor and is accomplished in about two minutes. The joint is sealed automatically and requires no further adjustment. Ordinarily, the metal housings are made of semi-steel (25 per cent steel) and are suitable for a working pressure of 300 lb. per sq.in., in a water pipe line, or 100 lb. per sq.in., in an air pipe line. With joints of forged steel, the working pressure can be increased to 600 lb. per sq.in. The seal of the flexible rim is more effective, the higher the pressure.

This system of securing and maintaining leaktight joints, in water and air pipe lines, is the result of special investigation and experiment by the Victaulic Co., Ltd., London, England. It should have a wide field of application in mines and quarries in this country.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 8-14, Incl., 1923

(Selected Questions)

QUESTION—*What are the principal causes of fires in coal mines and what precautions should be taken to guard against them?*

ANSWER—Among the chief causes of mine fires may be mentioned: The careless use of open lights, in presence of gas or in proximity to combustible matter; in the handling of powder; in the preparation of shots in blasting; or in the handling of hay for the mules; also, the care of oily waste used about the pumps and other mining machinery. A mine fire may result from the ignition of gas by a defective safety lamp or by the improper use of such a lamp; or the ignition of gas or dust may be caused by the flame of a blownout shot. A feeder of gas ignited by a blast may be left burning in the coal and start a fire that is difficult to extinguish. Fire also frequently results from the spontaneous combustion of fine coal and dust stored in the gob, or the same may occur in a pile of oily waste carelessly thrown aside. Fires are also caused by the imperfect installation of electric wires, the sparking of motors in the presence of gas or dust and the blowing out of a fuse or the short-circuiting of live wires.

To avoid these results and dangers, strict rules must be made and enforced in regard to the handling of all explosive and combustible material, the use of open lights and other conditions liable to cause a fire. All safety lamps used in the mine should be carefully examined at the close of each shift and the same cleaned, filled and assembled for use again, by a competent person in charge of the lamphouse. All installations of electric wires and machinery of that type should be made by a competent electrician familiar with mining conditions.

QUESTION—*A sinking bucket is 4 ft. 6 in. deep, 3 ft. 3 in. in diameter at the top and 2 ft. 9 in. at the bottom; what is the cubical contents of the bucket and what weight of water will it hold?*

ANSWER—The shape of the bucket represents the frustum of a cone whose two diameters are $D = 3.25$ ft.; and $d = 2.75$ ft., respectively. The height of the frustum, or depth of the bucket, is $h = 4.5$ ft. The volume of the frustum of a cone is calculated by the formula

$$0.7854 h \frac{D^3 - d^3}{3(D - d)}$$

In substituting the given values in this formula, we have $3.25^3 = 34.328$; and $2.75^3 = 20.797$, making the difference of the cubes 13.53, while the difference of the two diameters is $3.25 - 2.75 = 0.5$ ft. and giving for the cubic contents of this bucket,

$$\frac{0.7854 \times 4.5 \times 13.53}{3 \times 0.5} = 31.88 \text{ cu.ft.}$$

Calling the weight of a cubic foot of water 62.5 lb., the weight of water in this bucket when full would be $62.5 \times 31.88 = 1,992.5$ lb., or practically one ton.

QUESTION—*What first-aid service would you render a person suffering from: (a) Compound fracture of limb; (b) electric shock; (c) powder burns; (d) fractured rib?*

ANSWER—(a) The first-aider, on finding a compound fracture of a limb, must send at once for a physician, at the same time adjusting the limb in the easiest possible position, with great care, to avoid the splintered bone from lacerating the flesh. In this position he must bind it carefully in a manner to prevent any undue movement causing further injury. If practicable, the injured person should be removed on a stretcher to where he will get better air and revived with smelling salts or other means, to prevent collapse.

(b) If the man is still in contact with a live wire, promptly shut off the current if a near-by switch is available; or short-circuit it by any means at hand; or cut the wire by a single blow of an ax; or drag the person from the wire by catching hold of his dry garments, or by the use of a pole, or otherwise. Always avoid standing on wet ground or handling wet garments when striving to remove the man from contact with the wire. When this has been done, apply artificial respiration after the usual manner.

(c) Everything must be done to exclude the air from the parts burned, by applying a thin paste of flour, starch or baking soda; or by the use of vaseline, olive oil, cream or fresh lard. Then cover the parts with a light cloth and remove the person to where he can be more comfortably treated.

(d) The breaking of a rib causes a sharp pain, by reason of the action of breathing creating a movement in the chest whereby the broken bones are made to pierce the flesh. In order to reduce this trouble to a minimum, a large towel, a garment, or any suitable bandage, must be wrapped around the body and over the chest in a manner that will afford some support to the broken parts of the rib and prevent their movement as far as that is possible. The injured person must be moved very carefully and given every care and attention while awaiting the arrival of the doctor.

QUESTION—*If you were sinking a double-track slope, on a dip of 40 deg., how would you secure the track?*

ANSWER—The track must be held in position and prevented from slipping down the slope by spiking it to crossbars hitched into the rib on either side of the road, at intervals of ten or twelve feet. At times, use is made of short struts or braces made to bear against the crossbars and set in footholes cut in the rib, the struts making an angle of about 45 deg.

International First-Aid and Rescue Meet More Complex Than College Track Meet

Running off an International First-Aid and Mine-Rescue Meet such as was held in Salt Lake City, Utah, Aug. 27-29, is no easy task for either the Bureau of Mines officials who are in charge of the meet annually, or for the 54 first-aid and 21 mine-rescue teams from all over the country who participated last month. It is a far more complicated and serious business than the great college track meets which drag throngs to the country's athletic fields. In the first place more contestants are entered than usually take part



FIRST MEXICAN TEAM TO TAKE PART IN AN INTERNATIONAL MEET

Third prize in the mine-rescue contest was taken by the team representing Real Del Monte y Pachuca Co., of Pachuca, Mex., captained by Manuel Ramirez.

in any athletic meet short of the Olympic games—about 450 were at Salt Lake City—and each event is judged on scores of points from start to finish instead of merely on the ultimate outcome. A report of the meet appeared in last week's *Coal Age*.

The first-aid contest, which kept judges, the 54 teams and a good many spectators busy in Bonneville Pavilion for two days and which was won by the Anaconda Copper Co.'s team, began with an inspection of equipment with which mine teams are trained to treat sufferers of any mine accident. Each team was composed of six men, including a captain.

Each team as it performed a problem was rated by a subcommittee of three judges. Subcommittees of judges worked under a committee of three chief judges, one of whom acted as chairman. Subcommittees of judges performed their work progressively. Each judge kept and signed his own score card.



CUP PRESENTED BY THE BERTHA-CONSUMERS CO. TO WINNER OF FIRST-AID CONTEST

Each of the several judging subcommittees consisted of two doctors skilled in first-aid training and conversant with the Bureau of Mines first-aid standards, and one layman familiar with underground mining methods and trained in the Bureau of Mines first-aid standards. Each team performed the same three problems.

Each of the several judging subcommittees consisted of two doctors skilled in first-aid training and conversant with the Bureau of Mines first-aid standards, and one layman familiar with underground mining methods and trained in the Bureau of Mines first-aid standards. Each team performed the same three problems.



HIGHEST HONORS OF THE INTERNATIONAL FIRST-AID AND MINE-RESCUE MEET WENT TO THESE ILLINOIS MEN

They won not only first prize in mine-rescue work but also the combination first prize with honors for rolling up a rating of 94 in both first aid and mine rescue. They are, left to right, top row: Captain Mungo Marshall, James Weir, John Young, William Larson and Mungo Brown; front row, J. B. Kell and Robert Tait. These men represented the Benton district of the Illinois coal field.

Such problems as these were worked on the floor of the pavilion over one of the team members, by each team:

(1) Treat following injuries: Simple fracture of lower jaw; compound fracture of middle of right thigh, bleeding freely bright red blood from wound over fracture on the front and to the inner side of the thigh; patient conscious, in state of shock.

(2) Treat following injuries: Severe injury to left eye-ball; broken kneecap of right leg; dislocated right shoulder; little finger torn off left hand, bleeding profusely.

(3) Man is found, apparently not breathing, on his back with shoulder and upper part of both arms in contact with a live electric wire. Demonstrate three methods of rescue before treatment. Treat. No burns to treat. Demonstrate artificial respiration for two minutes. Treat for shock.

There were many pitfalls awaiting each mine-rescue team



SECOND HIGHEST HONORS OF THE INTERNATIONAL FIRST AID AND MINE RESCUE MEET WAS WON BY THIS MONTANA COPPER MINING TEAM

First prize in first-aid work with a score of 97.91½ and a prize for being the best first-aid team from the Rocky Mountain states were the honors taken by this team representing the Anaconda Copper Mining Co. of Great Falls, Mont. The men are, left to right, top row: Captain L. J. Deranleau, Viggo Paulsen, Gordon Gillis, George Roberts and Dr. C. C. Gerrard; front row, Joseph Marcure and Edward Egan.



MINE-RESCUE TEAM ENTERING SMOKE AND GAS GALLERY AS IT BEGAN WORKING OUT ITS PROBLEM IN MINE RESCUE

Slack Time Raises Mining Cost

Bituminous Mines Average 220 Days per Year—Steadiness of Operation and Car Supply Chief Price-Determining Factors

The effect of slack times on the cost of running bituminous-coal mines is the subject of a report issued Sept. 12, 1923, by the U. S. Coal Commission. The report is in two parts; that given herewith in full is the conclusion as signed by the commissioners; the appendix is a staff report that will be published in full in *Coal Age* at a later date.

The summary follows:

TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES:

As one of the results of its engineering study of the "cost of production" of coal, the U. S. Coal Commission submits its conclusions on the Effect of Irregular Operation on the Unit Cost of Production of Bituminous Coal. A more general discussion of irregular production in its broader aspects will follow in another chapter of this report.

The cost of producing a ton of coal, other things being equal, varies with the steadiness at which the mine is operated. If the mine runs every working day the cost is the lowest; each idle day adds to the cost of producing coal on the days worked. This is so because a part of the costs go on whether the mine operates or stands idle. Since irregular operation of bituminous coal mines is the rule rather than the exception, it is important to determine the cost of idle days.

It is the general practice to maintain soft-coal mines in condition as respects equipment, development and labor to produce coal on short notice. Mines are seldom completely closed for short periods and the labor force dismissed. Even in periods when the demand for coal is slack and orders few, it is customary for the management to maintain a working force, in part to keep the mine in condition to produce and in part because some of the force are paid by the month. Still other expenses, as will be detailed later, are continuous whether the mine is producing coal or not. Therefore, the sum total of the continuing expenses for a period of a year, for instance, must be prorated over the number of tons produced in that year. Obviously, if the mine produces twice as much coal in one year as in another, each ton of coal produced in the slack year must carry twice as large a proportion of the continuing expenses as are assessed against each ton produced in the year of high production.

Taking the month of 25 working days as full-time operation, it is found that when the mine works 16 days, 4 days per week, the cost per ton is increased 8 or 9 per cent over full-time operation; when working time is 12 days per month or 3 days per week, that is, half time, the unit cost

as it took the field. As each team went through its preliminary examination by the judges there were discounts totaling 100 points which could be assessed against the entrants. Failure to name or demonstrate tests for tightness and proper working condition of apparatus, improper assembly of apparatus, failure properly to explain the circulation of air through the apparatus, failure to discuss satisfactorily several main questions about crew performance and failure to explain properly the purpose of various parts of the apparatus were costly.

The whole meet was under the direction of D. J. Parker, for the Bureau of Mines, Mr. Parker is chief engineer of the Bureau's mine-safety service at Pittsburgh, Pa., with these Bureau men serving with him on the Bureau of Mines committee: J. J. Bourquin, E. H. Denny, Dr. A. L. Murray, Thomas Varley, B. O. Pickard, C. A. Herbert, W. D. Ryan, B. W. Dyer, D. Harrington and E. B. Swanson, W. Mont Ferry was chairman of the executive committee for the meet and Dr. A. L. Murray was secretary. Dr. G. H. Richardson of the American Red Cross, San Francisco, Cal., and H. M. Wolfen, superintendent of safety for the California State Industrial Commission, were chief judges of the first-aid contest. W. G. Duncan was chief mine-rescue judge.

is 21 to 25 per cent over full time or minimum cost; and when but 8 days per month or 2 days per week, is worked, costs increase 48 per cent. Four days per month, or 1 day per week, of operation raises costs 104 to 120 per cent over the minimum. If but one day is worked per month, the increase is from 474 to 549 per cent over full-time operating costs. These figures are based on the detailed reports of costs of production made to the Federal Trade Commission for 1918 and to the Coal Commission for 1921.

The following table gives the increase in cost of production for each day the mine is idle, expressed as percentages over the cost when the mine is worked 25 days per month:

Days Worked	Percentage of Full Time	Percentage Increase in Cost Production		
		1918	1918	1921
		266 Mines	117 Mines	119 Mines
25	100	0	0	0
24	96	1	1	1
23	92	2	2	2
22	88	3	3	3
21	84	4	4	4
20	80	5	5	5
19	76	7	8	6
18	72	8	9	8
17	68	10	10	9
16	64	12	12	11
15	60	14	15	13
14	56	17	18	16
13	52	19	21	18
12	48	23	25	21
11	44	27	29	25
10	40	31	34	30
9	36	37	40	35
8	32	45	48	42
7	28	54	58	51
6	24	67	72	63
5	20	84	90	79
4	16	111	120	104
3	12	155	167	145
2	8	243	263	227
1	4	507	549	474

The advantage and economy of full-time operation are clearly indicated. As between two similar mines, each having a cost of production of, say, \$2.50 per ton if worked 25 days per month, the mine that enjoys the best working time under conditions of car shortage and a strong market for coal, will make the larger profits because of lower costs; or under conditions of poor market one may undersell the other and realize a profit because with more days worked the cost will be lower. A mine having assigned cars or served by private cars in 1920, when car supply was relatively poor but prices uniformly high, worked every day with an average cost of, say, \$2.50 per ton. Another mine depending on its share of system cars may have worked but three days per week, in which event the cost per ton would have been 25 per cent higher, or \$3.12 per ton. If car shortage held operation down to two days per week, the costs would have risen 48 per cent to \$3.70 per ton.

It is during periods of car shortage, when demand for coal is at its best and prices high, that the effect of broken time on cost is most evident. In such periods the operator holds his full complement of labor and maintains his prop-

erty in condition for maximum output, in fact endeavors to increase his daily capacity because he thereby becomes entitled to a larger share of the available railroad cars. Under such conditions there is no possibility of economizing on costs as by lay-offs from payroll on idle days. The full effect of forced idleness is felt on costs under such conditions.

However, when demand is slack, railroad cars plentiful but orders for coal scarce, prices are low and labor is competing for jobs. Advantage can then be taken to reduce costs by curtailing indirect labor costs and in other ways. The cost of idle time can be and is thus somewhat reduced under slack market conditions. The comparative costs in 1918 of 27 companies operating 117 mines with the costs in 1921 of 25 of the same companies then with 119 mines gives the difference of idle-day costs due to car shortage as compared with idle-day costs due to no market. Taking again a base cost of \$2.50 per ton for full-time (25 days) operation it is found that when working 20 days (5 days per week) there was no difference; when working 16 days (4 days per week) the difference was negligible, 2½c. a ton; when working 12 days (3 days per week) the difference was 10c. per ton; and when working 8 days (2 days per week) the difference was 15c. per ton. One day per week brought the difference up to 40c. per ton. There is thus no notable difference in unit cost of production caused by short-time operation whether this broken time be due to lack of transportation or lack of market. The real difference enters in the reduction in the base cost, which can and quite generally is reduced in times of inactive demand.

It may be inquired in view of this factor of cost of idle time what effect on the country's coal bill the fact may have had that in the past 20 years the soft-coal mines have worked an average of but 220 days, or about 72 per cent of full time. If the price paid by the consumer were cost of production or a direct function of cost, then the answer would be that the total cost to the country was about 8 per cent more than it would have been if few mines working full time had produced this coal. However, the price in

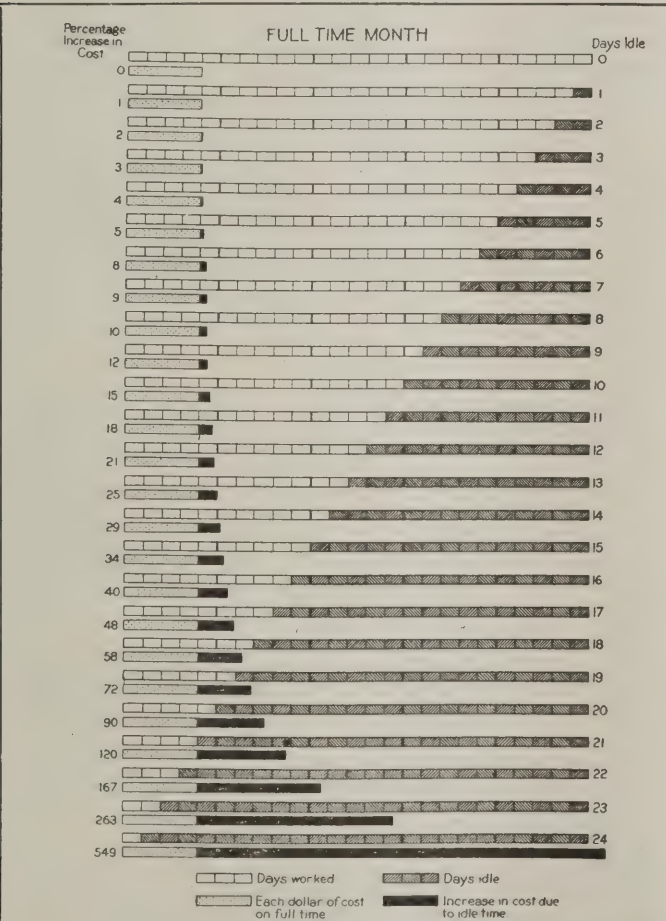
periods of dull demand is set by the mines with lowest costs, which, other things being equal, are the mines that secure enough business, largely by reason of their lower cost, to operate the nearest to full time. Then other higher cost mines work less days, take less profits, none at all, or lose money. In times of poor demand and keen competition for business the consumer quite generally get the advantage in lower production costs that attends full time operation of the mines. During prolonged periods of inactivity many mines are closed down and those that are operated on short time quite generally lose money.

In periods of active demand, increases in cost due to broken operating time caused by car shortage are absorbed by operators in the higher prices realized for their output, providing it is sold in the open market. Operators with contracts at fixed prices are affected in the opposite way. Better operating time obtained by taking on low-priced business in dull periods serves to lower costs; in active periods when car shortage prevents full-time operation, costs at these mines are adversely affected with no opportunity to make up the difference by increasing the sales price.

A more complete presentation of this study, which represents the work of C. E. Leshner and R. A. Walter, of the engineering staff of the commission, is appended, together with a diagram illustrating the effects described above. It is hardly necessary to point out that the ratio of increase in cost as days worked decreases, accurate as it may be as an average for a large number of operations studied, cannot be expected to exactly fit any one mine. However, in the appendix general principles are set forth by which the ratio of increase for a single operation may be calculated from a few observations.

EDWARD EYRE HUNT,
Secretary.
F. G. TRYON,
Statistical Adviser.

JOHN HAYS HAMMOND, Chairman,
THOMAS R. MARSHALL,
CLARK HOWELL,
GEORGE OTIS SMITH,
EDWARD T. DEVINE,
CHARLES P. NEILL.



Cost of production is at the minimum when the mine is worked full time, that is 25 days per month and has no idle days. The stippled bar at the left represents a dollar of cost under such conditions.

The loss of one day's operation increases the average cost one cent on each dollar of cost, or 1 per cent; the loss of two days in the month increases the cost 2 per cent, as is indicated by the solid black additions to the stippled bar representing each dollar of cost.

Thus, if the mine loses 8 days out of 25 in the month, the average cost of production is increased 10 per cent, that is ten cents on each dollar of cost. If the mine is a "low cost operation," with a full-time cost of say \$2.00 per ton, when it is idle 8 days the average cost amounts to \$2.20. If a "High cost" mine, with an average of \$3.50 per ton when working every day, the average cost per ton in a month when 8 days were lost would be \$3.85 per ton or 10 per cent greater.

When the time lost exceeds one third of the month that is from 9 days upwards, the increase in average cost rapidly increases. If the mine is worked 12 days and loses 13 days, costs are increased 25 per cent.

If 17 days are idle, the cost is nearly 50 per cent over the minimum.

If but one day a week or four in the month is worked, the cost is more than doubled. Two days of operation per month raises the average cost per ton 263 per cent and each dollar of minimum cost becomes \$3.63. If but one day is worked the cost increases by the amount of 549 per cent.

Effect of Irregular Operation of Bituminous Coal Mines on Cost of Production

Searchlight May Be Turned on Retailer Soon, Warns Byron R. Newton

That the United Mine Workers will advocate nationalization of the coal mines as soon as the report of the U. S. Coal Commission is out of the way, was asserted by Franklin Bache, of Philadelphia, mining engineer and a coal operator in Arkansas and Oklahoma, in an address at the annual convention of the New York State Coal Merchants' Association, at Sacandaga. The convention was held Sept. 10, 11 and 12. Mr. Bache told the coal merchants that for tactical purposes government control of the coal business and government ownership of the mines has not been pushed recently, but that it is the basic demand of the miners' union and that its advocacy will soon break forth again.

He assumed that the coal dealers agreed with him that the extension of the government's activities in business is highly undesirable, and told them that "if we do not speak for ourselves we will have more and more government in business." "No sane man believes for one moment that government control and government ownership will stop at the coal business," he continued.

Mr. Bache denied that coal mines are a "natural monopoly." A fair-minded and well-informed public cannot properly place the chief blame for higher prices on the operators, he declared, for since 1914 the day wage scale in bituminous mines has been advanced from less than \$3 for eight hours' work to \$7.50.

"With such an advance in labor, there can be no question even in the most prejudiced mind as to the responsibility for the largest part of the increase in the price of coal, and when we consider that the public only knows about the price of coal to be delivered at the point of consumption and that freight rates have about doubled, we can show that our hands are clean as regards the prices now paid for coal," he declared. "There is no combination of operators to restrict production or to maintain prices," Mr. Bache continued. "There is no monopoly in ownership, but only a monopoly of labor maintained by criminal violence."

Byron R. Newton, former Assistant Secretary of the Treasury, who addressed the convention on the first day, characterized the settlement of the anthracite miners' controversy as "a patchwork which will cost the public about \$35,000,000, of which Pennsylvania is the chief beneficiary." "The public will pay from 75c. to \$1 more on each ton of coal," Mr. Newton said. "The cure rests with the public in urging the closest co-operation between operators and public." He said that this is a critical time in the anthracite industry, as the oil, gas and electric industries are on the trail of the coal man. Saying that the mine operators occupy the front in every contest waged with the labor union, Mr. Newton declared that he was sure the public quite generally is inclined to support the operators in the splendid fight they have made, "particularly in this last campaign," and in what they tried to accomplish.

"Everything they have stood out for has been something for the protection of the public and the men," he said, "and with persistent stubbornness the union leaders have opposed the operators at every step." Mr. Newton told the dealers that as the operator has had the searchlight turned on him for so long the public knows all about him, it will now be turned on the retail dealer.

Mr. Newton said the facts and ethics of the situation all point to the necessity for co-operation between producers and distributors in educating the public.

Samuel B. Crowell, president of the National Retail Coal Merchants' Association, told of the work accomplished by the officers and committees of the national organization. Service is what the retailer has to sell, Mr. Crowell continued—knowledge of when and how to get the best coal, how best to prepare the coal at the yard; how to make the best delivery; how to obtain and keep a sufficient number of satisfied help and of the proper and broad way to handle labor problems. He told the dealers they would not go wrong if they forgot what prices competitors paid

for coal, and made the price for their own coal that which will enable them to give service in its fullest sense.

Charles B. Staats, of Albany, was re-elected president of the association for the ensuing year. Other officers chosen are: Vice-presidents, C. A. L. Wood, Rochester; R. J. Wulff, Brooklyn; John Murray, Waverly; Treasurer, J. M. Gaffers, Schenectady; Secretary, F. A. Eldredge, Auburn.

Pinchot Makes Public Text of Coolidge Message' on Strike Settlement

Governor Pinchot of Pennsylvania made public Sept. 13 the message of congratulation from President Coolidge upon the settlement of the anthracite controversy. The Governor also issued a statement explaining that the telegram was given out upon receipt of word from the President's secretary, C. Bascom Slemp, that Mr. Coolidge expected Mr. Pinchot to make it public.

President Coolidge's message was dated at the White House Sept. 7, the day before the anthracite operators' representatives and miners' union officials, in conference at Harrisburg, agreed finally upon the terms of settlement. The message said:

"Please accept my heartiest congratulations on the settlement of the coal controversy. It was a very difficult situation in which I invited your co-operation. Your management of it is a distinct public service. I cannot commend it too highly. Certainly there ought to be some method devised for a settlement of disputes of this kind in accordance with principles of justice and fairness to all parties concerned. The constantly recurring danger of lack of an adequate fuel supply is of itself a grave criticism of a great industry and an intolerable condition for the public to endure."

Although the message was received six days previously, Mr. Pinchot had declined to make it public until assured from the White House that there was no objection to its issuance at Harrisburg. The Governor's statement said:

"Having received word today from Mr. Slemp that the President expected me to make public his telegram of congratulations I do so with pleasure. At the same time I wish to express again my appreciation of the President's heartiest and welcome message."

Another paragraph was added by the White House Sept. 14 to the exchange of compliments between President Coolidge and Governor Pinchot over the anthracite settlement when this telegram from the Governor, responding to Mr. Coolidge's message of congratulation on the outcome of the Harrisburg conference, was given out:

"Please receive my heartiest thanks for your courteous and welcome congratulations on the settlement of the coal controversy."

Coal-Mining Men Drawn to Exposition of Iron and Steel Electrical Engineers

The exposition of the Association of Iron and Steel Electrical Engineers which will be held in the Broadway Auditorium at Buffalo, N. Y., Sept. 24 to 28, will hold much interest for coal men. This association numbers among its members many coal-mining electrical engineers and a large part of the program will be devoted to coal-mining electrical engineering problems.

Over one million dollars worth of apparatus will be on display, representing what developments by 150 manufacturers for the coal and steel industries.

The technical sessions to be held in conjunction with the exposition have all been prepared with a view to imparting the practical experiences and data obtained by engineers in the field of operation.

Items of special interest to the coal-mining engineers will be "Specifications Covering Automatic Engine Stops," "A System of Coal and Ore Bridge Traverse Control," "The Liquid Slip Regulator or Rheostat," "Economical Use of Fuel in the Steel Plants," "The Tempering of Coal," "High-Pressure Steam Boilers."

Coal Commission Submits Recommendations to Eliminate Strikes in Bituminous-Coal Mining

Report Is Neutral on Check-Off—Advises Operators to Organize and Adopt Labor Policy—Deprecates Coercive Correctives—Takes Middle Ground on District Autonomy—Opposes Nationalization and Compulsory Arbitration

The U. S. Coal Commission has issued a sequel to its report on "civil liberties," published in full in *Coal Age* last week. This report is on labor relations in the bituminous-coal industry and is understood to represent the last word of the Commission on strikes and labor questions. A detailed voluminous report, on which the following sequel is based, also has been issued. The report of the Commission, dated Sept. 14, 1923, follows:

TO THE PRESIDENT AND THE CONGRESS
OF THE UNITED STATES:

The public is not satisfied with the service it receives from the coal industry. The U. S. Coal Commission finds no reason to believe that a dependable supply of coal at a reasonable price is inconsistent with reasonable conditions of life and citizenship for the miners, or with a reasonable return on judicious investments. This chapter on the Labor Relations in Bituminous-Coal Mining is presented with the hope on the part of the members of the Commission that the suggestions it contains may help to point the way to better relations and to such service to the public that resort to public ownership may be unnecessary.

SUMMARY OF RECOMMENDATIONS

(1) We recommend that each side place some check upon provocative and truculent publicity which tends to undermine good relations.

(2) We recommend that the operators and the union undertake both separately and jointly the study of means of meeting the fundamental problem of unemployment through the stabilization of the industry, as a service to their own interests and as an evidence to the public of serious intention on their part to meet their own problems in a statesmanlike way under private administration.

(3) We recommend that the Congress provide for the continuing co-operative study of and action against the problem of unemployment as one of its first responsibilities. This would involve studies and activities in the fields of labor relations, technical aspects of production, and the marketing and storage of the product.

(4) We suggest the great importance in labor relations of good operating management in the mine, so that adequate production service to the men at the face will always be afforded.

(5) We recommend the establishment in each district and nationally of joint commissions of operators and miners, with the aid of competent men, to make thorough studies of the principal jobs and of the existing rate differentials. It is important to develop an adequate basis for the needed revision of the rate structure, at present marked by many inequalities between sections, between mines, and between jobs in the same mine.

(6) We recommend continuing co-operative study of the same subject by the general government.

(7) We recommend further attention to this same subject by individual mine managements and local unions.

(8) We recommend continuous, compulsory collection and publicity of rates and rate changes in the non-union fields by the general government.

(9) We recommend the universal establishment in the non-union fields of check-weighmen selected and paid by the men as a means of insuring confidence in weights.

(10) We recommend that that form of wage payment known as "subcontracting" be discontinued. It is held by most of the coal industry and by nearly all other industries out of date and inherently subject to abuse.

(11) It is recommended that the leasing of convict labor

to operators, such as is now the practice in Alabama and a few other non-union areas, be condemned as demoralizing to the industry and degrading to the convict.

(12) It is recommended that the practice of discounting "scrip" be made illegal.

(13) We recommend serious study by both sides, jointly and separately, of the problem of undue limitation of output and of the causes which lead to it.

(14) We recommend that each agreement in the union fields contain provision that disputed cases of discharge shall be settled promptly through conciliation or arbitration.

(15) We recommend to non-union operators that adequate checks, to insure against capriciousness and unreasonableness, be placed on the exercise of the right to discharge.

(16) We condemn violence, thuggery and gun work, violation of the law and disturbance of the peace, whether practiced by the union to enforce complete unionization, or by the operators to prevent it.

(17) We recommend that such destructive labor policies as the use of spies, the use of deputy sheriffs as paid company guards, house leases which prevent free access and exit, and individual contracts which are not free-will contracts, be abolished.

(18) We recommend the recognition of the right by the union to encourage non-union workers to join the union by the example of service to its members in the union field, by showing where the advances in the union field have helped the non-union workers and by peaceful and honest persuasion of every sort.

MAY PERSUADE MAINTENANCE OF NON-UNION BASIS

(19) We recommend the recognition of the similar right of the non-union operator, by good works and honest persuasion without force, to maintain a non-union status.

(20) We recognize the irritating effects of the check-off to the operator, especially in the collection of special fines and assessments. And we recognize its injurious effects upon the union in divorcing the problem of income from the winning of membership, and in the resulting lack of closeness of contact and of educational service and control by the higher officers to the lower officers, and to the rank and file members of the union. We believe that the unsettling effects of casting out this practice, however, might more than overbalance the gains. It may well be that the use of the check-off for the collection of fines and special assessments (except in the case of fines for violation of the agreement) should be discontinued. But we do not feel that the check-off is vital enough ever to justify a suspension of operations, whether the union is seeking to extend its use or the operators seeking to throw it out.

(21) We recognize that the establishment of a policy of complete district autonomy in the negotiation of new agreements, as advocated by some operators, would result in great turmoil and a renewal of the fierce competition between districts that must inevitably lower standards. We suggest, however, that many operators in the outlying fields have a real grievance when they say that essential elements of their agreements are made for them in conferences in which they are not represented. We suggest that the two parties should work out a system of national negotiation with district agreements, which will avoid standard-cutting wars between districts and secure adequate flexibility to meet necessary district conditions.

(22) We recommend a continuing umpire in each district as indispensable to the growth of good relations, since

such an agency tends toward the establishment of orderly processes of law in the industry, facilitates the necessary bargaining that goes on from day to day, is an educational force for both operators and union, and is a foundation for progress upon which the industry can build with confidence.

(23) We call attention to the fact that the operators are not so effectively organized for labor relations as the miners and that, both as a defensive and as a co-operative measure, there should be effective district and national organization and a national labor policy among union operators. Such an organization should bring to the surface the large amount of sound and constructive thinking that is being done among operators concerning the labor problems in the union fields; it should strengthen and stimulate the work of the various labor commissioners. It should create the office of national labor commissioner to function as do the labor commissioners in the districts, but on national problems. In this connection attention is called to the great importance, during the process of negotiating a new agreement, of having negotiators of the right type—men who know the union and the industry, who know when to be aggressive and when not to be, masters of sound strategy and wise tactics and, finally, men whose straightforwardness the union trusts.

(24) We find that one of the most constructive steps that has been taken collectively by the bituminous operators has been the almost universal establishment of the office of "Labor Commissioner." Only the highest grade men can adequately discharge the functions and get the full possibilities out of this office.

(25) We recommend much more serious concentration upon the problems growing out of the psychology of men at work, especially noting the examples of the many companies who have established good relations.

RECOMMENDS TRAINING IN MANAGEMENT

(26) Specifically, we recommend more attention to the training of superintendents, foremen and assistant foremen in problems of management, especially in dealing with labor under a union agreement. These men are closest to the miners and actually handle the grievances that arise; they, therefore, in large degree determine the bases on which the more general problems of labor adjustment rest.

(27) Half information on topics of mutual concern ranks high among the factors that tend to mar relations. We therefore recommend a policy of publicity of facts—both within the individual mine and nationally—which would include accounting reports by operators as recommended in the Commission's anthracite report and similar reports concerning union finances.

(28) In accordance with best policy in the coal and in all other industries, we recommend the policy in each company of centralized responsibility for labor relations.

(29) We recommend much closer contact and greater educational service from the district and national officers of the union to the local officers and men.

(30) We believe that the union will need to depend more on *facts* and less on *force* if it is, in the future, to advance the interests of its members as successfully as it has in the past. We therefore suggest the importance within the union of continuous facilities for research which will collect and interpret facts and aid and enlighten union policy.

(31) We particularly regret that the union has given so little serious consideration to the ways of meeting the fundamental problem of the coal industry—the problem of irregularity of production and employment—which concerns its members more deeply than any other problem observed, and on which they keenly desire that something be done. A definite effort to devise a joint system of unemployment compensation or insurance which shall offer considerable incentive toward steadiness of operation, as well as relief during payless days, will be of vital interest to the citizens of the industry.

(32) We believe that the union is facing a critical transition period. It has gone through and won the struggle to become powerful. The challenge confronting it now is whether it can use great power in a responsible way to serve social ends.

(33) We do not advocate nationalization as a means of meeting the national strike or other parts of the problem of labor relations.

(34) We recommend against compulsory arbitration as a means of preventing a national strike, because we do not believe in discretion-made law in either the industrial or political fields, and because there is no way to enforce a compulsory award which does not involve enforced operation or enforced labor.

(35) We believe that incorporation of the union would not have the effect of binding the union to its contracts, and making it responsible, often predicted for it. Contracts can now be made if both parties wish, with effective binding power, but ordinarily neither side desires that wage contracts shall be specific enough to be legally binding through judicial enforcement. The flexibility of various state incorporation laws makes it unlikely that incorporated unions would differ practically from unincorporated. Finally the Coronado case not only decides that a union is a legal entity for the purpose of responsibility for torts but also holds that a union voting a strike renders itself responsible for acts growing out of the strike just as a corporation would be responsible for the acts of its officers and that the union funds can be reached directly through a suit for damages, just as the property of a corporation can be.

URGES GOVERNMENT INVESTIGATION OF BASIC FACTS

(36) We recommend continuous investigation and publicity by the federal government of the basic facts upon which industrial relations depend. Such continuous investigation should not be principally critical, in the sense of being chiefly concerned with noting cases of bad practice, but rather with making known cases of the opposite sort. This should bring about such a continuous interchange of information as to stimulate a greater sense of public responsibility and better practices by the union and the operators.

(37) We recommend special compulsory investigation when the prospect of failure to renew an agreement is imminent, so that the public may have a chance to be heard before conflicts arise. Specifically, we recommend an inquiry under the authority of the President of the United States. To this end, it is suggested that all agreements should contain a clause that will provide for automatic renewal of all agreements except in regard to provisions concerning which either party may have given notice to the other ninety days in advance of the date of termination of the agreement. In case of failure to agree, a report, setting forth the factors at issue, should be made to the President, by each side, not later than sixty days before the expiration of the agreement. It is recommended that when such a report is made, the President immediately inquire into the factors at issue and secure a report and award thereon made on or before the date of expiration of the agreement. The award would or would not be made public as the President would deem wise in the particular circumstances. It should be the purpose of such a report to focus upon the negotiators the irresistible moral pressure implicit in their joint obligation to furnish the public with coal.

We are confident that with a continuous orderly process of investigation and report, and if advisable with the timely injection of a definite representative of the public into the situation in case of disagreement, it will become very much more difficult for either side to adhere in any captious way to a contention that will precipitate a tie-up of the industry.

In case a suspension occurs because of failure to reach an agreement before the expiration of an existing contract, there should be no question of the continuance of maintenance men at their occupations. Both in the interest of the industry and in that of the public every contract should provide for this contingency.

The best approach to a remedy for the evils of the general strike will not, in our judgment, be found in an immediate resort to drastic prohibitory measures. Whatever artificial gap may have developed between employer and employee, they must work together or there can be no peace and no real efficiency. The weight of opinion among operators and union officials alike is that they themselves desire to fix the fundamental terms upon which the industry shall

operate. The most thoughtful and best advised among them express great confidence of their ability to do this in an orderly way. From our survey of the statesmanship that exists in the industry, it is believed that the operators and the union are equal to this task, if once they recognize the finality of the public insistence on continuous operation and address themselves single-mindedly to bring that object to pass. It will be necessary, however, for them to find means of bringing their best statesmanship to the front in connection with the general negotiations. They cannot perform this indispensable public duty unless they emancipate themselves from the atmosphere of militancy that to often characterizes their proceedings.

It is believed that the combination of continuous investigation and publicity, with the possible resort to mediation at the instance of the President of the United States, may remove the necessity for more drastic emergency measures. The process here outlined should have a sobering influence that will make strongly for enforcing responsibility to the public among representatives of both the operators and the miners. Until measures for holding both sides to their responsibilities have been exhausted, it will be extremely unwise for the public to embark on coercive measures of regulation of labor relations.

While it is believed that the above suggestions will en-

courage mutual accommodation and agreement at the time of the renewal of negotiations and will therefore lessen the chances of national strikes or suspensions, the fundamentally constructive opportunity lies in the building up of the day-to-day relations within the agreement period. Improvement in industrial relations during the life of the agreement would very considerably lessen the probability of a national strike.

The full text on the subject of labor Relations in the Bituminous Industry is presented in another chapter which follows.

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Acknowledgment is made to Dr. J. H. Willits, professor of industry in the University of Pennsylvania, who was in responsible charge of this study for the Commission; to Dr. W. H. Hotchkiss and H. S. Dennison, who were associated with Dr. Willits as an advisory committee; to John Carmody, to Dr. Boris Emmett, to H. S. Gilbertson, to J. S. Keir, to Dr. W. M. Leiserson, to S. B. Mathewson, to R. L. Melendy, to O. L. Preble, to Dr. B. M. Squires, and to Delos Walker, who made most of the filed investigation for the study and helped in the preparation of this report; and to Dr. Helen Wright, who has been of great aid in assembling the material.

Check-Off Evils Need Correction

**Fiercely Debated Practice, Says Commission,
Likely to Survive in Bituminous Field—
Fears Its Elimination Might Be Unsettling**

The full discussion of labor relations in the bituminous coal industry, of which the summary by the U. S. Coal Commission is published in full on the preceding pages, contains approximately 60,000 words and if printed in full would occupy 40 pages of *Coal Age*. The document containing this discussion covers every phase of labor relations in the union and non-union bituminous-coal fields.

The discussion on the check-off is published here in full because that question is one of the most important on which the Commission has passed judgment. The Commission's recommendation with respect to the check-off is No. 20 on the preceding page, and the following is the evidence on which the recommendation was based:

"One of the most fiercely debated topics brought before the Commission is the so-called 'check-off.' The issue is likely to become confused in the public mind by the acrimony of the discussion and by the too frequent use of epithet in place of argument. The 'check-off' is an arrangement under which the operator agrees to deduct from the wages of each miner, who signs a written authorization, the amounts that may be due from month to month from such miner to the union for regular dues, special assessments or fines that may be levied against him by the union. The aggregate amounts thus deducted from the individual miners are then paid over by the operator to the treasurer of the local union. The operator thus acts as the collecting agency for the union so far as those of his employees are concerned who have signed and turned over to the union a written authorization for the operator to make such deduction from the amounts due them from pay day to pay day. The practice has never existed in the anthracite field but it was one of the demands that the miners made upon the anthracite operators when the negotiations for a new agreement in 1923 began; and it was the refusal to concede this demand that caused the first rupture between the miners and the anthracite operators in July.

"The check-off is not synonymous with the closed shop. The agreement and practice could exist in a mine run as an open shop. In such a mine the dues, etc., could be deducted in the case of union members who had signed authorization while no such deductions were being made in the case of non-union miners. On the other hand a closed shop could exist by agreement but the union collect its own dues from its individual members instead of having these amounts deducted by the employer. The check-off, therefore, bears

no essential or necessary relation to either the open or the closed shop.

"In support of the demand made on the anthracite operators for the check-off, the representatives of the miners cited as a precedent certain practices that have always been prevalent in the anthracite field. Practically all of the operators in that field supply their miners with the explosives, fuses, oil, caps, and other supplies used by the miner in his work. The miner is supposed to furnish these for his use in his work, and where these are furnished from the supply department of the mine they are charged to the miner and the total of his indebtedness for such supplies is deducted on each pay day from the amount due by the operator to the miner. This is a simple bookkeeping transaction.

Each day the miner's account is charged with any supplies furnished him by the company and is credited with the amounts due him for the coal mined or the work done by him. At each pay day each miner's account is balanced and he is paid the amount by which his earnings exceed his indebtedness to the company. In addition to deductions for supplies those companies that have company houses deduct the rent from the miner's earnings before paying him; similarly, the amount due for coal furnished the miner by the company is deducted. But these all represent merely a balancing of the amounts due by the miner to the company against the amounts due by the company to the miner. But in many instances other items are deducted that fall into a different category. It is not uncommon for a store at which a miner desires credit to require him to sign an order on the mining company directing it to deduct from his earnings each pay day the amount that may be due by him to this store for his purchases.

USES TO WHICH CHECK-OFF HAS BEEN PUT

"In past times deductions were sometimes made in this way for church dues, for liberty bond purchase by installments, and for numerous other purposes. These practices have been lessening but some of them still prevail. There is obviously a clear distinction between a case in which an operator merely balances an account and deducts from what he owes the miner the amounts that the miner may owe him and one in which an operator undertakes the request of the miner to withhold from the balance due the miner an amount that the miner may owe a third party.

"The first case, where the operator merely balances his own books and pays the miner the difference between the debits and the credits on his account, is not at all a parallel to the operator collecting the union dues. But the principle involved when the operator accepts authorization from the miner to withhold from his pay an amount due the grocer, or the bank or the church, is precisely the same as that

involved in the request from the union to have the operator agree to withhold from the earnings of each miner who so directs the amounts that may be due by the miner to his union for dues, etc.

"There are already two instances of a check-off for the union which were imposed on the anthracite operators by the award of the Commission in 1903. Where coal is paid for by weight a regular weighman is employed by the operator. One of the demands in 1902 that was granted by the award of the Commission was that at any colliery where the coal was paid for by weight the miners should have the right to select a check weighman whose salary was to be paid by them. The award further provided that when requested by the majority of the miners the wages fixed by the miners for their check weighman was to be deducted proportionately by the operators from the earnings of the individual miners.

"The same provisions apply to the check docking boss, an official selected by the miners to represent them at the docking station and whose salary is fixed and paid by the miners but deducted by the operator from the earnings of the individual miners. A similar practice was directed by the Commission in the case of miner's laborers. In the anthracite field most miners have as an assistant a laborer who is in the employ of the miner and not of the company. He is hired by the miner, paid by the miner and disciplined or dismissed by the miner. But the award of the Commission provided that before each pay day the miner should turn in to the company a statement of the amount due by him to his laborer and that the company should withhold such amount from the earnings of the miner and pay it directly to the laborer.

"These cases are on a parity with the proposed arrangement for the check-off, since they represent the operator collecting from his employees and paying the amounts deducted from wages over to a third party. While, therefore, it is apparent that the check-off in itself is merely a business arrangement and not essentially the insidious and diabolical thing that it is sometimes held to be, it is not a practice that should be forced on an operator against his will. It is the duty of a labor union, just as it is the duty of any other association, to collect the dues and assessments from its members by its own agents and not by coercing the employer to act as its collecting agency against his will.

"In defense of its efforts to secure the check-off in the anthracite field a representative of the miners pointed out the many difficulties that the local unions found in collecting direct from the individual members and contrasted this with the saving in both expense and effort resulting from having the operator deduct the dues from the pay checks of the miners. The advantage of the check-off to the union is very obvious but that is not a valid argument for its enforcement upon the operator. No doubt the churches, the fraternal organizations, the merchants, the landlords, and other groups could point out the difficulties and the losses they sustain through inability to collect all that is due them, and the unnecessary expense involved in collecting what they do get, as compared with the ease and economy if they could all turn over to the operator their accounts against the individual miners and have them deducted from earnings by the operator.

"Originally the check-off system was used only for dues, but it has gradually been extended to include fines and special assessments, the latter usually for strike funds. In their published statements the bituminous operators make particular complaint against the check-off. In private conversation many of them are inclined to accept the check-off as an established condition but to complain bitterly over its extension to assessments and fines. They strongly object to collecting funds with which they will be fought in case of strike or suspension. In this connection it is interesting to report a statement made by a prominent operator official to one of our investigators to the effect that he was present at the meeting in which union operators first made the suggestion that the check-off machinery be used in their territory by the union as a means of collecting funds for prosecuting strikes in non-union territory.

"What practice should obtain in respect to union membership under a collective bargaining agreement (to quote from

the anthracite report) is a debatable question, the answer to which should be arrived at by agreement or mutual accommodation between the parties. But any answer which relieves the union of responsibility for maintaining itself, and thus divorces the question of membership from the service rendered, is bound to be harmful to the union, not to mention the other interested parties.

"Unions, like other institutions, slip easily into arrogance and incapacity when existence is made too easy. Such a condition is sure sooner or later to make them a prey to attack both within and without. This opinion applies with equal force to the bituminous fields. So long as a bare alternative to non-membership in the union is anywhere open, the penalty may remain only faintly noticeable; but when the last steps in compulsory membership shall have been taken, and a 100-per cent monopoly of labor established with methods of automatic financing guaranteed, the union will have created a condition which will greatly intensify the possibilities of internal disloyalties and cliques. Many unions think it bad union policy to have a check-off.

"From this standpoint of its own permanent welfare, the union would seem to be showing a lack of wisdom in insisting on the universal application of the check-off. The check-off is bad for the whole situation and constitutes a steady source of irritation to employers, who are themselves forced to collect and deliver the whips with which they are to be scourged. This injury to a reasonable and proper pride will as surely result in retaliation as do similar injuries to the pride of the employees. On the other hand, it saves the union from the effort necessary to its own health of making close contact with its men; educating its membership and its local leaders; and educating itself through these contacts. This effort would be made necessary by a continuous member-calling campaign.

"The necessity of effort to maintain membership in an organization tends to keep the organization responsive to the sentiments of the rank and file; absence of such necessity tends to dull such responsiveness. It is not to be expected that this healthful effort will be spent where the necessity is not present. To the extent that an institution fails to exercise necessary functions it weakens its stamina, abdicates its sovereignty. We find indication in some territories even now that the operators come much nearer to owning the union than is wholesome from the standpoint both of union and public interest.

"Even though the check-off represents an abdication on the part of the union and is unsound from the standpoint of long-time union policy, it is not likely that it will be abandoned in the bituminous fields. In these fields it appears to be an established institution both in regard to dues and in regard to fines and assessments. The force of habit and established practice are such that the unsettling effect of changing the practice might well overbalance the benefits of a practice inherently more sound.

"The existence of the check-off makes it all the more necessary that the union take steps to correct the evils of the system and to overcome its weakening effects on the relation of the organization to its members. From the standpoint of effective administration and in the interests of wholesome relationships both with members and with operators, it would seem ultimately desirable to abolish the check-off for fines and assessments, but whether or not this occurs, there is certainly a crying need in many of the bituminous fields for a closer relationship and a greater service between the organization and its members. This question will be further discussed in the section on Union Administration."

Cement Shipments Increase

Production of portland cement during August, 1923, according to the Geological Survey, totaled 12,967,000 barrels, as compared with 12,620,000 barrels in the corresponding month of 1922, and 12,620,000 barrels in July, 1923. Shipments for the month were 14,971,000 barrels as compared with 14,361,000 barrels in August, 1922 and 13,712,000 barrels in July, 1923. Stocks at the end of August amounted to 6,077,000 barrels, as compared with 5,746,000 in August, 1922, and 8,081,000 barrels in July of this year.

Railroads Urged to Distribute Coal Cars According to Commercial Instead of Capacity Ratings

Strikes and Transportation Cause Shortages and High Prices—Better Use of Railroads, Not Their Overdevelopment' Recommended—Savings by Short Haul Stressed—Find No Evidence of Soft Coal Combustion

The causes of irregular operation of the bituminous coal mines, coal shortages, car shortages, high prices and low prices, and transportation, are treated in a report of the U. S. Coal Commission on "Irregular Operations with Suggestions as to the Remedy for the Same," released for publication on Sept. 20.

The introduction and general recommendations are published in the following pages; the sections of this report treating in detail the questions of irregular operation, overdevelopment and transportation will be published later.

TO THE PRESIDENT AND THE CONGRESS OF THE UNITED STATES

Among the topics referred to the U. S. Coal Commission for investigation and report is "irregular production" with "suggestions as to the remedy for same." The importance of this matter, including as it does not only irregular mine operation and overdevelopment of the industry but also related problems in the transportation of coal and possible measures of relief, leads the Commission to devote this chapter of the report on the bituminous industry to the subject of Relief from Irregular Operation and Overdevelopment. This chapter treats of the engineering and economic phases of irregular operation, leaving to another chapter the interaction of labor relations and irregular operation of the mines.

CAUSES OF SHORTAGES

Widespread strikes and lack of railroad transportation to carry the peakload in times of extreme demand are the two factors that alone are responsible for the serious shortages of bituminous coal in this country that have several times occurred since 1915.

There have been but two national strikes of the union coal miners, that of November and December, 1919, cutting off some 70 per cent of the soft-coal output; and that of the summer of 1922, affecting the bituminous-coal fields to the same extent and shutting down the anthracite fields completely for about five months. The loss of production occasioned by these concerted withdrawals of the organized mine workers has in each instance caused such general shortage of coal that even after resumption of mining there were long periods of insistent demand and high prices. The strike of the mine workers is the only bar to the continuous production of bituminous coal at a rate considerably in excess of any present possibility of consumption by the industries, railroads and households of this country, and of demand for export.

The bituminous-coal industry rests upon abundant, unmined reserves. The capacity in mines and mining labor is sufficient to produce at least 25 per cent more than the highest rate attained in periods of peak demand, and if demand were spread evenly over the year, the overdevelopment would be even more pronounced. The facilities of the railroads necessary to carry the coal from mines to consumers have not been sufficient in the past eight years to transport as much coal per week as at times the consumers of the country wanted and as the mines were able to dig and load into railroad cars.

The causes of strikes and the possibility of their prevention have been discussed in another chapter of this report. The effect of strikes on the orderly, economic production, transportation and distribution of coal are here considered. Local strikes increase the irregularity of operation and the cost of production, though with the surplus capacity they do not cause shortage of coal. Those affecting larger areas, as fields, such as were fairly common prior to the war in the organized fields, likewise have not resulted in shortage

or marked price inflation, again because of the excess capacity of other, adjacent fields that were in position to supply the market thus vacated.

These field strikes, notably those in the Central Competitive Field, were potent factors in forcing the overdevelopment of the soft-coal fields, both union and non-union. The two national strikes had that effect in marked degree on the non-union fields.

The bituminous-coal industry is highly competitive. It is likely that were there never any limitation on production imposed by lack of transportation, there would be little or no overdevelopment because prices would never rise above the competitive level that obtains in periods of full car supply. Such a cure for the overdevelopment of the soft-coal industry and for high prices for coal would simply transfer to the railroad industry the overdevelopment and necessarily increase freight rates. It is estimated that it would cost the railroads two billion dollars to build their facilities up to the point where they could carry the peak loads of coal. This would represent an average carrying charge alone with interest at 6 per cent, of 40c. a ton, on commercial shipments of bituminous coal. Such a solution of the problems of the coal industry could be considered only if none other were possible.

The alternative is better use of the transportation facilities currently available. This means simply the more uniform movement of coal throughout the year. Since the fall of 1922 the railroads have furnished transportation for a production of between 10,000,000 tons and 11,000,000 tons of bituminous coal per week; that is, from 500,000,000 to 550,000,000 tons per year, which apparently at this time is sufficient for the country's requirements and exports. This has not been accomplished without special effort. The railroads must be expected to expand their coal-carrying facilities in step with the expected increase in the nation's coal requirements, but they, in return, should not be permitted to dissipate their efforts in needlessly long hauls of coal.

Operating to hinder the uniform purchase and movement of bituminous coal are the seasonal character of consumption and the fluctuations in consumption attending changes in industrial conditions. The variation in use of household coal represents the extreme in seasonal requirements; the industrial expansion in 1915 is an example of rapidly expanding market due to improvement in business. A further factor, not so important as it was before 1917, is the national habit of buying soft coal as needed, instead of storage against future needs. Large scale strikes, either at mines or in railroads, of course, are positive bars to production.

The consumption of coal is an independent factor not to be changed, except as it is prevented through sheer inability to obtain supplies, by any economic or legislative proposals. It is obviously impracticable to legislate in the direction of forcing the uniform purchase and transportation of coal. The only remedy lies in furnishing an economic incentive to off-season purchase and the consequent storage at the point of consumption of bituminous coal, *at the proper seasons*. As has been stated, the alternative is overdevelopment of the railroads at an initial cost of \$2,000,000,000 and an increase in coal freight rates in which the item of 40c. a ton to meet added interest charges would be possibly the smaller part.

Industry is plainly able to forecast with considerable accuracy its purely seasonal fuel requirements, but not those variations attending marked business expansion and contraction. The increases in coal consumption of the winter of 1916, of 1920, even of 1922 were but dimly foreseen, as were the drop in 1919 and the notable slump of 1921. But

the concerted effort in this direction of equalized demand is the proper line of attack and the first steps are correcting those factors that have not only permitted but encouraged irregularity of demand and of production and providing for changes that will supply the economic incentive for the regular purchase and production of bituminous coal.

Irregularity of demand, the natural consequence of ordering coal only as it is required, buying in the fall and winter and not buying in the spring and summer, is the primary cause of present conditions. The habit bred and grew at a time when the development of the railroads was at least as advanced as that of the coal industry, if not more advanced. The practice presented no difficulties. That time has passed, but in the transition there has been no change in the method of business looking to changed conditions, only rules designed to prevent unfair discrimination.

The fact of irregular demand due to seasonal consumption alone offered incentive for development of soft-coal mines in excess of average requirements. If the country called for a maximum tonnage in November, there was a market in November at least for that maximum output, and mines were opened to meet that demand. A decade ago the cost of opening and developing a soft-coal mine was small, by every comparison with today. Coal land was cheap, little machinery was required and that less expensive. The railroads were anxious for the traffic. The periodic good market in fall and winter offered profits. Development, from keeping pace with the country's growth however, grew to overdevelopment as other factors were brought into play.

Among the more important of these factors contributing to overdevelopment prior to 1916, even beyond peak demand, were periodic regular strikes in the organized fields. The most important and regular were those in the Central

Competitive Field beginning April first every second year. These strikes came with such regularity that their effect was anticipated. Consumers, particularly the railroads, bought heavily in advance and stored coal to tide them over the strike. This meant a season of very active demand which encouraged development of new mines. In years when these strikes were of more than usual severity the non-union fields were called in to meet added demand for coal; thus their overdevelopment was promoted.

In this manner the irregularity of production caused by seasonal demand, sectional stoppages of production, and local transportation shortages brought on overdevelopment. To these causes are to be added the persistent seeking by railroads and by coal operators in the past 30 years for markets for the newly developing fields south of the Ohio River. In the early 90's the Pittsburgh field supplied 35 per cent of the total production of the Appalachian fields shipping to the Central West and Northwest, and the West Virginia fields shipped 15 per cent. Competition offered by the Southern fields has cut Pittsburgh to 25 per cent in the past 5 years and raised West Virginia to 32 per cent to the total.

Overdevelopment has its evil consequences on the industry itself. It is the cause of the average short working year for the capital invested and for the mine worker. Both have come to expect and to demand a full year's wage for little more than two-thirds of a year's work. This is the waste, that profits neither the mine owner nor worker, that the public is called on to pay for as the cost of overdevelopment. The soft-coal buyer actually does pay that part of it that is represented by the higher unit wage of the worker due to short-time employment. The consumer is only prevented from paying the full amount that capital would collect by the fact of active and sometimes ruinous competition.

Removal of Causes of Irregular Operation and Overdevelopment

The consequences of overdevelopment can be avoided only by removing so far as economically possible the causes that have produced it. Overdevelopment will then diminish to the economic minimum.

The causes and avoidance of strikes have been discussed in another chapter of this report. In the following pages are considered those causes related to production, transportation and distribution. The more important conclusions reached are briefly:

The system under which coal cars are distributed to coal mines in times of transportation shortage should be changed to give first consideration to the commercial ability of the producer to sell coal rather than to ability to produce and load it into railroad cars; and

Given substantial similarity in the grade and quality of coals available to a particular market, there is obvious economy in supplying that market with the coal nearest to it.

The first will furnish the economic incentive for regular off-season purchase and storage of bituminous coal by the consumer and by thus increasing the length of the average working year for the mine and miner, reduce costs of production and prices to the consumer. The second, by minimizing unnecessary and premature development will operate in the same direction and at the same time accomplish savings in the cost of transportation.

HISTORY OF OVERDEVELOPMENT

Prior to 1916 there were no nationwide car shortages, miners' strikes or price upheavals in soft coal. Then constant contention of the soft-coal operators was for markets. For years the wage levels and, therefore, costs in the organized fields had been stabilized and standardized. The non-union fields of the south were expanding faster than their older neighbors on the north because of easier mining conditions, lower wage scales, better working time and favorable freight rates.

The ease with which a soft-coal mine could be opened, the comparatively small capital required and the fact that coal is a staple commodity for which there is an obvious, though limited market, induced many to enter the field. There were additions to the list of producers every year, and eliminations. The turnover of companies was high.

Well organized and efficiently managed companies with coal reserves of good quality survived and grew—they survived the summers of low demand and grew in the winter, learning all the time the advantage to themselves of regular production and the cost of intermittency and seeking to even out their curves of production by building up regular trade connections and stabilizing their business. Poorly organized and poorly managed or weakly financed companies were unable to face the vicissitudes of the competitive conditions and were forced to the wall.

The influence of the union was at once to stabilize the industry and, through the biennial strike or suspension in the Central Competitive Field, to introduce the largest element of speculative profit and incentive for overdevelopment. The two-year wage contracts with the United Mine Workers in the decade before the war not only standardized wages but strikes as well. The fact that the expiration of these contracts was staggered for different union fields prevented any general cessation of mining if agreements were not promptly entered into. Thus though a prolonged disagreement in one field would shut off coal production for months, other union fields nearby speeded up and supplied the market. A strike of a year affecting half the State of Ohio in 1914 hardly caused a ripple in the market. The miners and operators alone suffered.

In this prewar period from 1900 to 1916 car shortage was locally severe enough at times, but it never assumed national proportions. The coal-originating ends of the railroads, the branch lines and feeders tapping the mine fields were developed in step with the mines. The delivering ends of the railroads, the interchange connections and terminals, were developed in step with the coal-consuming demands of industry. Storms or local rail congestion temporarily produced a car shortage, more notably and often in such highly developed centers as Pittsburgh, where are concentrated not only large coal producing but large coal consuming industries.

The buyers and consumers of bituminous coal had little cause for complaint throughout these years. There was no need to buy coal of poor quality for plenty of the best was available. The price was just about what the buyer was willing to pay. Many producers had no knowledge of any of the elements of the cost of production other than

the actual out-of-pocket expense of digging and loading the coal into railroad cars, and they sold it on the basis of that information.

The soft-coal business was profitable for those companies with good coal and good mines who sold service with their coal. Such companies had regular contract customers whose trade could be depended upon. The majority of soft-coal producers, however, in the prewar period fared indifferently, alternately taking profits and losses.

All the elements of economic maladjustment, all the conditions that confront the soft-coal consuming public and the producing industry, before this Commission for consideration, were present in some degree or form before the war. In one instance only had the help of the federal government been publicly sought by any party and that was by operators in the Middle West, who, beset by internal competition and forbidden by law to seek relief through collective action, turned to Washington for assistance in 1914.

There was overdevelopment, intermittent operation, good profits for some, receiverships for others, high earnings and low earnings, strikes, car shortage and occasional flurries in price and local stringencies in supply. None of these are new. The conditions imposed by the war intensified all these so-called ailments. What had been internal and local questions became national questions with all that implies in its political aspects. This country found itself with a coal problem.

SOFT-COAL SHORTAGES DESPITE RECORD OUTPUT

Production records were broken in 1916, in 1917 and again in 1918, yet the country was short of soft coal. The manufacturing industries stimulated by the war, before the country entered it and afterward, were large coal consumers. The country as a whole entered the winter of 1916-1917 with what might have been adequate stocks under normal conditions. These stocks were entirely inadequate, however, for the protection of the country going at the new high rate of speed. The demand for coal became a rush to get supplies not only for current consumption but for additions to stocks. For nearly two years—that is, from the fall of 1916 to late summer of 1918—the production of soft coal was but sufficient to meet current needs. By September, 1918, the situation was by way of being tranquilized by the gains in storage coal in the hands of consumers.

By the first of November, 1918, the enormous total of 63,000,000 tons of bituminous coal had been accumulated by consumers. The next year this stock pile was largely consumed. The strike of 1919 which shut off 70 per cent of the soft-coal production for 6 weeks and the "outlaw" switchmen's strike on the railroads in April and May, 1920, seriously reduced production and forced consumers to use up storage coal. The industrial boom of 1920 thus began with industrial and railroad stocks of coal at low ebb. Again the combined demand for coal for use and for building up storage piles was more than the railroads could handle, though the mines were able and anxious to produce. Prices for bituminous coal rose to unprecedented heights, to fall only when the demand had been satisfied because consumers' reserves had been built up to approximately safe levels.

Again in 1922 consumers accumulated between 60,000,000 and 70,000,000 tons of soft coal in anticipation of a general strike. The strike lasted nearly 5 months and at the end stocks again were low. This time there was a more accurate, general knowledge of the situation, and the country was informed currently as to the status of production and stocks and advised to proceed slowly in accumulation of winter reserves. The result was an orderly distribution of coal and with a few local exceptions a comparatively small increase in the mine price. The huge deficit in anthracite production as a result of the simultaneous strike in that field, some 40,000,000 net tons, in so far as it was overcome, was made up by soft coal without putting an undue burden on the bituminous coal industry.

The price of bituminous coal at the mines in the summer of 1923 dropped back to competitive levels. Transportation has been comparatively open and an average of between 10,000,000 and 11,000,000 tons per week has been produced without stress or strain or inflation of mine prices.

SHORTAGES AND HIGH PRICES

The shortages of soft coal and price inflations of previous years were of small consequence compared with those of 1917, 1920, and even the fall of 1922. It is to a study of the most recent history that the Commission has directed its attention. Correction of conditions that make possible such high-price orgies as that of 1920 is what the country desires.

The immediate cause of high and exorbitant prices of soft coal is a demand from buyers far in excess of the supply. There is no evidence of any combination or monopoly among producers and shippers of bituminous coal, now or at any time, to control production or influence prices. In fact the mines are so numerous, the control so diversified and the competition so keen that such a combination, even to influence the price, is inherently impossible.

It has been the history of the past 10 years that the combination of low consumers stocks and rapid expansion in demand almost inevitably results in a sellers' market in which prices soar. Stocks of soft coal, which are almost exclusively in the hands of consumers and not of producers and shippers, reached a low point in the summer of 1916 and again in 1919, the cause in each instance being the natural reaction from active buying and building up of reserves immediately before. In the first quarter of 1916 consumers were active in acquiring storage coal against an anticipated strike in the Central Competitive Field on April 1. There was no strike but the consumers used up their reserves instead of ordering from the mines and production lagged. After the Armistice on Nov. 11, 1918, the consumers of soft coal devoted themselves to the consumption of the large reserves accumulated prior to that date and let the mines lie idle more than half the time until mid-year 1919. In both these years 1916 and 1919 the average holding of reserve coal over the country declined nearly to two week's supply.

Such soft coal as was accumulated between July and Nov. 1, 1919, when the national strike of union miners in the bituminous-coal region began, was used while that strike endured. Again, the gain in storage during the winter was dissipated by the curtailment in production caused by the railroad switchmen's strike early in 1920. Thus the coal buyers' panics of both 1917 and 1920 were ushered in by low stockpiles.

The initiation of active buying of coal, as of any other commodity, tends to elevate prices. The sharp activity that characterized the coal market in the fall of 1916 and throughout 1917 was the immediate result of consumers' anxiety for coal. Stocks were low, business was booming and more coal was required to manufacture and transport the products of industry. Without coal nothing could be made to fill the orders and the industrial began to bid for coal. He set the price.

EFFECT OF CAR SHORTAGES ON PRODUCTION

The price went up under these circumstances because the consumer could not get coal as fast as he wanted it. This inability was not due to lack of soft coal in the ground, of mines, or of miners, but to lack of transportation. The railroads were and are equipped to carry a normal tonnage of coal from the mines to market. Nearly 90 per cent of the soft coal produced requires transportation to markets away from the mines, and 97 per cent of the transportation is by railroad. Transportation, therefore, may limit production. When it does, there is said to be a "car shortage," though the deficiency is often as much in locomotives as in cars and the trouble often is due to congestion in railroad yards and terminals.

When coal mines get orders for coal they order cars in which to ship the coal. When there are not sufficient cars supplied to fill these orders the buyer cannot get all the coal he has ordered or contracted for. The car shortage results in a coal shortage. Distribution and the ordinary course of trade is disorganized. The rising price of coal furnishes the incentive for the opening of new mines and the reopening of old ones. Whereas there had been less than 300 new mines opened per year in the 6 years prior to 1916, there were 454 new soft-coal mines in 1916, 1,285 in 1917, 1,573 in 1918 and 1,058 in 1919. Each of the going

mines sought to enlarge its capacity. Coal buyers placed orders wherever they could, often duplicating, sending agents out and giving employment to a host of new coal jobbers and brokers.

There are just so many railroad cars each day to be given to the coal mines. When the orders for cars exceed the number available, the supply is prorated among the mines, the idea being to give each mine the same number of hours work per day or per week. As more mines demand cars, the railroads being bound by law to parcel the supply without discrimination, the older mines are given less. A mine able to produce 10 cars per day, when there is 80 per cent car supply gets 8 cars; with 50 per cent car supply, gets 5 cars. The only way to get more cars is to increase mine capacity and thereby become entitled to a larger proportion. The result of this method was that when every operator made this endeavor none could profit much thereby. There was a scramble for men to increase daily capacity. The new mines had the advantage in part because of easier work and in part because they paid wage bonuses. The old established companies lost ground.

In Indiana County, Pennsylvania, for instance, there are 5 large, old-established producers. This group employed 5,270 men in 1914 and produced 3,800,000 tons of coal. By 1916 the number of men they had declined to 4,126 and by 1918 they had 4,095 men and their production had increased to 4,200,000 tons. Meanwhile, all other producers in this county with 7,496 men in 1914, added to their force and had 8,094 men in 1917 and 8,747 men in 1918. Their production rose from 5,600,000 tons in 1914 to 8,500,000 tons in 1918. In Somerset County, Pennsylvania, the same thing took place. The two largest producers had 4,189 men in 1914, in 1918 but 2,651. Their production in 1914 was 3,700,000 tons and fell to 2,600,000 tons in 1918. All other producers, many small, had 7,580 men in 1914, and 8,363 in 1918. Their production increased from 6,500,000 in 1914 to 7,700,000 in 1918. This is typical of what was happening all over the soft-coal fields.

Many of the new mines were small and inefficient, many were wagon mines. Their costs were higher, but that mattered not, for they had no contracts at low prices and the spot market took their product at almost any price. These new mines took cars and labor from the older mines, and by so doing increased the difficulties of the railroad and disrupted labor relations.

Normally between two-thirds and three-fourths of bituminous coal is sold on contracts, for the most part covering a year, usually from April 1 to April 1. Prior to 1917 shippers had little difficulty in fulfilling their contracts, as the only interference was from an occasional brief car shortage. The major strikes that affected large areas were discounted in advance and no contracts made over their duration. However, the car shortage that began late in 1916 was severe enough to cut down the output of individual mines and thus reduce shipments on contract. Shippers were uncertain of what tonnage they could get out and consumers what coal they were going to receive on their contracts. Receipts of contract coal were also reduced because some shippers, lured by the higher prices in the spot market, failed to ship coal in accordance with their agreements. The net result was a wild scramble for free coal—that is coal not under contract. Later in 1917 the government fixed prices, but it was not until April, 1918, that the distribution mess was cleaned up.

ASSIGNED AND PRIVATE CARS

Out of all this confusion there emerged the assigned car, railroad and privately owned, and the consumer owned mine. Since with recurring car shortages there was no assurance of getting full delivery on contract coal, and at such times the open market price on free coal was high, that the railroads resorted to a device known as the assigned car to get their fuel. Since getting coal in such periods of shortage is nothing more or less than getting cars, the railroads would make agreements with mine operators to give a specified mine a full quota of cars in which to load railroad fuel. Such a mine, of course, worked all day every day. It attracted the best labor in the field, it had the lowest cost because of full-time operation. The railroad cars given to mines for loading railroad fuel on

the assigned-car basis were taken from the available supply before distribution was made to other mines shipping commercial coal.

Coal cars had for years been owned by a few soft-coal producers. Shipping their own coal in their own cars was a part of the service these few companies gave their customers. For a few the advantages even times of car surplus were sufficient to warrant the heavy investment. The advantage became great in times of car shortage, for the producer with a sufficient supply of his own cars was independent of the railroad supply and could operate his mines more nearly to full time. He was able to furnish coal to his customers when others could not. This fact made the producer with his own cars the most desirable source of supply.

Coal of suitable quality is the most important raw material of railroads, public utilities and of certain industries, as iron and steel. The first step of this important class of users toward stabilizing their fuel supply was the purchase or development of coal mines. Thus at least proper quality and freedom from high market prices were assured. The number and capacity of consumer-owned mines has increased notably in the past 6 years. In 1920 the production from these mines represented some 25 per cent of the total output of soft coal. The movement toward ownership of coal mines by consumers has been a factor of no small importance in adding to the overdevelopment of this industry, since the tendency has been to open virgin coal rather than to acquire old mines.

But owning the coal mines it not in itself assurance of a fuel supply. The consumers' plants are distant from the mines and the coal must be hauled over the railroads. When transportation is abundant the consumer can obtain coal to his liking without difficulty and at reasonable price, and at such time his ownership of a mine may be of doubtful advantage. If the consumer requires 1,000 tons of coal per week and develops his mine to produce that quantity, he will find his supply reduced in times of car shortage to whatever percentage of car supply the railroad may allot the mines. To get 1,000 tons per week he may find it expedient to increase the capacity of his mine to 2,000 tons per week, so that if car supply falls to 50 per cent, he may still get his 1,000 tons of coal. Mine capacity is overdeveloped on this account.

To overcome this difficulty some consumers likewise have their own coal cars. Under the rules that have obtained in the past, but which the Interstate Commerce Commission changed in its decision of June, 1923, on assigned and private coal cars, these private cars could be given to the mines in any quantity, regardless of how meager the supply of railroad-owned or "system" cars might be. The consumer owning coal cars, with or without his own mine, under the rules in effect until now, has been in a favorable position to get coal at any rate he desired, regardless of "car shortage." A number of railroads not reaching the coal fields have bought coal cars to send to mines on other roads exactly as public utilities or industrials have done.

The private coal car has been a good investment in the past 6 years, because of the extended periods of "car shortage." On the other hand the growth of the practice of assigning cars, both railroad for fuel coal, and private, has worked to the disadvantage of producers and consumers not in position to avail themselves of this form of favored car supply. Large public utilities, for instance, have taken the position that the character of the service they rendered the public is as essential as that of the railroads, and that they should be allowed to have "assigned cars" from the railroad supply, to protect shipments of coal to them purchased under contract.

The inequalities introduced by the assigned car are illustrated by the figures for the Pennsylvania R.R. in Pennsylvania. In 10 months of 1920 the commercial mines—that is, those depending on their distributive share of railroad cars—received 50 cars for every 100 they ordered. The mines getting assigned cars, of course, received a full supply. If all cars had been evenly distributed each mine would have had 69 cars of each 100 ordered. That is, the commercial coal mines lost 19 out of every hundred cars ordered that assigned car mines might have full time. In September, 1922, one-fourth of the coal cars on this road

were assigned; in January and February of 1923 two-thirds of the cars were assigned. In February commercial operators were receiving 18 cars out of every 100 ordered.

The Interstate Commerce Commission decided in June, 1923, that the practice of assigned cars, railroad or private, is unfair and has ordered it discontinued.

Doing away with assigned cars will not appreciably increase the total transportation the railroads can offer the soft-coal industry. Having no assigned cars will not ease the problem of those consumers that must have large, regular supplies of coal. Unfair as it has been found to be, the assigned car was an effective prop on which a growing number of consumers were coming to lean. The reason of course, was the protection of supply coupled with assurance of lower price. There should be a substitute method meeting these requirements, but without the objection of the assigned car practice.

COMMERCIAL RATINGS RECOMMENDED

The Commission recommends that in the future in determining the rating of a mine for the purpose of car distribution, consideration should be given to the commercial ability of the mine to sell its production as well as to its physical capacity to produce.

In the years before the war certain of the important coal-loading railroads in this country at one time or another did give consideration to commercial ability as well as to physical capacity. In some instances both factors were given equal weight. In other instances one or the other factor was given a weight double that of the second. In the course of the development of coal-car distribution rules during the war and post-war periods, reliance upon commercial ability to sell and ship coal was discarded. This was perhaps a natural result of the fact that over a long period during these years there was a ready market for practically all the bituminous coal that could be produced and transported.

But in the future when in the face of the existing state of the industry it may be expected that there will come long periods when the market cannot by any means absorb the potential production, there is good reason for again considering commercial ability to sell as well as physical capacity to produce bituminous coal, in determining the rating of a mine for car distribution purposes. The Commission's recommendation is that in determination of such ratings in the future, the commercial factor should be given a controlling influence.

The Commission understands, of course, that the primary duty to determine a just and reasonable rating lies with the railroad which distributes the cars. But in our opinion, if the railroads for any reason are slow to adopt the method of rating here suggested, the principle is of sufficient concern to justify investigation of the entire subject by the Interstate Commerce Commission on its own motion to the end that just and reasonable and otherwise lawful methods of rating and distribution consonant therewith may ultimately be established.

Study convinces us that action along this line is necessary to effect relief to the industry and to the consuming public. Such a system of distribution would certainly:

Furnish incentive to the producer to operate during dull seasons, and thereby more evenly distribute the transportation load throughout the year.

Furnish incentive to the consumer to buy and receive coal above actual current requirements in dull seasons and thereby more evenly distribute the transportation load throughout the year.

Remove the incentive to secure preference in the use of transportation facilities at certain periods by the use of the assigned car, either railroad or private.

Mitigate the effects of coal car shortage by reducing car shortage in amount because leveling out demand and production, and taking the pressure off the spot market in times of car shortage by permitting continuous performance on contracts.

The practical effect of a system of distributing transportation based on ability to sell coal together with ability to produce would be:

To straighten the production curve, leveling off peaks and filling valleys not only of the industry as a whole, but of individual mines.

To reduce the opportunity for the sporadic opening of speculative mines.

To increase the opportunity for regular operation and thus reduce the cost of production, and on the average the cost of coal to the consumer without undermining the profits of those operators who elect steady business at moderate profits as against intermittent operation at speculative profits.

To reduce the existing overdevelopment of the industry and curtail unnecessary development.

To promote consolidations for the purpose of marketing; that is, the grouping of smaller producing units for selling purposes.

This would advance co-operative marketing, already under way for years in certain fields.

To increase the transportation and thereby the production of coal in times of severe car shortage by reducing at such times the number of mines to be served with cars.

To increase the average days per year the miner is given opportunity to work.

The proposed factor of commercial car rating should not be based on contracts between buyer and seller. The proposed ratings should be determined by quantity of coal shipped during the last protracted period of car surplus, whether the shipment were on long-time or short-term contract or spot sale. It is expected that it would be to the mutual advantage of buyer and seller to engage in at least 12-months contracts under such a system enabling the seller to move the coal in the low market season and the buyer to insure a supply guaranteed as to price and tonnage in times of car shortage and higher prices.

To administer such a system of car ratings would require that the railroads maintain no more records than they now have. A weekly or monthly summary of tons shipped from each mine, or by each group of mines operated by the same company in the same field would be the base for the commercial rating. For the capacity rating necessary to govern distribution of cars available over and above those required to fill commercial ratings, the records now maintained as the base for rating mines would be used.

The introduction of the commercial factor in rating mines is not open to objection on the score of discrimination. The producer, large or small, has equal opportunity to take advantage of the system. The private coal-car owner should be permitted to use those cars continuously throughout the year, but should have no advantage over the shipper in system cars if there were a shortage of transportation facilities other than of cars. The rules by which the commercial factor is applied should be designed so as not to encourage ill-advised competition through reductions in wage scales.

The change suggested in the system of rating mines may require some modification of the Transportation Act.

Coolidge Urges Study of Anthracite Prices By Federal Trade Commission

President Coolidge has suggested to the Federal Trade Commission, it was stated at the White House, Sept. 14, that this body devote some attention to wholesale and retail prices of anthracite coal following the resumption of operations in the hard-coal fields. The Coal Commission recently made public an amplified statement regarding pyramiding profits in hard coal in which it was shown that during the strike of 1922 some carloads of anthracite coal changed hands among wholesalers as many as four times, a marginal profit being added by each party to the transaction so that the ultimate margin ran as high in one instance as \$4.25 per ton.

Measures against excessive prices, it was pointed out at the White House, largely are matters of local administration of the law, but it was said that in so far as the federal law can reach this subject, the effort of the national administration would be exerted toward obtaining coal at a reasonable price to the consumer. This, it was said, probably best could be accomplished by the Federal Trade Commission, with the force of public opinion behind its findings.

Coal Retailers Assail Pinchot Settlement

In a statement presented to Chairman Hammond of the U. S. Coal Commission Sept. 12 by Roderick Stephens, chairman of the Governmental Relations Committee of the New York State Coal Association, the National Retail Coal Merchants Association declares that the Pinchot settlement of the anthracite strike is merely a victory for "arrogant organized labor"; that the Governor of Pennsylvania sought peace at any price, and that he completely ignored economic facts concerning the retail dealers. Arbitration was "relegated to the scrap heap," it says.

Proceeding, the statement says: "We are distinctly opposed to the proposal of Governor Pinchot that the cost of the arrangement he has proposed in settlement of the controversy between the anthracite operators and the United Mine Workers shall be borne by the retail coal trade. . . .

"Another anthracite crisis has been passed, and Governor Pinchot is modestly accepting the laurels being thrust upon him as the protector of the public interest. Like all settlements arrived at in a political atmosphere, it has been attained by the age-old practice of 'passing the buck.'"

Commission Report on "Pyramiding" Is One-Sided, Say Wholesalers

Characterizing the recent statement of the U. S. Coal Commission on pyramiding of profits on the part of the middlemen as "one-sided," the American Wholesale Coal Association on Sept. 17 made public a letter of protest, addressed to the Commission and signed by Charles L. Dering as president of the association.

The entire wholesale coal business of the country in 1921 was carried on at a net profit of only six-tenths of a cent per ton and the entire year's business of the central western division was handled at a net loss of 2c. per ton, the letter declares, while at no time since 1916 did the average margin of wholesalers of the country as a whole exceed 8 per cent of the cost of the coal to them. Attention is called to the agreement signed with Secretary Hoover in July, 1922, by which the total service charge of wholesale dealers should not exceed 8 per cent, it being contended in the letter that this agreement put the stamp of the government's approval on an 8-per cent margin.

The protest of the wholesalers is against the broadcasting by the Coal Commission of its find of 750 carloads of anthracite handled in New England last winter with heavy wholesalers' margins and its silence on other matters, which misled the public to a belief that all wholesalers take such profits and follow such practices.

Kansas Industrial Court Asks Ouster Suit Against Jackson Walker Co.

The Kansas Industrial Court wants to put the Jackson Walker Coal & Mining Co. of Kansas out of business. After investigation, the court finds that the company is restricting coal production from 9,000 acres in southeastern Kansas without permission, is depriving a good many miners of a chance to work and is about to force a group of sublessees into ruin. It has asked the State Attorney General to institute an ouster suit against the company.

The court's investigation showed that when the government ordered the Santa Fe R.R., years ago, to dispose of its coal mines in Kansas, the sale was to the Cherokee & Pittsburgh Coal & Mining Co., all of whose stock was owned by the Santa Fe except a few officers' qualifying shares. Then the land was leased by the Jackson Walker concern, which was financed by the former company. Jackson Walker, in turn, leased parts of the tract to other operators, who now have invested about a million dollars in improvements. With a contract to supply the Santa Fe all the Kansas coal the road needed, the Jackson Walker Co. took a contract royalty of 40c. a ton from all sublessees. Now that the railroad has turned to oil the sublessees say they cannot

sell coal on the open market unless the 40c. royalty is reduced. The Jackson Walker Co.'s refusal to reduce gives the Industrial Court its basis for the charges now set up.

S. P. A. Clough, president of the Jackson Walker company, testified it is the company's policy to conserve its coal supply until the relative positions of oil and coal as fuel make it more advantageous to use the coal.

J. A. McDermott, presiding judge of the court, in addition to signing the general findings, wrote an additional report in which he asserted that unless their contract is modified or some unexpected substantial improvement occurs in the coal industry, the sublessees face heavy financial loss and ultimate ruin. He calls the Jackson Walker course "piracy" and declares the elimination of the company from the operation of the subleased land would be beneficial.

Colonel Reveals "Plot" to Blame Herrin on Labor; Chamber of Commerce Denies It

Echoes of the Herrin massacre are heard periodically. The last one was set up when Colonel Sam Hunter, of the Illinois Governor's staff, declared to the Illinois Federation of Labor at a convention Sept. 11 that efforts were made by men of the Illinois Chamber of Commerce to get him to testify "to lies that would have obtained the indictment of Gompers, Lewis, Farrington, Walker and Olander" in connection with the massacre. Walker and Olander are labor leaders. Colonel Hunter did not divulge any details nor mention the names of men who approached him.

A prompt denial that the Illinois Chamber of Commerce had suggested any such thing to Colonel Hunter was forthcoming from John H. Camlin, president of the state chamber. Mr. Camlin publicly challenged Colonel Hunter to name a single man who had made such a proposal for the chamber. Colonel Hunter did not immediately reply.

The Colonel was at Herrin before and during the massacre of June 21, 1922, representing Governor Small, and declares he urged the Governor and Adjutant-General Carlos Black to send state troops when the trouble became serious. Both officials deny this. After the massacre, when county officials did nothing to apprehend or punish the murderers, the Illinois Chamber of Commerce was active in raising a fund to aid the state's futile prosecution of a long list of union miners. The union made a great play, at the time, upon the claim that the Chamber and "capital" were doing their best to break down unionism.

Coal-Freight-Rate Hearing On in Denver

With a large number of Western and Middle Western coal operators in attendance, Henry C. Hall, a member of the Interstate Commerce Commission, began its inquiry at Denver, Sept. 10, into coal freight rates between Colorado and New Mexico mines and points in Nebraska, Kansas, and Missouri. The complaint in the case was filed by the Colorado and New Mexico Coal Operators Association, and directed against the Denver & Rio Grand Western and other railroads. The operators charge discrimination against them in favor of Illinois, Wyoming and other coal-producing points.

Illinois Mine Workers Get Rid of Infamous Herrin Strip Mine

The United Mine Workers of Illinois are reported to have sold the infamous Lester strip mine at Herrin, Ill., scene of the Herrin massacre, to a new concern under the name of Mammoth Coal Co., of Benton, Ill. The union has issued no statement of the transaction. S. S. Shive, of Benton, formerly a salesman for the Jeffrey Manufacturing Co. and lately in the mine supply business, is president of the Mammoth Coal Co. D. C. Johns is mine manager. The union bought the mine early this summer for \$729,000, presumably to quiet damage claims of the owners against the union.

Commission Ends Work Sept 21; Correction of Coal Ills Still Up to the Industry Itself

This week marks the official end of the U. S. Coal Commission. It will be a long time before its work can be cataloged, read and understood. So far the public is thinking of it in terms of an anthracite-strike settlement, which it did not settle. The union miners have long since backed off and are openly hostile, charging the Commission with writing a brief for the West Virginia non-union operators. Congress is yet to be heard from.

The President has not indicated in detail what he will do with the report and recommendations of the Commission. Automatically the report will be presented to Congress when that body convenes. It was stated at the White House that speaking generally, the President expects to commend the report of the Coal Commission to Congress, but, contrary to the general newspaper reports, there has been no statement that the President will emphasize any particular phase of the Commission's report or that he feels it necessary to do so.

It is difficult to find any coal man who feels that the Commission has done anything constructive. There is no general condemnation of the Commission. Instead it is commonly said that Mr. Hammond and his colleagues did about all that any board could do; but that that isn't much. Nobody accuses the Commission of not being intelligent or honest. Instead the common refrain is: "They found out all there is to know—what every coal man knows is true—but it is beyond the power of any one group of mortals working one year to produce any cure for the troubles of this industry."

WALLOP BOGIE OF "COAL BARONISM"

Most observers agree that a service of some value has been rendered in the publishing of so much coal information to the people. That at least calls the attention of a few citizens to the fact that coal men are not robbers and criminals. The bogie of "coal baronism" is dealt a wallop. But the trouble is, as these men see it, too few people are ever going to wade through the Commission's reports to learn what is in them. Nobody could write such reports and broadcast them in such a way as to appeal to popular fancy. Therefore the possible good of the Commission's work is necessarily limited because the Commission produced nothing spectacular.

The only other thing that the coal fraternity can see as a result of the Commission's work is that the country may learn from it that there is no use expecting some federal commission to wave a wand and correct all the ills of the industry. Some other way must be found. That other way the Commission half points out. It is that the correction must be made by the industry itself and that the coal consumers of the land must do their part.

Two of the outstanding conclusions and recommendations which will appear in the final report of the Commission, as forecast in sectional reports made public by the Commission, will be provision for full publicity from operators and miners alike under government supervision, and that many of the most serious problems confronting coal mining may be worked out by the elements of the industry itself far better than would be the case were legislative bodies to attempt to enact mandatory laws dealing with these subjects.

The recommendation for publicity occurs in several chapters of the report so far made public. This means not only publicity of the operators' figures but also publicity as to the disposition as well as the source of funds of the United Mine Workers. The most serious direct criticism that the Coal Commission has made regarding the union is that the mine workers have devoted so little attention to the solution of problems affecting its membership through constructive study. It is apparent that the Commission will recommend against nationalization of the mines.

The Coal Commission during the last week has made

public several chapters of its report. One of these was conclusions on "Effect of Irregular Operation on the Unit Cost of Production of Bituminous Coal." A report was released on Sept. 14 giving the recommendations on "Labor Relations in Bituminous Coal Mining," followed on Sept. 17 with an extensive report on this subject.

The Commission released a report on Sept. 20 dealing with the causes and remedies for irregular operation and overdevelopment, and treating of transportation. Its findings on earnings and wages in the bituminous-coal industry and investments and profits in both anthracite and bituminous coal are yet to be published, as are the reports on living conditions and the wholesale and retail trade. It is understood that many of its reports will not be released for publication for several weeks.

Several briefs and statements were filed with the Commission during the week and the Bituminous Operators' Special Committee called on members of the Coal Commission Sept. 13 and renewed their offer of voluntary publicity of prices, costs, etc., through some governmental agency.

A statement in behalf of the National Retail Coal Merchants' Association was filed with the Coal Commission Sept. 13 in which criticism of Governor Pinchot's settlement of the anthracite suspension was voiced.

The wholesalers on Sept. 17 made a formal protest to the Commission on its press release of Aug. 30 regarding pyramiding of prices, alleging that it is unfair.

There has been no decision as to what will be the disposition of the records of the Coal Commission or those of the Federal Fuel Distributor, each of which expire by statutory limitation Sept. 22. The records evidently will go either to the Department of Commerce or to the U. S. Geological Survey. While their term of office will expire Sept. 22, the members of the Coal Commission will remain available to President Coolidge for consultation and advice unofficially after that date.

Pinchot Invites 30 Governors to Confer On Anthracite Situation

Governor Pinchot has sent letters to the Governors of thirty states which use anthracite coal, suggesting that they make an examination, with a view to personal conference later on, of the hard-coal situation in their states. The purpose of the investigation is to prevent unnecessary increases in the price of anthracite because of the wage increase agreed to by the operators and miners at the Harrisburg conference.

The letters were sent to the Governors of states using 1,000 tons or more a year of anthracite. The states are Connecticut, Rhode Island, Vermont, New Hampshire, Maine, New York, New Jersey, Maryland, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Carolina, Tennessee, Texas, Wisconsin, Alabama, Massachusetts, Virginia and West Virginia.

Abolition of Assigned Cars Deferred Until Nov. 1

The Interstate Commerce Commission has postponed the effective date of its order abolishing assigned cars until Nov. 1, 1923. This is the second time the effective date has been postponed. In its order dated June 13 the I.C.C. abolished assigned cars as of Sept. 1, but on July 25 the effective date was postponed until Oct. 1.

Anthracite Miners Ratify New Wage Agreement and Return to Work

Governor Pinchot's peace plan between the anthracite miners and operators, signed at Harrisburg by the union chiefs and operators nearly two weeks ago, was ratified at the tri-district convention of the miners at Scranton late in the afternoon of Sept. 17, the first day of the convention. The 155,000 mine workers who had been idle since Sept. 1 returned to work yesterday morning. The contract was not signed, however, until 1 p.m. at Milford, the home of Governor Pinchot.

In the convention hall, where 500 delegates representing every local in the hard-coal field were seated, there rose only twenty voices in objection to ratification. This little group represented some of the day men employed about the collieries, who are not satisfied with the 10-per cent increase.

Better Inspection and Education Will Lower Hazards of Mining, Says Commission

Increased inspection and continued education of all men in the industry are emphasized by the U. S. Coal Commission as outstanding factors in reducing the hazards of coal mining in a report on "Safety in Bituminous Coal Mining," made public by the Commission Sept. 18.

In this report the Commission states its conclusions on this subject with a summary of the findings of a committee selected by the Bureau of Mines at the request of the Commission to investigate this subject. This committee comprised: E. A. Holbrook, chairman, dean of Mining School, Pennsylvania State College; W. M. Wolfin, chief engineer, California Industrial Accident Commission; J. J. Rutledge, Chief of the Maryland State Bureau of Mines; W. B. Plank, head of mining department, Lafayette College; R. N. Hosler, superintendent, Coal Mine Section, Pennsylvania Compensation Rating and Inspection Bureau; J. H. Griftner, the Associated Companies, of Hartford; F. P. Hanaway, United Mine Workers of America; T. A. Furniss, Bituminous Operators' Special Committee, and W. W. Adams, statistician, U. S. Bureau of Mines. The detailed reports prepared by this committee will be issued later in three sections treating different phases of the subject.

In its summary of the findings of the committee and conclusions of the Commission, the Commission states that more men are killed from falls of roof and coal than from all other underground causes combined and that in many districts it is more dangerous to transport coal underground than to mine it. While mine explosions attract wide attention owing to the large number of men involved, the report states, the deaths underground from this cause are only 12 per cent of the total. Differences in laws, regulations, customs and appliances affect the accident rate more than any difference in natural conditions, it is stated. If accidents could be reduced, the average bituminous miner would live the normal life span, the Commission reports, as there is no positive evidence that soft-coal miners are subject to special occupational diseases.

Using the comparative compensation rates of Ohio and Pennsylvania as a basis, the report states that 10 per cent of all occupations listed take a higher rate than bituminous-coal mining and 90 per cent a lower rate. State mining laws and compensation insurance inspection are the two great factors for mine safety, the report states. The majority of the investigating committee felt that certification of miners is sound in theory and an aid to safety, but the operators' representative held that in practice this law gives control of all miners to the union.

The Commission declares that the Bureau of Mines has accomplished much for mine safety work, but that the appropriation given it for this purpose should be sufficient to double the present personnel and equipment. More safety service inspection work by the Bureau also is recommended.

Regarding inspection, the report states that there is too much politics in some of the state departments. The codes of some states need revision badly, it is declared.

Unification of basic points in the various state laws would increase safety, it is asserted. Every operating company should foster first aid, provide a safety inspector and personal instruction in safety to the miner. The union has exerted a positive influence in obtaining safety legislation, it is pointed out. The Commission declares that insistence on ability at least to understand spoken English should be made a condition of employment in coal mining or the employee should work under a foreman who speaks his language.

Overseas Coal Export Situation Improved Only Slightly Since July

Summarizing the overseas coal export situation as of Sept. 1, Federal Fuel Distributor Wadleigh says in part: "There have been no new developments in the coal export market during August. There are indications of a cleaning up of conditions in European markets brought about by the Ruhr occupation, but it is still considered useless and inadvisable to make any statements or predictions regarding the existing state of affairs or the future outcome of the conditions in the Ruhr district. The ocean freight market has been quiet and dull; rates are still at low levels and conditions but little improved over those obtaining in July. Prices continue at the lowest levels of the year, both at British ports and on this side."

In United States markets "actual charters reported for August have decreased as compared with previous months and export tonnages also have decreased. Inquiries, however, are still being made for future shipment and there seems to be a decided feeling of optimism in the trade as to the future of our export business. Prices of U. S. coals f.o.b. tidewater for export continue low, with but little change since Aug. 1. August tonnages of coal show a decrease as compared with those of July, which in turn were lower than overseas shipments during June and May. Export of coke overseas showed an increase during August although only two charters were reported as having been closed in that month."

Illinois Operators' Central Control Board To Replace Divided Representation

The three operators' associations of Illinois though remaining separate are proceeding definitely to organize a central control board the plan for which was accepted last month. Matters of labor and state-wide policy are to be placed in the hands of a committee of eight men, five representing the Illinois Operators' Association, two the Fifth and Ninth District Association and one the Central Illinois Association. Disagreements under the labor contract which cannot be settled by operators' commissioners with the men will be carried to this one board instead of to the several joint boards of association officials and miners which have previously functioned. Greater centralization of control over operators' affairs is hoped for. The appointment of the eight members is expected after an operators' meeting this week.

Federal Trade Commission to Probe Charge Of Pyramiding by Middlemen

The Federal Trade Commission, according to a press report, is preparing to investigate the charge of pyramiding of anthracite prices by middlemen. At a meeting on Wednesday the commission began work on a program for an inquiry based on a report issued by the U. S. Coal Commission Aug. 30, the probe to be conducted with a view to ascertaining whether wholesalers have been guilty of unfair trade practices in violation of the Federal Trade Commission Act.

American Mining Congress Adds Technologic Sessions As Adjunct to Its Annual Exposition

Beginning Sept. 24, the American Mining Congress will hold its Twenty-sixth Annual Convention and a National Exposition of Mines and Mine Equipment in the Auditorium at Milwaukee, Wis. This convention program divides itself into five parts covering Industrial Co-operation, the Problems of the Coal Industry, those of the Metal Industry, Standardization and Mine Taxation.

Under the first head it may be said that the Industrial Co-operation Division of the American Mining Congress, which is now functioning in twenty-three states, will be in charge of this section of the program. It will hold two sessions. The first will be at 2 p.m. Tuesday, Sept. 25, at which W. A. Grieves, chairman of the Industrial Co-operation Division, will present a report covering the work of the division. He will be followed by Norman W. Schlichter, of West Virginia, J. G. Bradley, of the same state, and other representative men. A second session of this division will be held on the evening of the same day in the Hotel Wisconsin at 6:30 p.m. Sidney J. Jennings, president of the American Mining Congress, will preside, and the speakers will include Lawrence F. Abbott, of the Outlook Publishing Co.; Edward J. Henning, Assistant Secretary of Labor, and Cleveland H. Dodge, representing the Phelps-Dodge interests. At this meeting there will be a general discussion of the work of the division.

The second group of discussions will relate to the problems of the coal industry. Albert J. Nason, of Chicago, Ill., will preside. The principal addresses will be made by J. C. Brydon, president of the National Coal Association; Frank D. Rash, president of the St. Bernard Mining Co., Earlington, Ky.; Philip Penna, of Indiana, and coal men representative of other districts.

STANDARDIZATION GROUP HAS FOURTH SITTING

The National Standardization Congress will hold its fourth annual session on the standardization of mining methods, practices and equipment. Its first meeting will be on Thursday, Sept. 27, at 10 a.m., at which addresses will be made by A. J. Durgen, special representative of the Department of Commerce, who will be present at Milwaukee at the special request of Herbert C. Hoover, Secretary of Commerce; Warren R. Roberts, chairman of the coal-mining branch of the Standardization Division of the American Mining Congress; Charles A. Mitke, of Bisbee, Ariz., who is chairman of the metal-mining branch of the same division of the congress, and Albert W. Whitney, chairman of the American Standards Committee.

In the afternoon of that day a joint conference will be held at which several reports will be presented and discussed. The reports will be on Drilling Machines and Drill Steel, Underground Power Transmission and Power Equipment, Mining and Loading Equipment, Mine Timbering, Metal-Mine Accounting, Underground Transportation and Mine Ventilation.

At 10 a.m. on Friday the committees reporting will be those on Mining and Smelting Practices, Outside Coal-Handling Equipment, Fire-Fighting Equipment, Mine Drainage, Methods of Mine Smelting, Mining Excavating Equipment and Mechanical Loading Underground.

The fifth general group of discussions will be devoted to the problems of taxation. Among those who are expected to address the meeting are Paul Armitage, of New York City; George E. Holmes, Wade Kirk of Joplin, Mo., and other well-known tax accountants and lawyers.

An entirely new feature of the convention, which runs almost continuously and every afternoon for three days is the Open Forum for discussion of equipment problems—informal discussions of the practical operating problems of mining men in handling, selection and adjustment of mine equipment and mine machinery under varying conditions.

The program in brief is as follows:

Tuesday, Sept. 25, Conference Hall

- 1:30 p.m.—Subject, Rock Drills; Chairman, D. E. A. Charlton.
Question—Churn Drills vs. Air Drills for Open-Pit Work.
- 2 p.m.—Subject, Explosives; Chairman, N. S. Greensfelder.
Question—Means of securing co-operation from miner in using explosives that will produce maximum quantity of lump coal.
Question—Disadvantage of dynamite cartridges of small diameter.
- 2:30 p.m. to 4 p.m.—Subject, Mine Transportation; Chairman, R. Dawson Hall.
Question 1—Advantages of standardized track gages and standardized frog switches and turnouts.
Question 2—Mine cars, their design and effective use.
Question 3—Effective lubrication of mine cars.
Question 4—When and where to use gasoline trolley and electric storage-battery locomotives.
Question 5—Roller bearings vs. plain bearings and other types of axles in mine cars and mine locomotives.
- 4 p.m.—Subject, Shoveling and Loading Machines; Chairman, R. Dawson Hall.
Question 1—Advantages of the caterpillar shovel.
Question 2—What are the principal requirements to consider in selection of underground loading and shoveling machines, and what are their limitations?
- 5 p.m.—Subject, Safety Appliances; Chairman, H. G. Bell.
Question 1—What can be done to further the development and introduction of safe equipment for hoists, pumping and loading machinery?
Question 2—Mine ventilation and its application to various mine conditions.

Wednesday, Sept. 26.

- 1:30 p.m.—Subject, Crushing, Screening and Separating; Chairman, C. F. Willis.
Question 1—What is the field for magnetic separators?
Question 2—Can manufacturers of crushers and screens work together more fully for mine operator's advantage?
- 2:30 p.m.—Subject, Underground Power Equipment and Transmission; Chairman, Percy Barbour.
Question 1—Alternating vs. direct current in mine operations from the standpoint of efficiency and safety.
Question 2—Relationship of feeder lines to return current.
- 3:30 p.m.—Subject, Pumps and Mine Drainage.
Question 1—Centrifugal vs. Plunger Pumps.
Question 2—Effective use of acid-resisting metal in pumps.
- 4:30 p.m.—Subject, Hoists and hoisting equipment; Chairman, D. E. A. Charlton.
Question—Hoists and their application to mine problems.

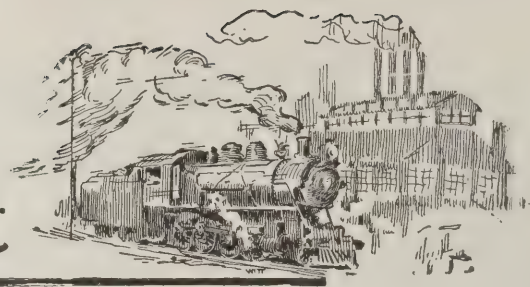
Thursday, Sept. 27, 1923.

- 2 p.m.—Subject: Power Plant Equipment in Mining Enterprises; Chairman, Percy Barbour.
- 3 p.m.—Subject, Power Transmission; Chairman, Percy Barbour.
- 4 p.m.—Subject, Use of Traveling Cranes in Mining.
Question—Are there any operations around a smelter or stamp mill in which a light mobile corduroy crane can be used to advantage?
- 4:30 p.m.—Subject, Welding in Mining.
Question—Advantageous use of various types of welding.

The convention will close on Friday evening at the annual banquet, where among the speakers will be Max W. Babb, vice-president of the Allis-Chalmers Mfg. Co., W. R. Finley, president of the Chicago & Northwestern Railway Co., and Irvine L. Lenroot, U. S. Senator from Wisconsin.



Production and the Market



Weekly Review

The soft-coal market slumped slightly following the settlement of the anthracite strike. Spot demand fell off and prices showed a slight decrease. Contract coals moved in good volume although consumers are indicating a desire to have shipments slow down. Spot business is barely sufficient to keep prices at their present level, and in some sections of the country no improvement is looked for now. Producers of soft coal are disappointed at the way the anthracite trouble was settled, particularly because of the increase in wages, declaring it will make it more difficult for them to deal with the union next Spring.

Coal Age Index for Sept. 17 shows a decline of three points to 202 from the previous week, with an average price of \$2.44, dropping back to the Aug. 27 figure.

Although the anthracite mines have been completely shut down, river dredging and culm washing netted about 5,000 tons during the week ended Sept. 8, in addition to which there were shipped approximately 1,000 cars of steam coal drawn from storage piles.

Soft coal is being produced on an average of 11,000,000 net tons weekly, notwithstanding slow demand and low prices. In August production was 48,864,000 net tons. The first eight months of the year recorded a total of 367,260,000 tons, 18 per cent ahead of the average production of the corresponding periods of the nine years 1914-1922.

Car shortage is increasing and there are fewer reports of no market, particularly in the Middle Appalachian region, Illinois and the far West.

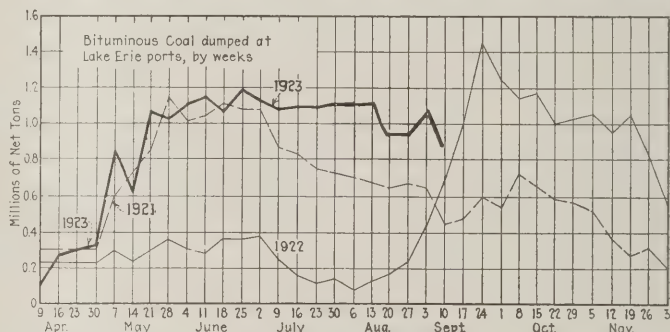
One of the large producing companies announced an increase of 70c. per ton in the mine price of domestic coals early this week. Several other companies said they had reached no decision regarding their prices at that time. Consumers feel there is no need for anxiety regarding supply and are not showing great desire to fill their bins now.

The Chicago market reports a fair domestic demand for various coals, due to a drop in temperature, while

in the Northwest the demand for nearly all fuel, excepting anthracite stove size, dropped off following the settlement of the hard-coal strike. The Pittsburgh market is inactive for the same reason, while in New England there is no immediate improvement in sight.

Bituminous screened coal and coke as substitutes for anthracite have practically dropped out of the market. There is almost no call for the former and the demand for coke is much slower, with quotations for the latter lower than they were last week.

There is a feeling of optimism in the export trade despite the falling off in demand and inquiries during the past few weeks. While inquiries have been slow,



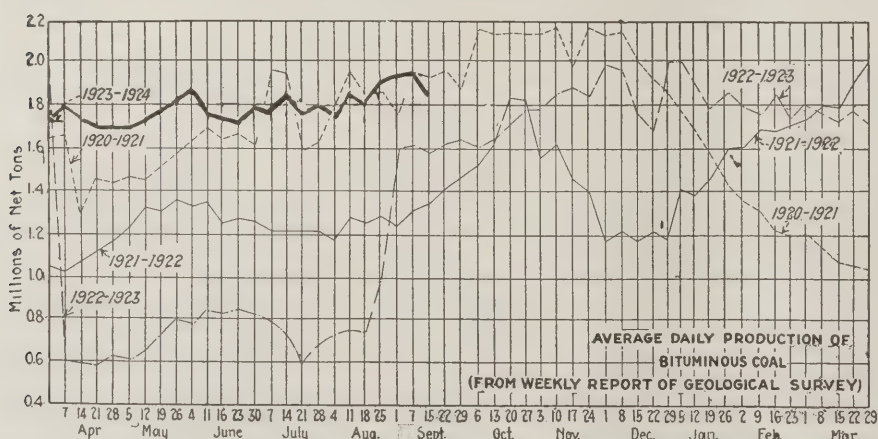
LAKE COAL DUMPED
(Net Tons)

	Week Ended Sept. 10	Season to Sept. 10
Cargo	756,917	19,616,851
Fuel	49,236	1,031,582
Totals	806,153	20,648,433

exporters believe that trade will soon pick up. Coal is accumulating at Hampton Roads and prices are lower.

Inquiry for Welsh anthracite eased considerably following the ending of the strike. Several cargoes are expected to reach the Atlantic seaboard within the next week or two.

Dumpings at Hampton Roads for all accounts during



Estimates of Production (Net Tons)

	1922	1923
BITUMINOUS		
Aug. 25	6,736,000	11,383,000
Sept. 1 (a)	9,359,000	11,737,000
Sept. 8 (b)	8,791,000	10,433,000
Daily average	1,659,000	1,787,000
Calendar year	241,709,000	379,244,000
Daily av. cal. year	1,136,000	1,787,000
ANTHRACITE		
Aug. 25	37,000	2,165,000
Sept. 1	37,000	1,893,000
Sept. 8	51,000	(a) 5,000
COKE		
Sept. 1 (b)	138,000	322,000
Sept. 8 (a)	137,000	347,000
Calendar year	4,360,000	13,531,000

(a) Subject to revision. (b) Revised from last report

the week ended Sept. 13 amounted to 327,871 net tons, as compared with 343,733 tons the previous week.

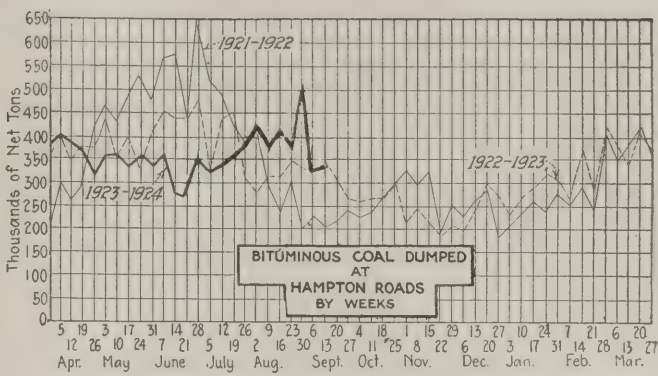
Chicago Prices Not Strong

A fair domestic demand for various coals around Chicago was caused by a cold snap lasting until Saturday. On that day the mercury rose. Weather observers prophesy warmth for the rest of September. Coal men, by the same sign, prophesy a slump in business. There is by no means enough business to hold all domestics firmly against the top quotation. Good Franklin County lump and egg sells for \$4.35 in spots, but a good deal of it moves at \$3.75@ \$4. Central Illinois lump has a hard time bringing \$3.25. Some sags to \$2.75. Steam business is slow with prices shading downward. Southern Illinois screenings run as low as \$1.25 under pressure and central Illinois to \$1.10. Nut coal is slow in all Western fields. Western Kentucky coal is offered in considerable volume in spite of car shortage with steam prices sliding. Smokeless mine-run moves steadily.

Around St. Louis, demand improved for both Mt. Olive and Standard lump for city and country, but smaller sizes drag. This backwatering of nut and screenings has kept mines idle half the time, though they have domestic orders booked for several weeks ahead. One operator in the Standard district hiked his lump price out of sight to stop orders. The St. Louis city trade is largely in the cheaper grades of coal. In anthracite, coke and smokeless there is practically nothing doing.

Kentucky Softens Too

Reduced demand for all kinds of Kentucky coals plus the end of the anthracite strike sufficed to soften prices on both eastern and western Kentucky coals even though a car shortage has developed. West Kentucky lump, which ranged from \$3 to \$3.25 last week, is now well below \$3 and good Eastern gas lump no longer goes at \$4@ \$4.25, but rather at \$3.50@ \$3.75. Steam buyers seem to be out of the market. West Kentucky slack, in one or two places has dropped as low as 75c., but averages 90c.@ \$1.25.



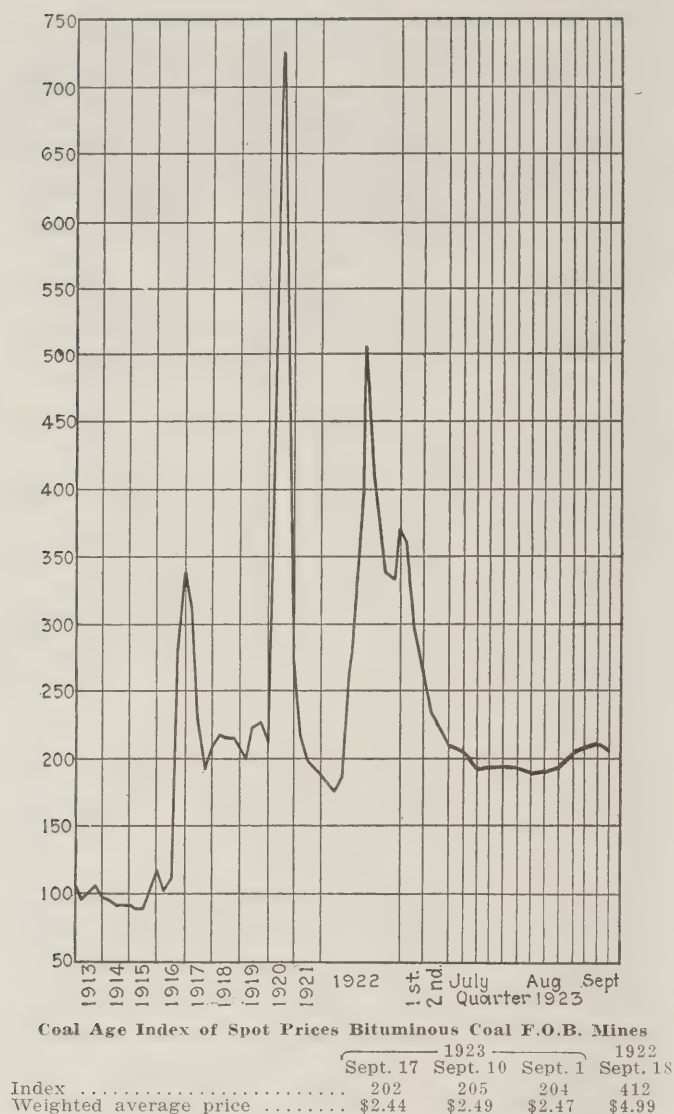
Although there is bituminous coal in plenty all through the Northwest the demand for almost all fuels except stove anthracite has dropped off because there is no further fear of an anthracite strike. In Duluth, dock operators stopped taking orders for a day or two to inventory hurriedly, fearing they had oversold the popular sizes, but discovered they had enough. In Milwaukee, where retail prices range about \$1.70 above Duluth, a state commission is going to find out whether the operators are basing their charges on rail freights rather than on lake-and-rail. Receipts on the docks are in good volume. There is plenty of time to get the normal winter's supply moved up the Lakes.

Not enough winter has struck the western and Rocky Mountain states to stir up much action in coal. In all fields the steam business is flat and small sizes are backing up while a thin business in domestic sizes goes ahead. Cars are in plenty, but in Kansas there is much complaint against too many flat bottoms. Prices there are unchanged. In Colorado, where bituminous demand is picking up some, circulars show these quotations: Walsenburg lump, \$6; nut, \$5.50; mine-run, \$4.25@ \$4.50; slack, \$2.25@ \$2.50; Trinidad lump, \$5; nut, \$4.75; mine-run, \$4@ \$4.25; semi anthracite egg and nut, \$7.50; chestnut, \$3. Utah mines are still working better than half time in spite of the slow steam

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Sept. 18 1922	Sept. 1 1923	Sept. 10 1923	Sept. 17 1923†
Smokeless lump.....	Columbus....	\$6.25	\$5.95	\$5.95	\$5.75@	\$6.15
Smokeless mine run.....	Columbus....	5.75	3.00	3.00	2.75@	3.25
Smokeless screenings.....	Columbus....	5.50	2.35	2.35	2.25@	2.50
Smokeless lump.....	Chicago.....	6.25	6.35	6.25	6.00@	6.25
Smokeless mine run.....	Chicago.....	5.85	3.35	3.35	2.75@	3.00
Smokeless lump.....	Cincinnati.....	6.50	6.25	6.25	6.00@	6.25
Smokeless mine run.....	Cincinnati.....	5.50	3.25	3.25	2.75@	3.25
Smokeless screenings.....	Cincinnati.....	5.50	2.50	2.35	2.00@	2.50
*Smokeless mine run.....	Boston.....	8.05	5.10	5.05	5.00@	5.10
Clearfield mine run.....	Boston.....	4.35	2.20	2.15	1.80@	2.50
Cambridge mine run.....	Boston.....	5.25	2.85	2.85	2.50@	3.25
Somerset mine run.....	Boston.....	4.85	2.50	2.50	2.00@	2.75
Pool 1 (Navy Standard).....	New York.....	5.40	3.25	3.25	3.00@	3.50
Pool 1 (Navy Standard).....	Philadelphia.....		3.10	3.20	3.00@	3.50
Pool 1 (Navy Standard).....	Baltimore.....	5.50				
Pool 9 (Super. Low Vol.).....	New York.....	4.75	2.55	2.55	2.30@	2.75
Pool 9 (Super. Low Vol.).....	Philadelphia.....	5.60	2.55	2.55	2.50@	2.80
Pool 9 (Super. Low Vol.).....	Baltimore.....	5.10	2.45	2.45	2.40@	2.50
Pool 10 (H.Gr.Low Vol.).....	New York.....	4.35	2.25	2.20	2.00@	2.30
Pool 10 (H.Gr.Low Vol.).....	Philadelphia.....	5.10	2.15	2.15	2.10@	2.35
Pool 10 (H.Gr.Low Vol.).....	Baltimore.....	4.85	2.25	2.25	2.25@	2.30
Pool 11 (Low Vol.).....	New York.....	4.10	2.00	2.05	1.75@	2.00
Pool 11 (Low Vol.).....	Philadelphia.....	4.85	1.85	2.15	2.00@	2.20
Pool 11 (Low Vol.).....	Baltimore.....	4.35	1.90	2.00		2.00
High-Volatile, Eastern						
Pool 54-64 (Gas and St.).....	New York.....	4.35	1.70	1.80	1.65@	1.90
Pool 54-64 (Gas and St.).....	Philadelphia.....	4.60	1.85	1.85	1.65@	2.00
Pool 54-64 (Gas and St.).....	Baltimore.....	4.60	1.85	1.75		1.75
Pittsburgh acid Gas.....	Pittsburgh.....		3.00	3.00	2.90@	3.00
Pittsburgh gas mine run.....	Pittsburgh.....		2.50	2.50		2.50
Pittsburgh mine run (St.).....	Pittsburgh.....	4.65	2.30	2.30	2.20@	2.30
Pittsburgh slack (Gas).....	Pittsburgh.....		1.55	1.55		1.50
Kanawha lump.....	Columbus....	5.75	3.05	3.15	2.85@	3.50
Kanawha mine run.....	Columbus....	5.50	1.90	1.90	1.75@	2.10
Kanawha screenings.....	Columbus....	5.30	1.15	1.25	1.15@	1.25
W. Va. lump.....	Cincinnati.....	6.85	3.60	3.75	3.50@	3.75
W. Va. gas mine run.....	Cincinnati.....	6.85	1.80	1.80	1.50@	1.65
W. Va. Steam mine run.....	Cincinnati.....	5.35	1.80	1.80	1.50@	1.65
W. Va. screenings.....	Cincinnati.....	5.25	1.35	1.20	1.00@	1.15
Hocking lump.....	Columbus....	5.75	2.75	2.85	3.00@	3.25
Hocking mine run.....	Columbus....	5.10	1.85	1.90	1.85@	2.00
Hocking screenings.....	Columbus....	5.25	1.10	1.20	1.15@	1.30
Pitts. No. 8 lump.....	Cleveland.....	4.85	2.65	2.65	2.25@	3.00
Pitts. No. 8 mine run.....	Cleveland.....	4.60	2.10	2.10	2.00@	2.10
Pitts. No. 8 screenings.....	Cleveland.....	4.60	1.35	1.35	1.20@	1.30
Midwest		Market Quoted	Sept. 18 1922	Sept. 1 1923	Sept. 10 1923	Sept. 17 1923†
Franklin, Ill. lump.....	Chicago.....	\$5.40	\$4.20	\$4.20	\$3.75@	\$4.35
Franklin, Ill. mine run.....	Chicago.....	4.75	3.00	3.00	2.75@	3.25
Franklin, Ill. screenings.....	Chicago.....	4.45	1.80	1.75	1.25@	1.85
Central, Ill. lump.....	Chicago.....	5.10	3.10	3.10	2.75@	3.25
Central, Ill. mine run.....	Chicago.....	4.55	2.20	2.20	2.10@	2.35
Central, Ill. screenings.....	Chicago.....	3.60	1.40	1.40	1.10@	1.25
Ind. 4th Vein lump.....	Chicago.....	5.25	3.35	3.35	3.25@	3.50
Ind. 4th Vein mine run.....	Chicago.....	4.85	2.60	2.60	2.50@	2.75
Ind. 4th Vein screenings.....	Chicago.....	4.60	1.60	1.60	1.25@	1.65
Ind. 5th Vein lump.....	Chicago.....	5.10	2.75	2.75	2.50@	3.00
Ind. 5th Vein mine run.....	Chicago.....	4.65	2.10	2.10	2.00@	2.25
Ind. 5th Vein screenings.....	Chicago.....	4.40	1.40	1.40	1.20@	1.35
Mt. Olive lump.....	St. Louis.....	4.75	3.10	3.10	3.00@	3.25
Mt. Olive mine run.....	St. Louis.....	3.90	2.05	2.05	2.20@	2.30
Mt. Olive screenings.....	St. Louis.....	2.85	1.35	1.45	1.30@	1.40
Standard lump.....	St. Louis.....	4.75	2.60	2.60	2.65@	3.00
Standard mine run.....	St. Louis.....	3.90	2.05	2.05	1.80@	2.30
Standard screenings.....	St. Louis.....	2.85	1.00	0.95	0.90@	1.00
West Ky. lump.....	Louisville.....	4.75	2.55	2.60	2.25@	2.50
West Ky. mine run.....	Louisville.....	4.25	1.90	1.95	1.85@	2.10
West Ky. screenings.....	Louisville.....	4.00	0.90	1.05	0.80@	0.85
West Ky. lump.....	Chicago.....	4.25	2.75	2.75	2.50@	3.00
West Ky. mine run.....	Chicago.....	4.25	1.75	1.96	1.85@	2.10
South and Southwest						
Big Seam lump.....	Birmingham..	3.45	3.75	3.75	3.65@	3.90
Big Seam mine run.....	Birmingham..	2.60	1.95	1.95	1.75@	2.15
Big Seam (washed).....	Birmingham..	3.10	2.35	2.35	2.25@	2.50
S. E. Ky. lump.....	Chicago.....	4.25	3.10	3.20	3.25@	3.50
S. E. Ky. mine run.....	Chicago.....	4.25	1.80	2.30	1.75@	2.00
S. E. Ky. lump.....	Louisville.....	6.65	3.10	3.10	2.75@	3.50
S. E. Ky. mine run.....	Louisville.....	5.65	2.00	2.00	1.75@	2.25
S. E. Ky. screenings.....	Louisville.....	5.50	1.20	1.20	0.90@	1.25
S. E. Ky. lump.....	Cincinnati.....	6.85	3.75	3.75	3.25@	3.50
S. E. Ky. mine run.....	Cincinnati.....	5.35	1.80	1.75	1.50@	1.65
S. E. Ky. screenings.....	Cincinnati.....	5.25	1.45	1.30	0.90@	1.10
Kansas lump.....	Kansas City..	6.25	4.50	4.50		4.50
Kansas mine run.....	Kansas City..	5.00	3.50	3.50		3.50
Kansas screenings.....	Kansas City..	2.60	2.60	2.60	2.50@	2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

market. Bunker coal for the coast is about to be reduced 90c. to stimulate business. Other prices are steady.

Ohio Market Quiet

The after-effects of all the talk that came along with the strike in the anthracite fields is being keenly felt in the Cincinnati market. Buyers who took eleventh-hour chances on filling up before a prospective period of distress have taken elasticity out of the market now that their wants are cared for, at least for several weeks ahead. In the Columbus market there was a slight falling off in steam demand at about the time of the anthracite settlement, operators having a brisk trade in these coals being the first to feel the change, although the general effect was to slow down the entire market. A lull was experienced by domestic producers. Producers and distributors, however, believe that the let-up is only temporary and look for better business towards the end of this month. Steam users who have been accumulating have stopped buying, while a survey shows that stocks in reserve will last from forty-five to sixty days.

Operators serving the Cleveland market say the general demand apparently is increasing in volume and inquiries are more numerous.

The coal market at Pittsburgh has turned quite inactive since the anthracite settlement, but cannot be said to have

had any great change in the fundamental relation between production and consumption. During August many consumers who had previously been hand-to-mouth buyers turned in and bought ahead for short distances. It is a question whether the dullness in the coal market is attributable entirely to the anthracite settlement.

With the adjustment of the anthracite dispute, production took a slump in the central Pennsylvania field. However, there is a high production, principally in the higher grades of fuel.

Peak of Dullness Almost Reached in New England

In New England it almost seems that the peak of dullness has been reached, but no improvement is in sight and it is likely to be thirty days at least before any buying materializes. The difficulty which shippers meet with in trying to dispose of cargoes here on the market shows how well saturated is this territory, and continued shut-downs and curtailments among several of the industries make buyers quite indifferent to any talk of high prices. Practically all the large consumers, railroads included, have such large reserves that deliveries even on contract have been reduced. In no direction does there seem promise of better business during the fall.

All-rail receipts from central Pennsylvania continue relatively light, shipments being confined almost entirely to contract requirements. Many operations are idle and spot orders for grades other than specialties are extremely hard to find. There has been a marked let-down in tonnage moved via the New York and Philadelphia piers, and more than a few shippers are being pressed to move accumulations.

At Hampton Roads there is hardly any spot inquiry from New England. While no outright quotation of less than \$5 per gross ton f.o.b. vessel has been heard the buyer is made to feel that lower offers would be accepted.

The soft-coal market at New York continues dull. Save for contract coals there is slow movement and the spot market is quiet. Shipments to tidewater, except on consignment, are slow. At Philadelphia no bad effects as the result of the hard-coal settlement were felt and the position of the bituminous market is considered better than fair, with prices indicating a betterment. The industrial situation is considered good and there is a growing tendency on the part of consumers without contracts to seek cover at least for a portion of their tonnage to April 1. There is little change in the Baltimore situation, while quietness has marked the Birmingham market. There is scarcely any demand for bunker coal at the Southern ports.

Shipments of Anthracite Eagerly Awaited

A small tonnage of anthracite domestic coals is being moved as the result of the strike. Producers have no coal to offer and quotations heard for coal on cars or in boats have been nominal. There has been some offering of washery egg, stove and chestnut sizes made at \$10@11 f.o.b. mines but sales have been slow. The steam sizes were plentiful and were quoted at around \$3.50 for buckwheat No. 1, \$2.50 for rice and \$1.50 for barley. Movement, however, has been slow. Dealers are anxiously awaiting the first shipments of domestic coals following the resumption of mining. Hard coal is in good demand in Toronto.

DUE TO THE SUSPENSION OF MINING in hard-coal fields and the practical stoppage of shipments from the mines, quotations are merely nominal, and are not printed. Coal Age quotations on anthracite will be resumed when the new prices are available.

Car Loadings, Surpluses and Shortages

	Cars Loaded		Car Shortage	
	All Cars	Coal Cars	All Cars	Coal Cars
Week ended Sept. 1, 1923	1,092,567	206,610		
Previous week	1,069,932	203,076		
Same week in 1922	923,806	149,227		
Surplus Cars				
	All Cars	Coal Cars		
Sept. 1, 1923	66,559	3,922	9,441	4,891
Same date in 1922	70,455	54,566		
Aug. 22, 1923	74,917	5,498	7,690	3,574

Foreign Market
And Export News

British Coal Production Increases Slightly;
Exports for August Show Gain

Production of coal in Great Britain's mines during the week ended Sept. 1 was 5,280,000 tons, says a cable to *Coal Age*. This is the largest weekly output since July 7 last, when it was 5,360,000 tons. During the week ended Aug. 25 output was 5,163,000 tons.

The South Wales market is quieter with prices slightly lower, due to the improved Italo-Greek controversy and the settling of the anthracite situation in the United States. Demand is insufficient to absorb the output. European buying is slightly heavier.

The wages of Welsh miners have been advanced in September by 3.85 per cent to 41.47 per cent over the standard of 1915. Earnings would have been larger but for June holidays.

The Newcastle market is better and inquiries are more free, the most business being done in the gas and coking sections.

Coal exports for the months of August, 1923 and 1922 as reported by the Board of Trade were as follows, in tons:

	1923	1922
Germany	1,215,000	1,166,000
France	1,561,000	940,000
Italy	513,000	476,000
Other countries	3,291,000	3,564,000
Total	6,580,000	6,146,000

Business Slow at Hampton Roads

The market at Hampton Roads felt the effects of the anthracite settlement in lessened activities, and in slackening inquiries. The dumpings at piers fell off, and little new business is in sight for the immediate future.

Export business showed a tendency downward, and the bunker trade was doing little better than holding its own. Coastwise business was on the upgrade, but did not show a sufficient increase to have any effect on the market.

For the first time in many months low volatile coal was actually offered on the spot for less than \$5. The tone of the market was dull, and the outlook not so bright.

U. S. July Coal and Coke Exports
(In Gross Tons)

	1922	1923
Anthracite	16,698	455,370
Bituminous	366,287	2,278,241
Exported to		
Belgium		9,322
France		101,302
Germany		30,224
Greece		5,529
Italy	7,476	69,723
Latvia		11,838
Netherlands		124,021
Sweden		18,374
England		9,317
Canada, Marit. Prov.	209,008	54,737
Quebec & Ont.		2,054,369
Prairie Pro.		16,889
Brit. Col. & Yuk.		8,821
Guatemala		49
Honduras		165
Nicaragua		85
Salvador		7
Mexico	6,415	11,393
Miquelon, etc., Is.		8,458
Newfld. & Labrador		233
Bermuda		2,757
Jamaica		7,028
Other Brit. West Indies		49
Cuba	22,500	68,477
Dominican Republic		1,903
Dutch W. Indies		9,170
Haiti		2,600
Virgin Is. of U.S.		3,233
Argentina	7,576	25,802
Brazil	12,544	42,508
Chile		5,459
Colombia		11
Ecuador		49
British Guiana		1,793
Uruguay		11,684
Other Oceania		420
British W. Africa		1,021
Egypt		2,425
Algeria & Tunis		12,379
West Indies	8,079	
Panama	7,025	
Other Countries	4,664	
Coke	27,686	60,462

French Market Firm; Demand Active

The French coal market is firm with demand for all grades, chiefly in house coals, active. Prices show a tendency to advance, Belgian sizes coals increasing 15 fr. and ovoids 10 fr. Imports of British coals are lower in spite of a decrease in prices for secondary industrial grades. From Aug. 21 to 27 the S.C.O.F. received 23,000 tons of coke from the Ruhr, making a total of 101,000 tons received during the first twenty-seven days of that month. Dur-

ing the first twenty days of August France and Luxemburg received 34,500 tons of coal, 67,100 tons of coke and 600 tons of lignite briquets. Announcement has been made that the price of German coke would be advanced 24 fr. to 388 fr.

Export Clearances, Week Ended
Sept. 1, 1923

FROM BALTIMORE	
For France:	Tons
Belg. SS. Nervier	7,823
For Greece:	
Ital. SS. Ignazio Florio	8,189
For Costa Rica:	
Br. SS. Putney	2,980
For Italy:	
Br. SS. Dunstaffnage	5,432
COKE	
For Costa Rica:	
Br. SS. Putney	31
For Germany:	
Am. SS. Eastern Star	4,088

FROM PHILADELPHIA	
For Cuba:	
Schr. Ludlow, for Port Tarafa	—

FROM HAMPTON ROADS	
For Chile:	
Br. SS. Putney, for Valparaiso	848
For West Indies:	
Du. SS. Arundo, for Fort de France	4,977
For Holland:	
Du. SS. Aldebaran, for Rotterdam	11,331
Belg. SS. Caucasier, for Rotterdam	6,325
For Cuba:	
Br. SS. Berwindvale, for Havana	7,388
Amer. SS. Theoline, for Manzanillo	893
For Italy:	
Ital. SS. Zovetto, for Porto Ferrajo	6,887
Br. SS. Lord Ormonde, for Genoa	3,719
For France:	
Bel. SS. Carlier, for Havre	5,417
For Canada:	
Nor. SS. Modiz, for St. John	4,024
For Brazil:	
Br. SS. Picton, for Santos	6,694
For Philippine Islands:	
Amer. SS. The Lambs, for Cavite	8,305

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:		Sept. 7	Sept. 13
Cars on hand		1,403	1,597
Tons on hand		81,979	94,408
Tons dumped for week		108,351	108,420
Tonnage waiting		1,500	600
Virginian Ry. piers, Sewalls Pt.:			
Cars on hand		1,904	1,806
Tons on hand		111,140	108,720
Tons dumped for week		107,952	81,597
Tonnage waiting		7,042	2,228
C. & O. piers, Newport News:			
Cars on hand		2,372	1,843
Tons on hand		120,688	97,300
Tons dumped for week		90,602	102,725
Tonnage waiting		6,005	3,050

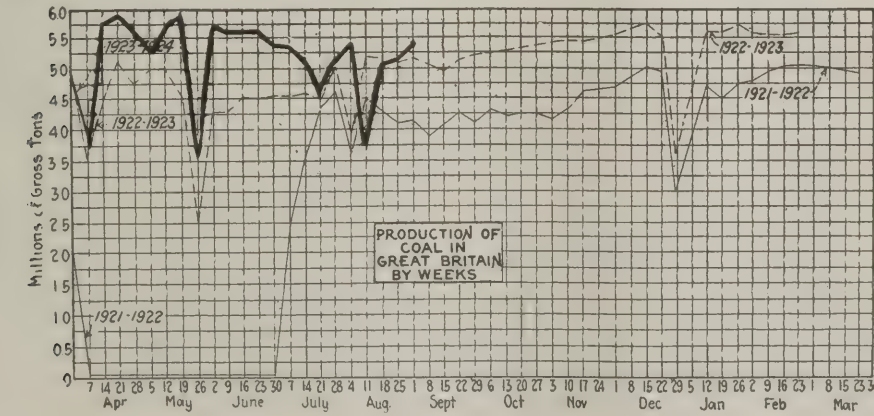
Pier and Bunker Prices, Gross Tons

PIERS		Sept. 8	Sept. 15†
Pool 9, New York	\$5.35@ \$5.75	\$5.25@ \$5.60	
Pool 10, New York	4.75@ 5.25	4.85@ 5.10	
Pool 11, New York	4.50@ 4.75	4.50@ 4.75	
Pool 9, Philadelphia	5.25@ 5.70	5.30@ 5.75	
Pool 10, Philadelphia	4.65@ 5.25	4.65@ 5.30	
Pool 11, Philadelphia	4.35@ 4.80	4.35@ 4.80	
Pool 1, Hamp. Roads	5.25	5.15@ 5.25	
Pools 5-6-7, Hamp. Rds.	4.35@ 4.50	4.50	
Pool 2, Hamp. Roads	5.00	4.85@ 5.00	

BUNKERS		Sept. 8	Sept. 15†
Pool 9, New York	5.65@ 6.05	5.55@ 5.90	
Pool 10, New York	5.05@ 5.50	5.15@ 5.40	
Pool 11, New York	4.80@ 5.05	4.80@ 5.05	
Pool 9, Philadelphia	5.60@ 6.05	5.65@ 6.10	
Pool 10, Philadelphia	5.00@ 5.50	5.10@ 5.60	
Pool 11, Philadelphia	4.65@ 5.00	4.70@ 5.00	
Pool 1, Hamp. Roads	5.25	5.15@ 5.25	
Pool 2, Hamp. Roads	5.00	4.85@ 5.00	

Current Quotations British Coal f.o.b.
Port, Gross Tons

Quotations, by Cable to Coal Age		Sept. 8	Sept. 15†
Admiralty, large	28s. 6d. @ 30s.	28s. 6d.	
Steam smalls	20s.	20s.	
Newcastle:			
Best steams	24s. @ 24s. 6d.	24s. @ 24s. 6d.	
Best gas	24s. @ 24s. 6d.	24s. @ 25s.	
Best bunkers	22s. 6d. @ 24s.	23s. @ 24s. 6d.	



News Items From Field and Trade

ALABAMA

The DeBardleben Coal Corporation has resumed operations at the Townley mines, in the Carbon Hill district of Walker County. These mines were taken over from the Corona Coal Co. in the recent merger, but an extensive rehabilitation program had been under way for several months by the former owners. Modern equipment for the mining, handling and preparation of coal has been installed and all machinery is electrically driven. The workings of Nos. 1 and 2 mines have been connected and the coal will be removed from the No. 1 slope. It is expected to increase development work and eventually attain an output to 1,500 or more tons daily.

The Alabama, Tennessee & Northern Ry., now operating between Chattanooga, Tenn., and Gadsden, Ala., is making preliminary surveys for the extension of the line from the present terminus at Gadsden to Birmingham, and also will establish physical connections with the Seaboard Air Line and Central of Georgia Railways, so it is reported.

ARKANSAS

Judge Youmans in the U. S. District Court at Fort Smith on Sept. 11 overruled a motion to dismiss the suit of the Coronado Coal Co. against the United Mine Workers of America, in which judgment is asked for \$2,222,000 as a result of labor riots in the Hartford Valley of Sebastian County, in 1914.

COLORADO

Colorado produced 689,254 tons of coal in July, employing for the purpose 11,472 men. This brings the total output for the year to 5,078,897 tons, 637,761 tons ahead of last year. This was done in an average of 87 days of operation.

ILLINOIS

The Chicago, Burlington & Quincy Ry. is building new double tracks from Woodlawn to Waltonville. The work is said to be a part of the \$2,000,000 improvement program and will greatly relieve the congested coal traffic between the southern Illinois fields and the Galesburg coal yards of the railroad. W. O. Frame, coal supervisor for the company at Herrin, is in charge of the construction work now going on at Waltonville.

Francis Lewis, mine manager for Mine No. 7 of the Consolidated Coal Co., Herrin, has been appointed superintendent of the Illinois Coal & Coke Co.'s mine at Virden, and will take charge at once.

Bids will be received and opened on Sept. 25 by the commanding officer of the U. S. Quartermaster Department at Chicago for furnishing and delivering 2,000 net tons of run-of-mine bituminous coal to Fort Sheridan, deliveries to be made in carload lots. Alternate bids for furnishing the same quantity of semi-anthracite, lump and run-of-mine also will be accepted and considered. Bids also will be received for furnishing and delivering 1,216 net tons of bituminous run-of-mine coal to the Fairfield Air Intermediate Depot at Osborn, Ohio.

INDIANA

Activities which are expected to result in a new coal mine for Hymera, in the northwestern part of Sullivan County, are well under way. The United Fourth Vein Coal Co. has ordered abstracts on the Ed. Vanarsdall farm near Hymera and officials of the company have informed Vanarsdall that they will exercise their option to buy his farm, both coal right and surface land. The Vanarsdall farm lies in the center of a 1,000-acre tract, near Hymera, that has been under option for several years. The coal has been thoroughly tested and is reported to be of fine quality in veins Nos. 5, 3, 2 and 1.

The Southwestern Indiana Coal Corporation, Evansville, has been incorporated with a capital of \$200,000 to mine and deal in coal. The directors of the company are William F. Quarrie, Frederick E. Reeve, Tom J. Phillips, Loris G. Julian and L. C. Oliver.

Announcement has been made of the election of C. C. Huestis as president of the newly reorganized Crawford & McCrimmon Manufacturing Co., of Brazil. Mr. Huestis will continue to make his home in Greencastle. The new industry which Mr. Huestis heads is one manufacturing mining machinery and special machines of various kinds and is one of the big concerns of the city of Brazil.

KANSAS

Several weeks of negotiations between the Southwestern Interstate Coal Operators' Association and District 14, United Mine Workers of America, for a machine mining contract for the Pleasanton field, which includes Linn County, Kansas, and Bates County, Missouri, terminated when the joint committee refused to ratify the report of a sub-committee which had agreed on a scale. Since then President William Bogartz of the Mine Workers has been publishing in newspapers in the district a warning against union miners going to the Pleasanton field. He asserts the mines are closed pending a contract. Efforts to make a machine scale for the entire district several weeks ago ended in failure.

The City of Burlingame has sold to the Bell Coal Co. the local steam power house. This will furnish power to the Fostoria mine and to the mine of the Miller Coal Co. The old power plant of the Bell Coal Co. has been sold to the Standard Coal Co., of Scranton, Kan. All mines will install electric machines. Operators in Osage County are organized to create and hold markets for their coal and among plans are some for joint retail yards in Topeka and other Kansas towns.

KENTUCKY

The trial of the suit of Thomas C. Fuller, of Lexington, against Stuyvesant Peabody, trustee, involving the 140,000 acres of coal and timber land in Clay, Harlan, Leslie, Letcher, Perry and Bell counties, purchased by Henry Ford from the F. S. Peabody Syndicate, is on the equity docket of the September term of the U. S. District Court, Eastern Division, which will convene in Frankfort Sept. 24 with Federal Judge Cochran presiding. Fuller, in his bill of complaint against the syndicate, alleged that the land sold to Ford is worth no less than \$15,000,000, and that the syndicate has contracted with the Fordson Company for a sale of the property for \$12,500,000 or \$2,500,000 less than its real value. He contended that he is the owner of a one-tenth interest in the property and that the syndicate is indebted to him in the sum of \$105,000, the amount being money which he put up to finance the project. Fuller seeks a receiver for the F. S. Peabody Syndicate and for a restraining order to prohibit the sale of the land to Ford until his rights and interests are determined by the court.

Lonnie Jackson, Mayor of Central City and president of District 23, United Mine Workers, who recently announced that no members of his organization could join the Ku Klux Klan without being fired from the miners' body, has been upheld by the city council of Central City, which has banned Klan meetings in the city.

The Kentucky Farm Bureau Secretaries Association, in convention in Louisville, went on record as favoring a coal tonnage tax on production, arguing for such a tax to be used for educational work in the state.

The Denmark Coal Co., of Madisonville, with a capital of \$20,000, has been chartered by Wayne Plymal, James C. Hurt and Robert P. Cox.

MASSACHUSETTS

Directors of the Island Creek Coal Co. on Sept. 11 declared an extra dividend of \$2 a share on the capital common stock, in addition to the regular quarterly disbursement of the same amount. The regular quarterly dividend of \$1.50 a share also was declared on the preferred stock. All dividends are payable Oct. 1 to stockholders of record Sept. 21. Three months ago the company paid an extra dividend of \$3 a share on the common stock. The company

produced 302,000 tons of coal in August. This compares with 277,000 tons in July and is the largest month's output since June, 1922. Output for the present year up to Sept. 1 is now about 1,230,000 tons. The following shows the rising trend of output figures during the past few months (in tons): April, 206,431; May, 224,978; June, 220,898; July, 277,000; August, 302,000.

MARYLAND

H. A. Cochran, recently promoted to the position of coal traffic manager of the Baltimore & Ohio R.R., with offices at Baltimore.



H. A. COCHRAN

has had long experience in railroading and is one of this country's experts on coal traffic. He served in an advisory capacity to Federal Fuel Administrator Garfield during the war.

MINNESOTA

Renewed interest in the possibilities of peat for fuel has been stimulated by the high coal cost. Tests have been made in Minneapolis as to what can be done with peat, but as yet the handicap has been the difficulty of drying and pressing into compact form.

Government figures on foods and fuel indicate that the Twin Cities are under the average large cities on food costs by 71c., but on hard coal the Twin Cities are \$2.40 higher than eight average large cities and on soft coal they are \$2.90 higher.

NEW YORK

Bids will be received and opened on Sept. 21 by the Quartermaster's Department, U. S. Army, First Avenue and 59th Street, Brooklyn, for furnishing and delivering in carload lots to various posts, camps and stations in Maryland and Virginia 13,255 net tons of 2-in. lump bituminous coal, and 1,537 net tons of mine-run bituminous coal to be delivered and trimmed in bunkers of government vessels at Norfolk. The coal is to be delivered during the period Oct. 1, 1923, to June 30, 1924.

The Parliament of Community Councils of New York City in resolutions has urged action by Governor Smith and special sessions of Congress and Legislature to pass legislation that will preclude prohibitive coal prices next winter, according to Jabez E. Dunningham, executive secretary. The resolutions ask that a special session of Congress be called for the purpose of enacting such legislation as either will regulate the proper mining of coal and its distribution at fair and reasonable prices, or that the Government of the United States take over such mines and operate the same for the public welfare.

Thomas F. Kelly, of Buffalo, has been appointed manager of the Smelters' General Briquette Corporation of New York City, specializing in the manufacture of briquets for smelting purposes — notably from iron flue dust. The new corporation has been organized to succeed the metallurgical department of the General Briquetting Co. Ellsworth B. A. Zwayer, of Perth Amboy, N. J., has been appointed manager of the General Fuel Briquette Corporation organized to succeed the fuel department of the General Briquetting Co.

The Montour Coal & Coke Co., Buffalo, controlled by the Milnes Coal Co., of Toronto, has discontinued business and the

books and accounts have been shipped to the parent office. John Adema, who was vice-president and manager of the Montour company, has engaged with the Barnett Coal & Coke Corporation as salesman.

The Board of Directors of the **Lehigh Valley Coal Sales Co.** have declared a dividend of \$2 per share, payable Oct. 1, 1923, to those stockholders of the company who are holders of full-share certificates of stock, registered on the company's books at the close of business Sept. 13, 1923.

The **Maier Collieries Co.**, an Ohio corporation, with capital of \$900,000, has filed its certificate of incorporation in the office of the Secretary of State at Albany and will enter New York State. H. S. Gould, of 37 Wall Street, New York City, is agent for the corporation.

Walter L. Banta has become vice president of the **Seeger Coal Co.**, New York City. Mr. Banta formerly was secretary and treasurer of the Fairbanks Co.

PENNSYLVANIA

The **Candlemas Coal Co.**, which recently took over the abandoned anthracite workings formerly operated by J. S. Wentz & Co., at Silverbrook, has announced that plans are under way for the erection of 20 blocks of houses at that place. The work is to be started soon. Silverbrook has been an abandoned mining village since 1907.

The State Bureau of Securities has issued final closing orders against the firm of **Evans, Sprague & Sturges**, promoters of the Chicago & Western Coal Products Corporation, Pittsburgh, and other firms in Allentown and Philadelphia, charging that the firm's advertising is misleading.

John L. Lewis, international president of the United Mine Workers, announced that a contribution of \$3,000 has been made to the Japanese Relief Fund by that organization.

By exploding a charge of dynamite in his month, **Peter Gallagher**, inside electrical hoisting engineer at the Cranberry Creek Coal Co., Hazleton, ended his life on Aug. 29. Worried due to differences between himself and the local union of the United Mine Workers to which he belonged, it is said, was the cause of the suicide. Mr. Gallagher resided at West Hazleton.

A state charter has been issued at Harrisburg to the **Horatio Coal Mining Co.**, Punxsutawney. Its purpose is mining, shipping and preparing coal for the market. The company's capital stock is \$25,000 and the incorporators are A. King Yost, Punxsutawney, treasurer; Peter C. Cameron and Glenn M. Cameron, Philadelphia.

The **Wilbur Coal Mining Co.**, the **Kniekerbocker Smokeless Coal Co.** and the **Somerser Mining Co.** have entered into a merger, the new company being known as the **Wilbur Coal Mining Co.**, according to papers filed at the State Department at Harrisburg. The central office of the company is at Johnstown and the capital stock is \$1,171,666.67. F. M. Graff, Blairsville, is the treasurer. The purpose of the company is mining and preparing bituminous coal for the market.

A law to compel operators and distributors marketing substitutes for anthracite entering interstate commerce to declare on their invoices exactly what these substitutes may be, so that the public may not be defrauded into paying the price of first class fuel, will be the object of a bill that will be introduced in Congress when it convenes by Congressman J. Banks Kurtz, of Altoona. If Congress favorably considers the proposition the public will be given the same protection when buying coal that is now accorded it when it buys articles of food, declares Congressman Kurtz.

The **West Penn Power Co.** recently purchased eight Westinghouse new model multiple retort underfeed stokers for its Springdale plant. They will be driven by eight two-speed three-phase motors complete with slide rails and controllers. Sixteen three-phase squirrel cage rotor motors also have been ordered to drive the rolls on the rotary ash discharge devices. These motors are actually capable of developing two maximum and two minimum speeds, giving a four to one speed ratio through two sets of poles, the stoker motors having six and twelve poles respectively and the grinder motors having six and eighteen poles respectively.

Workmen in the act of making excavations for a new building to be erected by Jacob Alinkoff, at Wilkes-Barre, ran into an outcrop of most valuable coal. Between 20 and 30 tons have already been mined. According to an old miner on the scene of the find, the coal is an outcrop of the Hillman vein of the Lehigh & Wilkes-Barre Coal Co. The vein is reported to be between 2 and 5 feet in thickness and of the finest grade of anthracite. Who will own the

coal is not known at present because it has not been determined whether the Michael Holton estate, from which Mr. Alinkoff bought the property, or the coal company has the mineral rights.

TENNESSEE

C. E. Klinger, of Pottsville, Pa., has purchased several large coal-lease rights near Chattanooga, and has announced plans of producing 2,000 tons per day of coal from his properties.

VIRGINIA

The **Clinch River Coal Corporation** of Virginia recently purchased the properties of the **Odle Coal Corporation** at Coeburn, on the Pocahontas Division of the Norfolk & Western Ry. The properties consist of 634 acres containing the Widow Kennedy and Banner seams. Production, particularly of domestic sizes, will be considerably increased.

Organized in October, 1921, with a capital stock of \$300,000 the **Glen Burke Coal Corporation** will soon begin operations on an extensive scale a few miles northwest of Richlands. Six mines have been opened with a view to mining a very high grade of coal, the coal to be loaded over a tippie equipped with shaker screens and provided with four loading tracks. It is stated that the tippie will have a capacity of 500 tons an hour. In addition to the usual plant buildings twenty-seven mining houses have already been constructed. Officers of the company are Lewis C. McNeer of Dante, president; Thomas T. McNeer, of Dante, vice-president; A. S. McNeer, of Richlands, assistant to the president; J. M. Rasnick, Richlands, secretary-treasurer; Frank R. Clark, Clinchco, general manager.

WEST VIRGINIA

The coal industry of West Virginia will be well represented at the annual meeting of the National Tax Association to be held at White Sulphur Springs, Sept. 24-28, if all the coal men designated by Governor E. F. Morgan of West Virginia as representatives of the state attend. Among those named by the Governor were the following: Joe L. Smith and T. H. Wickham, of the Winding Gulf field; Colonel Z. T. Vinson, of Huntington; W. M. Wiley, of Sharples, general manager of the Boone County Coal Corporation; J. C. Pack, of Bramwell; S. A. Scott, general manager of the New River company; Dr. Gory Hogg, of Harvey; John Laing, of the Wyatt Coal Co., and G. H. Caperton, of the South Side Coal Co., of Charleston; J. J. Lincoln, of Elkhorn; Edward O'Toole, general manager of the United States Coal & Coke Co., of Gary.

An attempt was made early in September to burn down the tippie and conveyor of the **Sunbeam Coal Co.** at Fort Branch in the Logan County field. The fire was discovered by Thomas T. Perry, mine foreman, who extinguished the blaze without assistance and saved the property from destruction. An examination of the origin of the blaze showed unmistakably that it was the work of firebugs bent on destroying the structure. Within 24 hours another attempt was made to destroy the property, the night watchman seeing a man enter the conveyor system. A search failed to reveal the presence of the intruder and he is believed to have fled before the property could be surrounded.

Albert O'Neal, of Pax, who has been connected with the Packs Branch Coal Co. at Pax, has resigned his position with that company to become superintendent of the **Ingram Branch Coal Co.** at Ingram Branch.

In finally prevailing upon 450 striking coal miners at the Barrackville, W. Va. mine of the Bethlehem Mines Corporation to return to work, officials of the United Mine Workers not only do not condone the strike but have stated semi-officially that the strike was the result of underhand work on the part of the **Howatt-Hamilton** element opposed to John L. Lewis.

R. E. Taggart, who has been in charge of the mines of the Stonega Coal & Coke Co. at Big Stone Gap, Va., as general manager, has been appointed as general manager of the properties of the **New River Collieries Co.** recently taken over by the Wentz interests, of Philadelphia. This company operates mines at Eccles and Sun, and the understanding is that Mr. Taggart will make his headquarters at Eccles.

George Morrow, one of the leading coal operators of the Kanawha field and one of those largely interested in the Hazy Eagle Collieries Co., which he organized, died at his apartments in the Peyton Building, Charleston, on Sept. 8 as the result of self-inflicted bullet wounds. Ill health and business worries are thought to have been responsible for his act, as he had been in

a despondent condition for some time. His business troubles, however, friends think, were more fancied than real. George Morrow established his home in Charleston about six years ago, at which time he organized the Hazy Eagle Collieries Co. operating on the Coal River branch of the Chesapeake & Ohio R.R. From that venture he is said to have received large returns. Before organizing the Hazy Eagle company, Mr. Morrow had been a salesman for the Pittsburgh Gage & Supply Co. in the Kanawha and New River fields. Mr. Morrow's former home was at Weirton, in Hancock County, where he has an aunt and other relatives. His body was taken there for burial.

As a result of the special convention of the miners of District 17 held at Charleston early in September following an agitation growing out of the last miners' election, an amendment has been adopted to the constitution of the district providing for the recall of officers under certain conditions. The convention also directed the executive board of the district to hold a new election for vice-president. That was the office to which R. M. Williams, who was the instigator of the movement for a special convention, aspired, but he was ruled off the ballot by the executive board, William Petry being elected vice-president. Under the terms of the new amendment a petition of only 10 per cent of the membership will be required to call for the circulation of a recall election and it will require only 30 per cent of the membership to demand such an election. The district executive board reversed its decision removing the name of Williams from the ballot and was sustained by the convention. It is stated that a new election will be held as soon as possible.

WASHINGTON

Roslyn coal mines were awarded several large contracts when the State Department of Business Control Aug. 30 bought its coal for the various state institutions. The Roslyn Fuel Co. was awarded three contracts, as follows: 5,000 tons at \$6.95, to Eastern State Hospital, Medical Lake; 1,500 tons at \$5.04, Ellensburg Normal School; 1,500 tons at \$6.50, Cheney Normal. The Roslyn Cascade Coal Co. was awarded the following contracts: 3,000 tons at \$6.95, Custodial School, Medical Lake; 5,900 tons at \$7.40, Washington State College.

WISCONSIN

The Wisconsin department of markets has issued a warning advising all people of the state to be careful in placing coal orders to avoid obtaining low-quality fuel. The action of the department was caused by the activities in the state of so-called "snow birds" who buy up coal at bargain prices, irrespective of grade or quality, and ship it to some unsuspecting agent or representative who has been induced to tie up with the proposition. Milwaukee, Fond du Lac, Madison, Racine, Janesville and many other cities have been flooded with literature of these scoundrels.

WASHINGTON, D. C.

The Membership Committee of the National Coal Association for the coming year is as follows: Walter Barnum (Chairman), treasurer, Pacific Coast Co., New York; George S. Brackett, executive vice-president, Northern West Virginia Coal Operators Association, Fairmont, W. Va.; E. R. Clayton, secretary, Harlan County Coal Operators Association, Harlan, Ky.; Ira Clemens, president, Clemens Coal Co., Pittsburgh, Kan.; L. C. Crewe, president, LaFollette Coal & Iron Co., LaFollette, Tenn.; George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago; W. L. A. Johnson, general commissioner, Southwestern Interstate Coal Operators Association, Kansas City, Mo.; D. C. Kennedy, secretary, Kanawha Coal Operators Association, Charleston, W. Va.; F. S. Love, general manager, Union Collieries, Pittsburgh, Pa.; W. F. Megeath, president, Roundup Coal Mining Co., Omaha, Neb.; C. J. Neekamp, secretary, Northeast Kentucky Coal Association, Ashland, Ky.; R. M. Randall, general manager, Consolidate Coal Co. of Saginaw, Saginaw, Mich.; W. J. Sampson, president, Witch Hazel Coal Co., Youngstown Ohio; H. N. Taylor, president, U. S. Distributing Corporation, New York; Jonas Waffle, secretary, Indiana Coal Traffic Bureau, Terre Haute; D. B. Wentz, president, Stonega Coke & Coal Co., Philadelphia.

CANADA

By an order of Justice D. A. McDonald, in the Supreme Court of British Columbia,

the Fleming Coal Co. has been declared bankrupt. The order was not opposed by the defendant's counsel. The company owns a property in the Middlesboro field, near Merriitt, and for some time has been developing a 6-ft. seam of coal, which, however, has two persistent rocky partings, making operations difficult and costly. Last year the mine produced a little less than 40,000 tons of coal.

The recent appointment of Thomas Graham to the position of general manager of the Canadian Collieries (D) Ltd., in place of J. M. Savage, deceased, has created a very favorable impression in coal-mining centers on Vancouver Island and among business men throughout the province. The same may be said of the announcement of the elevation of Charles Graham, a brother, to the post of general superintendent, formerly held by Thomas Graham.

After a conference between C. A. McGrath and J. A. Ellis, federal and provincial fuel controllers, and Premier Ferguson and Charles McCrea, Minister of Mines, at Toronto recently, relative to Ontario's fuel supply for the coming winter, Premier Ferguson announced that arrangements are being made to have municipalities appoint local fuel controllers for the purpose of regulating the distribution of anthracite and fixing the price per ton locally. This latter action is necessitated, said the Premier, by reason of the difficulty of a central fuel controller fixing prices for outlying places with the transportation conditions and other exigencies of which he may not be familiar. Local municipal fuel controllers will have power to fix prices through having authority delegated to them from the provincial fuel controller.

John L. Lewis, president of the United Mine Workers, has notified the members of local unions and members of the organization in Nova Scotia that they must recognize the provisional officers and pay into the treasury their per capita tax. Silby Barrett is the president of the provisional district and Lewis McCormick is secretary-treasurer. Since the old board of executive officers were deposed, it is stated, several of the locals have refused to pay to Mr. McCormick the monthly per capita tax. The Dominion Coal Co. is making preparations to start work on a new colliery at Langan Bay. The shaft will be about 1,000 ft. deep and will be equipped with the latest machinery and working appliances. Workmen are already engaged in constructing a branch road from the main railway near by.

Obituary

C. W. Steward, a pioneer retail fuel dealer of Minneapolis, died recently, after a residence of 52 years in the city.

Henry G. Williams, former general manager of the Utah Fuel Co., Salt Lake City, is dead at Los Angeles. Mr. Williams was in his 70th year. He left Salt Lake City two years ago. He served the company in an advisory capacity until last year. He was regarded as one of the leading coal-mining engineers in the West.

Percy L. Dubois, for many years a director in the Consolidated Coal Co. of St. Louis and auditor of that company, died at the Barnes Hospital in St. Louis, Sept. 1, after an illness of several months. Practically all of his life he was connected with the Consolidated Coal Company's interests. He leaves a widow and was a member of many of the country clubs and ranked high in Masonic circles.

James Ewan Robertson, senior partner of James E. Robertson & Co., El Paso, Texas, died suddenly at his home Aug. 5. Mr. Robertson was a son of Major James E. Robertson of Appomattox County, Virginia, who served four years in the 20th Virginia battalion of heavy artillery in the Confederacy. His mother was a descendant of Lord Delaware and Governor Spotswood, one of the Colonial governors of Virginia. About twenty years ago Mr. Robertson went to El Paso, where he was connected with the El Paso Smelter, later entering business for himself. At the time of his death he was one of the most widely known men interested in mining in Mexico, California and the Southwest. Mr. Robertson is survived by his widow, two sons, James E., Jr., of Los Angeles, Calif., and Dave W., with the New York office of the H. H. Robertson Co., which his father also represented, and one daughter, Mrs. Alice Summerill, of El Paso. The business which Mr. Robertson established will be carried on by his partner, Francis Wagner, of El Paso.

Publications Received

Coal Age is prepared to present to many of its readers a copy of a bound volume of "Legal Decisions Affecting Coal and Coke," prepared and compiled by Arthur L. H. Street, of the Minnesota Bar, and reprinted from *Coal Age*. This is a valuable book of 128 pages and should be on the desk of every coal man. It can be obtained by sending 25c. to cover the cost of mailing.

Traffic News

The Minnesota State Railroad and Warehouse Commission has applied to the I. C. C. to intervene in the hearing on users of anthracite coal from all over the country. The attitude of the Minnesota board is not determined but will be governed by the evidence. The board will seek to prevent any increase of freight rates, and if possible, will seek to secure reductions.

Anderson (Ind.) retail coal dealers have filed a complaint with the Interstate Commerce Commission through the Indiana Coal Merchants' Service Bureau, asking a reduction in freight rates from the West Virginia and Kentucky coal fields. It is said that many points in Illinois and Ohio have considerably lower rates on coal from West Virginia and Kentucky than Anderson.

The Norfolk & Western R.R. has made application to the Interstate Commerce Commission for authority to acquire control of the Big Sandy and Cumberland R.R. and other short lines of road in the vicinity of Devon, W. Va. The Norfolk & Western has agreed to pay approximately \$600,000 for the new property, which is held by the W. M. Ritter Lumber Co.

Officials of the Louisville & Nashville R.R. have announced that the State of Georgia has withdrawn objections filed against the road taking over a 999-year lease on the Carolina, Clinchfield & Ohio R.R., and the only protests now are those of the Seaboard Airline and one or two small roads, which have filed protest before the Interstate Commerce Commission. The latter protests are merely to protect business in hand, and are not likely to be seriously considered, whereas the proposed connection between the L. & N. and the C. C. & O. will be of vast advantage to the L. & N. and Atlantic Coast Line.

In the matter of New Mexico Ry. vs. Atchison, Topeka & Santa Fe Ry.—Docket No. 13755—the Interstate Commerce Commission upheld the report of the examiner and dismissed the complaint. The complainant prayed that the defendant be ordered to turn over its company coal to the complainant for transportation from Kennedy to Willard, N. M., at a charge to be prescribed, and that through rates and joint rates and reasonable and equitable divisions of such joint rates be established on commercial coal from points on the defendant's line in the Raton district, N. M., via complainant's line to points on defendant's line in eastern New Mexico and Texas. It was found, however, that the commission is without power to require the transportation of defendant's company coal by complainant and that the existing through route for commercial coal over defendant's line is not unreasonably long as compared with a route via complainant's line.

Approximately sixty companies, including railroad, steel, iron, coke, glass and others, have petitioned the commission for a rehearing of the case, the majority of them declaring they did not have an opportunity to present important evidence at hearings held prior to the commission's ruling that the assigned car rule should be abolished. It is understood that one of the principal reasons for the latest further postponement of the effective date of the order is that the commission desires to have its full membership act upon the many petitions for a rehearing of the case, and as a number of the commissioners will not return until after Oct. 1, this would be impossible unless the date was extended.

Civic bodies of St. Paul, Duluth and Minneapolis have filed a protest with the I. C. C. against the proposed 11c. reduction on coal from the docks to the Twin Cities, and suggest a rate of \$1.50. The protest states that the carriers had about decided on a voluntary rate of this amount several years ago, when the commission's distance schedule allowed the present rate of \$1.82, which was put in. They refer to a rate of \$1.70 proposed by the State Railroad and Warehouse Commission on northbound shipments

as intended to be a maximum rate to protect isolated communities from excessive rates and was not intended to govern the heavy tonnage moving from the docks to the Twin Cities, which is claimed to be immensely profitable—unreasonably so. There should be a final ruling from the I. C. C. on the complaint of the dock association as to the relative rates on coal from the docks and from the all-rail fields. The hearing was held last May, and the arguments made in June. The examiner's report was made a month or so ago, and the decision should be coming along soon.

Railroads of the United States, according to the Car Service Division of the American Railway Association, loaded more cars with revenue freight during the week which ended on Sept. 1 than during any week heretofore in history. The total for the week was 1,032,567 cars, which exceeded by 22,635 cars the previous record, established during the week ended Aug. 25. Despite the fact that the loading of revenue freight for the week of Sept. 1 was the greatest in the history of the nation, the railroads on that date had 66,559 surplus freight cars in good repair and immediately available for service if necessary, while the reported car shortage was only 9,441 cars for the entire country. This is the twelfth week this year the million car loading mark has been exceeded, and in eight of the twelve weeks the total has exceeded the record established during the week of Oct. 14, 1920, when 1,018,539 cars were loaded.

Coal loading during the week of Sept. 1 was 206,610 cars, 3,534 cars above the week before. This also was an increase of 57,383 cars over the corresponding week last year and an increase of 52,024 cars over the corresponding week in 1921. Coke loading totaled 13,970 cars, an increase of 457 over the previous week. This also was an increase of 5,587 cars over the corresponding week in 1922 and an increase of 9,238 cars over the corresponding week in 1921. Loading of revenue freight this year to date totals 33,161,743 cars compared with 27,607,701 in the corresponding period of 1922 and 25,754,571 during a similar period two years ago.

Readjustment of freight rates was discussed by representatives of the agricultural, manufacturing, labor, mercantile, banking and transportation interests constituting the Rates Committee designated by the Chamber of Commerce of the United States, at a meeting Sept. 12 in the board room of the Chamber in Washington. The rate question was approached by the committee as one of readjustment rather than reduction. Whether certain rates, such as those on light and bulky freight made up usually of manufactured products moving in less than carload lots, are not too high in relation to rates on heavy commodities such as wheat and coal, forms the chief topic of the report which will be submitted to Julius H. Barnes, president of the National Chamber. With the reports of the four other committees on Regulation, Consolidation, Waterways and Motor Transport, it will constitute the basis of discussion for the forthcoming general conference on transportation.

Coming Meetings

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the National Exposition of Mines and Mining Equipment, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee. Secretary, J. F. Callbreath, Washington.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

Fifth annual general Western meeting, Canadian Institute of Mining and Metallurgy, Oct. 3-5, at Estevan, Saskatchewan, Canada. Secretary, G. C. Mackenzie, Drummond Building, Montreal, Que., Canada.

American Gas Association, annual meeting Oct. 15-19, Atlantic City, N. J. Secretary-Manager, Oscar H. Fogg, 342 Madison Ave., New York City.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, SEPTEMBER 27, 1923

Number 13

The Coal Commission's Legacy

A YEAR AGO the people of this country and the coal industry, both labor and capital, entered into what was essentially voluntary arbitration without binding award of a perplexing matter, the coal question. None was satisfied with the way the coal business was being conducted. The public thought the price too high and the supply too often short. The coal men were suspected of being robbers and profiteers.

The miners were as unsettled as the Balkans, perennially striking or threatening strikes. The operators were writhing under a crossfire of congressional investigation, popular denunciation and perpetual trouble with labor. There was no peace in coal.

A commission was proposed to investigate, get all the facts and tell the country the truth about coal. The operators urged it upon the President; the miners said they only wanted the facts made known. The public hailed the idea with delight. A United States Coal Commission was authorized by Congress, its personnel was selected by President Harding. It has now run its allotted course, spent its time and money and reported its findings.

No party to the proceedings is going to be wholly satisfied with the results. In fact the first reaction is certain to be positive dissatisfaction on all sides. This is a point distinctly in favor of the Commission's work. A report that pleased one party only could not have been conclusive or fair. Unanimous findings imply concessions. Imagine the banality of a report on which J. G. Bradley and John L. Lewis as members of a commission could come to unanimity of conclusion!

The great majority of the public, whose knowledge of coal is confined to newspaper headlines and check-book stubs, is going to be most woefully disappointed. The anthracite consumer is told that the fundamental evil in the anthracite industry is that of monopoly; that the one remedy short of price fixing or government ownership, which the Commission does not recommend, is through taxation, taking back to the public treasury in proportion as the profits are large or small, but without cutting the price of coal.

It is repeatedly driven home that the public must know more about this great industry and be guided by facts rather than by rumors and prejudice. It is plainly stated that for lower prices for hard coal the consumer must look to himself. "There are substitutes for hard coal and a readiness to resort to them is the ultimate and effective defense against an unreasonable price." This is the soundest kind of economic reasoning. It is true and being true it absolutely belies the previous statement that the anthracite industry is fundamentally a monopoly.

The Commission pays tribute to the economic organization of the anthracite industry by planning measures that will bring the soft-coal industry to the same state

of compactness, large units, regularity of operation, and natural division of markets. So "desirable" is this state of absence of overdevelopment and of irregularity of operation that the Commission is not content to facilitate natural processes to bring soft coal to that happy state but urges artificial measures, as licensing of interstate coal traffic and "granting and withholding of transportation service through supervision."

Senator Frelinghuysen's "fact finding" under the alias of "Publicity of Accounts" is offered by the Commission as a panacea for the ills of the whole coal industry. Much, but by no means all, that is claimed for current publicity of facts about coal can reasonably be expected. Certain as it is that there can be no solution of the coal question from any quarter or by any means without full knowledge of the facts, it is idle and indeed futile to expect the facts unaided to carry to the proper conclusion. The industry itself will profit most from "permanent and co-ordinated" fact finding and quite properly has given its prior acquiescence to the program. It may be pardoned, however, if it holds its nose while swallowing the nostrum that already, in the conclusions of the Coal Commission, gives off the odor of permanent regulation.

Of course coal mining is an indispensable service. Every point the Commission makes to establish this contention is sound. It is an economic fact that almost goes with the saying. There is a vast difference, however, between the economic fact of an indispensable service and the legal fact of a public utility. The line of reasoning by which the Coal Commission would put coal under regulation by the Interstate Commerce Commission will put a long line of industries in this country in the same position.

What the Commission terms its final report is but a partial summary of its work. It is mainly concerned with the question of publicity and the future regulation of the industry. The document is significant for the subjects that it does not cover or but mentions in passing. These are matters relating to labor. Throughout the body of its reports the Commission recognizes large scale strikes as the fundamental cause of coal shortages and high prices, but it nowhere treats of the fact of the labor union as an economic force. The Commission sees the labor question only as a negotiator. It has passed by the bigger question.

There are immense possibilities for good to come from the tremendous work of the Coal Commission and that good can come only as the government and the consumer, but first of all the operator and union, build on the groundwork of facts, which after all is its principal legacy. Though the conclusions and recommendations of this Commission are not binding they are certain to bear heavily on the future of the coal industry.

Hammond and His Associates End Year's Labors; Completed Report Comprises 800,000 Words

The United States Coal Commission, appointed Oct. 10, 1922, by President Harding, expired by limitation on Sept. 22, 1923, one year from the effective date of the act which created it.

The Commission held practically no formal hearings and save in the one instance of the Washington (D. C.) retail dealers took no formal record. Members of the Commission made one visit to the soft-coal fields, in Alabama, and one trip through the anthracite region. The Commission was in more or less continuous session in Washington for eleven months. It took an active part in the negotiations between the bituminous-coal operators and the union miners that led to the signing of the present contract, and it was the means of bringing the hard-coal operators and miners together after their deadlock in August.

The reports of the Coal Commission include the preliminary report of Jan. 15 and the report of July 5 on the Anthracite Industry, together with the accompanying reports on Earnings of Anthracite Miners; Labor Relations in the Anthracite Industry; Cost of Production of Anthracite; Revision of Wage Structure; and Investment and Profits in the Anthracite Industry.

During the present month, the report on the Bituminous Coal Industry has been prepared for issue in separate chapters as follows:

Civil Liberties;

Effect of Irregular Operation on the Unit Cost of Production;

Labor Relations, both as a summary of recommendations and as a full discussion;

Relief from Irregular Operation and Overdevelopment;

Safety in Bituminous Coal Mining;

Waste of Coal;

Earnings;

Wage Rates;

Labor Turnover;

Description of Mining Population;

Costs of Living;

Living Conditions;

Engineering and Management;

Wholesale and Retail Coal Trade;

Storage and Fuel Economy;

Purchase of Coal on Contracts;

Cost of Production;

Investment and Profits in the Bituminous Industry.

Appendices on these and other subjects resulting from the Commission's study will be later transmitted to the Congress.

The completed report of the Commission will comprise something over 800,000 words, equivalent to eight standard books. These reports are being issued now in part only and in mimeograph form, as the Commission had no funds for printing. It is expected that Congress will later order the reports printed in full.

The Commission had an appropriation totaling \$600,000, of which all but about \$20,000 was spent. Its office and field force at one time numbered nearly 500.



United States Coal Commission

Left to right—E. E. Hunt, (Secretary), C. P. Neil, E. T. Devine, John Hays Hammond (Chairman), Thomas Riley Marshall, Clark Howell and George Otis Smith

Final Report of U. S. Coal Commission

Conclusions and Recommendations Summarized for Government, Industry and Consumer

Federal Regulation Urged to Stabilize Industry and Protect Public—Broad Program for Economic Reorganization of Bituminous Industry Laid Down—Use of Substitutes Only Remedy for High Price of Anthracite

IN RENDERING its final report the United States Coal Commission reiterates the premises stated in its earlier reports: The coal-mining industry is not only one of the largest in our country but its uninterrupted service is essential to the well-being of the whole people; the condition of this key industry affects directly and in large measure the prosperity of all American industry; the large public interest in coal raises fundamental questions touching the relation of private right to public welfare; but underlying these questions in economics and law are the issues of peace in the industry and justice to the individual—issues that strike deep into the heart of American institutions.

An unfailing supply of coal at the lowest prices consistent with just returns to mine workers and mine owners is what the public needs and can rightfully demand of the coal industry. It was to find the major facts throwing light upon this complex problem that this commission was created. At the close of its investigations, extensive in scope but limited in time, the Commission has presented its findings in a series of chapters and there remains the task of briefly stating the underlying purpose of the inquiry and of summarizing the specific recommendations based upon the results of the inquiry.

Coal Mining an Indispensable Service.—Food and water alone outrank coal among the necessities of life. An uninterrupted supply of these three is a requirement of urban life as we know it today. Though anthracite ministers to health and comfort in several million homes, bituminous coal is the real foundation of the great industrial and transportation structure which enables more than a hundred million people to live in America and be so well supplied with all those things necessary for their health, comfort and convenience, and bituminous coal also furnishes domestic fuel for two-thirds of the homes of the land. Therefore the mining of coal in 29 states, its interstate transportation, and its country-wide distribution together make up a service indispensable to the general public. Shut down its coal mines and the whole country would soon be not only cold but idle and hungry.

Examine the long list of commodities whose current prices are used in computing the official index of the cost of living: Of the forty-three articles of food, from meat to fruit, the only ones into the production of which coal does not directly enter are "strictly fresh" eggs and fresh milk, and even those reach the market behind the steam-driven locomotive. The Western and Southern fruit that appears on the Eastern breakfast table costs its weight in coal in the form of ice or locomotive fuel. Next in the list come articles of clothing, furniture, and household utensils, every one of

which was manufactured by the use of coal-generated power.

Under the heading of fuel and light, only wood and kerosene, which enter into few family budgets of today, are free from a content of coal. And even the large item of rent, which next follows, represents expenditure of coal in the past, for from the moment the steam-shovel starts the excavation until the last coat of paint is applied coal is an essential component in the construction of a modern building, each structural material, whether steel or brick, cement or glass, being largely the product of coal burned at furnace, kiln or factory; the brick and cement on which rent is paid represents one-quarter to one-half their weight in coal, while every ton of metal has cost two, three or even five tons of coal. Although appearing but once in this long list of the necessities and luxuries of life coal is thus an ever-present element in the cost of living.

Or, if you will, review the everyday experiences of the average citizen: His day may begin with the pressing of a button, when coal acting through the electric light leaps to his service; or it may be coal in the form of gas that furnishes the light as well as cooks his breakfast. Coal next serves him in the power supplied for his ride to his place of work, where a power-driven machine is his helper throughout the day; or if his work is at a desk he is taken to his floor in the office building by elevator—a transportation service that in New York City alone consumes a quarter of a million tons of coal a year. Whatever the nature of his day's task, it is difficult to imagine the city worker who is not served every hour by coal manifest as light, heat or power. In the home equipped with modern conveniences this continuous and silent service rendered by coal in the form of gas and electric current is so great that in a year it may involve the expenditure of as many tons of bituminous coal at the distant gas plant and power station as there are tons of anthracite burned in the home itself. It is this unseen coal whose indispensable service is so unappreciated, if not wholly overlooked.

On the farm also the contribution of coal to daily life is great. The story of wheat is a story of coal. Every article of farm machinery, which makes farm labor so effective, represents the expenditure of coal at steel plant and factory; coal also in the form of nitrogen fertilizer, from the coke ovens, now reaches the farm to the amount of hundreds of thousands of tons a year; and the coal supply required at harvest time to drive the threshing machinery in the great wheat region is so large as to warrant a strong claim for special priority in times of coal shortage. The movement of this country's crops to market is on a scale so large that it could be accomplished by no other conceivable form of transport than coal-driven railroads. And at

COAL MINING AN INDISPENSABLE SERVICE

Coal enters into the cost of all commodities figured in the official index of cost of living, save eggs and milk. Dependence upon coal is country-wide and all embracing. Coal is affected with a public interest arising from the clear and direct obligation to the public of continuous production, transporta-

tion, and distribution. The indispensable service which the coal mine performs gives a large social value which in effect grants to the public an interest in that use and creates a compelling reason for public control. The Commission notes that here it is passing upon an economic fact and not the law.

the flouring mill, coal continues the work of preparing the wheat for use, and when the flour is brought to the city baking plant more than a third as much coal as flour is required to make bread. Indeed, next to iron and steel in the long list of manufactured products it is the foodstuffs that represent the largest consumption of coal.

Yet, the forty thousand tons or more of bituminous coal that invisibly reaches our tables every day is of little moment as compared with the coal that makes up the staff of life of our industries. The distribution of the year's output of the bituminous mines tells the story: 28 per cent goes to the railroads, 25 per cent to the boiler houses of factories and mills of all kinds, 15 per cent to the coke ovens and gas plants, 10 per cent to the homes, 7 per cent to steel plants and the same percentage to power plants and street railways, 4 per cent is exported to Canada or overseas, 2 per cent is used at the coal mines for necessary power, and the remaining 2 per cent goes to the seaboard for steamship fuel. In these proportions bituminous coal is the driving force of modern industrial and commercial activity.

This dependence upon coal is not only country-wide but all-embracing: every man, woman and child is the beneficiary of coal. So it is that absolute public necessity is back of the demand for continuous service from the coal mine and from every agency responsible for the transfer of coal from mine to place of use. As the direct source of the energy that turns most of the wheels of an industrial nation, coal affects the community at large to a degree that is not generally realized until the continuity of this service is threatened. Twice within four years both transportation and industry have been threatened with partial paralysis due to wage disputes in the coal industry. The dependence of our whole industrial structure upon the continuous production of coal has been too obviously demonstrated by these two instances to leave room for any further debate on the relation of coal to the public interest.

Bituminous coal enters into interstate commerce on a scale approached by no other commodity. Less than a fourth of the coal mined in the United States fails to enter interstate commerce either as railroad freight or locomotive fuel. Every one of the 45 coal-producing districts in the United States, except the Michigan district, ships coal outside the state in which it is mined, and the neighboring coal state, Indiana, ships coal to 17 states although itself receives coal from 17 mining districts in seven other states. Three hundred miles of cars loaded high with coal is the measure of the daily output of the bituminous mines of the United States and with that volume of traffic it is obvious that the uninterrupted flow of coal from mine to boiler room is a prime requisite to the general welfare.

With storage at the mine necessarily exceptional and at best limited in quantity, it is commonly true that without its daily supply of railroad cars the mine does

not start—thus closely is interstate commerce linked with coal mining. The daily rate of consumption is the proper unit of measure of bituminous coal, and so large is this daily requirement of the railroads and different industries, that in general it is impossible to accumulate stocks of coal sufficient to last as long as the stocks commonly carried of other raw materials. The two and three months' supplies of coal which the electric power stations and gas plants of the country now have on hand are exceptionally large and perhaps approach the practicable limit of stocks to be held in reserve simply as insurance against interruption of supply. Unfortunately, however, such stocks of coal are never evenly distributed among users, so that in fact a stoppage of either the mining or the carrying of coal would within a few weeks threaten large cities in every state with industrial disaster, and even a temporary interruption may cause serious embarrassment.

The present extensive and unrestrained interstate exchange of foodstuffs and other commodities, which has so lessened the danger of either local shortage or local monopoly, is itself conditioned upon an unfailing supply of coal, the very life blood of interstate commerce. The common carrier soon becomes unable to perform its full public service if its supply of fuel is even reduced, and a railroad without coal would at once cease to function, whatever its legal duty under a public grant. Continuity of operation of more than a quarter of the soft-coal mines of the country is demanded to keep the railroads themselves in operation; and the requirements of the public utilities would increase this quota to over a third. To that extent are coal mines directly essential to the operation of businesses that are universally recognized as clothed with a public interest.

If these businesses cannot be conducted without an ample and continuous supply of coal, obviously coal is affected with a public interest, arising from the clear and direct obligation to the public of continuous service not alone in the transportation of coal but in its production also, as there can be no transportation of coal without production of fuel—these two are inextricably bound together and constitute one agency of public service, for the coal is not mined until the railroad car for its transportation is set at the mine.

The public-welfare element in coal, then, is seen in the dependence of public health and safety on an unfailing supply of fuel, in the close connection between the prosperity of most industries and the uninterrupted operation of the coal mines, and in the obvious fact that without coal the great network of railroads which binds together this great country would be an idle, useless thing. It happens too that the railroads and the public utilities, themselves so clearly obligated to render whatever public service is demanded of them that the constitutionality of their public regulation is unquestioned, are of all industries most dependent upon coal. Thus, coal makes up over 35 per cent of the oper-

THE FUNCTION OF PUBLICITY

The first step toward the protection of the public interest in coal is a better understanding. The people will be able to exercise wisely their power over coal when guided by information rather than prejudice. The coal industry has profited immeasurably in the better knowledge it has obtained

of its own business while contributing to the investigations of the Commission. The government and the leaders of the coal industry both are blamable if the public has no proper conception of what coal means. The public needs information and the industry needs publicity.

ating cost at the gas plant and over 25 per cent at the electric power station, and in the operating expenses of a railroad the cost of coal is the largest single item, next to labor.

A failure of the gas and electric plants of a great city to function would result in a public catastrophe of almost inconceivable extent. This is one of the reasons that has put these utilities under public control, and the practical logic that half a century ago clothed with a public interest the steam locomotive and in later years the electric-power station must recognize a large element of public service in the coal mine that furnishes the necessary energy to both locomotive and power plant. It is this indispensable service which the coal mine performs that gives the large social value both to the property and to its product and in turn this social value in effect grants to the public an interest in that use and creates a compelling reason for public control.

The Commission is passing here upon an economic fact and not upon the law.

The Function of Publicity.—The first step toward protection of the public interest in the mining and marketing of coal as a continuous and efficient service is a better public understanding of the coal business. Guided by facts rather than rumors, by information rather than prejudice, the people will be able to exercise wisely the powers of the government over this type of private business to which society has given a larger value and special opportunity.

The extensive investigations by this Commission have necessarily put a heavy burden upon the industry. Yet in its response to these official inquiries, the coal industry has profited immeasurably in the better knowledge it has thus obtained of its own business. And this self-examination has not been limited to the inquiries initiated by the Commission, since supplementary investigations have been carried on by the coal associations, national and district, all of which have contributed to a truer understanding of the economic questions involved. If regarded not as arguments for or against any theory or system but as answers to current problems, as aids to suggested improvement in practice, and as the direct means of guiding the public in its relation to this great industry, this wealth of information will yield the best results.

The government and the leaders of the coal industry both are blamable if the public has no proper conception of what coal means to the country, what conditions and handicaps have to be met in the mining and distribution of coal, what economies can be effected, what advance is needed and what can be done in bettering working and living conditions. On all of these subjects the public needs information and the industry needs publicity. Those in the industry who have expressed their purpose to take the American people into their

confidence in the future by freely furnishing all the current information bearing on the relation of their business to the public interest surely can offer no objection to legislation providing specifically for that kind of publicity.

On the eve of the presentation of this report, the Bituminous Operators Special Committee appeared through its chairman, J. C. Brydon, and counsel, H. L. Stimson and G. H. Dorr, and submitted a plan for the collection and publicity of accounts on a voluntary basis. This plan represents such a substantial and gratifying development of opinion within the industry that the Commission heartily commends it to the favorable consideration of the agencies of the government through which it might be carried out. Pending the enactment by Congress of a law to provide for complete and compulsory publicity, this plan of voluntary reports would furnish much of the information required for the bituminous industry, and would thus bridge over the period between the close of the present Commission's investigation and the beginning of the permanent system of fact-finding and reporting recommended by it.

The Use of Federal Powers.—Both to protect the public and to promote the normal development of this great basic industry, the Commission recommends the use of the powers of the federal government over interstate commerce, recognizing that under our constitutional system a substantial part of the responsibility rests on the state and local governments and should remain there, and an even larger part on the industry itself and the public which it serves. The public includes investors in coal lands and properties, coal operators and miners, sales agents and retail dealers, as well as industrial and domestic consumers; and it is the aim of the Commission, in view of the facts presented in its reports, not only to protect the legitimate interests of the industry but to utilize to the fullest extent the good will and resources of the industry itself in putting to an end the disgraceful evils which have developed and which we have described.

Existing organizations in the industry—of operators, miners and dealers—furnish the natural point of departure for the reforms and improvements that are essential. When it became necessary to create a Federal Reserve system of banking, it was recognized that it could best be put into effect through the banking industry. The function of the government is that of supervision, with substantial powers of regulation. The same principle has been applied for a longer time to the railroads. This may be regarded as the characteristically American and constitutional method of dealing with such a national problem as is now presented in the coal industry. The Commission has aimed to make such proposals as will increase rather than decrease the sense of responsibility within the industry.

A legitimate pride in workmanship, in fair practice,

REGULATION BY THE INTERSTATE COMMERCE COMMISSION

The Coal Commission is opposed to new governmental agencies. It recommends that to the other responsibilities of the Interstate Commerce Commission the regulation of coal be added. The coal fact-finding services of the federal government must now be put on a permanent and well co-ordinated basis. The regulation of commerce in coal involves

the right to know the cost of its production, the investment in the business, the profits of owner, operator and dealer, and the earnings and working conditions of the miner. The logical and appropriate agency to exercise the administrative and quasi-judicial functions required for the coal industry are now in the Interstate Commerce Commission.

in operating and commercial enterprise will be developed not by taking over from an industry its own natural functions and placing them in the hands of the government but by such measures as will insure public knowledge and will create public confidence that abuses are in a fair way to be removed, and that service is constantly improving. This means drastic regulation when necessary as a last resort for those who will not voluntarily give the service on reasonable terms, but it means also a reasonable attitude on the part of the government and the public toward investors who risk their capital either in operating or in marketing, and toward miners who risk their lives in a laborious and hazardous occupation.

The government can act only through administrative agencies, and it is clear that if anything is to be done at all commensurate with the gravity of the problem an effective agency, with sufficient funds, experience and powers at its disposal, must be charged with the direct responsibility for such regulation and supervision as is necessary. Honest and efficient coal operators and dealers have nothing to fear from this. They have, on the contrary, reason to welcome it.

Administrative Agency Recommended.—The Commission is equally averse on the one hand to the unnecessary establishment of any new and unattached governmental agency and on the other to leaving this very necessary governmental responsibility to a haphazard collaboration of existing bureaus, whether in any one department or in several departments. We believe that the logical and appropriate agency to exercise the necessary administrative and quasi-judicial functions required for the coal industry already exists in the Interstate Commerce Commission. We recommend the creation for this purpose of a special division in that Commission.

The Congress of the United States is by the Constitution authorized to "regulate commerce among the several states." The railroads have already been declared to be interstate common carriers and to be within the regulatory power of the Congress exercised through lawful decrees of the Interstate Commerce Commission. The power to regulate involves the use of this means of transportation in the way that will best serve the interest of the several states of the Union. The regulation of commerce in coal among the several states involves the right to know the cost of its production, whether the investment on which a return is claimed is fairly estimated or inflated, and what profits are made by owner, operator, and dealer, and what are the earnings and working conditions of the miners.

Some of this information is already collected by existing bureaus. The Geological Survey in the Department of the Interior has made and is continuing the field examination of the coal reserves. Its geologists

have classified and valued the public coal lands in great detail and its statisticians compile annual and weekly figures on coal production and annual and seasonal statistics of coal consumption and commercial stocks on hand. The engineers charged with the investigation relating to water power are studying closely allied subjects, as for example, their extensive survey of the super-power project.

The Bureau of Mines, also in the Department of the Interior, is engaged in investigations in mining technology, mining safety, fuel economy, and it has had wide experience in coal sampling and analysis. Its relation to the coal lands is that of administering the government leases. Still other information concerning the industry and those who are engaged in it is collected by the Bureau of the Census in the Department of Commerce, and essential facts about sanitary conditions can be officially obtained when necessary by the Public Health Service in the Treasury Department.

The Fuel Administration of the war period and the present Coal Commission have obtained, as authorized by law, dependable and directly pertinent information concerning costs, sales realization, margins of profit, wage rates, earnings of miners—a wide range of engineering and economic facts which are essential to the kind and degree of self regulation under governmental supervision which we now recommend.

The Commission believes that this fact-finding service must now be put on a permanent and well co-ordinated basis. It believes that the moral influence exerted through publicity is an important if not the only necessary safeguard of the interest of the public.

Publicity as to the quality of coal in interstate commerce will greatly deter unscrupulous operators and dealers from the sale of "fireless" and other adulterated coals.

Publicity as to the costs and profits of the operators, transportation charges, the costs and profits of the wholesalers and retailers, will enable the consumer to judge whether a fair or an exorbitant price is being charged for his coal.

Publicity as to the earnings, living conditions and living costs of the miner will enable the public to form a judgment as to the equities of disputes between operators and miners over the renewal of wage agreements; and informed public opinion at such times will exert a deterrent influence upon the adoption of an unreasonable attitude by either or by both parties to the controversy and thus tend to prevent a lockout or a strike.

In times of prolonged suspension of mining, as in 1922, involving serious shortage of coal, the necessity of the most economical use of such coal as is available, and its equitable and efficient distribution after the resumption of operations, authoritative information will be of incalculable value in performing the func-

GOVERNMENT MUST GO BEYOND CONTINUOUS FACT FINDING AND PUBLICITY

The whole responsibility for the administrative correction of abuses—the regulative function—must be concentrated in one place. The fundamental evil in the anthracite industry is monopoly—treatment of limited natural resources as if they were like other private property. A graded tax on royalties

and differential profits is the one remedy found short of price fixing or public ownership. Limitation of margins to a reasonable return on legitimate investments and the elimination of monopoly profits are perfectly reasonable demands of the public. The Pennsylvania sales tax raises the price of anthracite.

tions which the Federal and State Fuel Distributors have been attempting to perform, although with inadequate authority and facilities. In times of emergency the proposed division of the Interstate Commerce Commission would be ready to act as Federal Fuel Distributor and subject to the direction of the President of the United States, the agency to deal with transportation and distribution as the emergency requires.

Co-ordination of Fact Finding and Regulation.—

There should be some organic relation between the Interstate Commerce Commission, in the exercise of its regulatory powers over the coal industry, and the Geological Survey and other bureaus which already have experience and facilities for collecting any part of the information needed. The Interstate Commerce Commission itself should, however, create any necessary facilities for continuing the collection of current information which does not more appropriately and naturally come from these existing sources.

Fact finding and interpretation of the facts would thus, with mutual advantage, be separated to this extent from executive action based on the facts. The Geological Survey, for example, might continue to gather systematically, publish currently, and interpret the facts about production, reserves, storage, etc., and could furnish special information within its field when called upon by the Interstate Commerce Commission to do so. The Bureau of Mines might have the whole responsibility of safety, investigations, and for any necessary federal inspection of quality, etc. Investigation of labor disputes (not compulsory arbitration) might belong to any governmental agency which is charged with similar responsibilities in other industries.

The whole responsibility for the administrative correction of abuses, the regulative function, must be concentrated in one place. Our proposal is that this should be a special division of the Interstate Commerce Commission. The collection of information about finances, operating costs, etc., not having been undertaken heretofore by any other permanent agency would naturally belong to the Interstate Commerce Commission itself, and that body should have power to secure all needed information either from the original sources or from such bureaus as collect it.

All these facts change from season to season, and vary from district to district, and from mine to mine; and the public is entitled to know them. This Commission does not advocate publicity about private affairs, but it holds that the transportation of coal in interstate commerce is so affected with a public use and that coal enters so intimately into all the necessities and conveniences of modern life that there is no longer any private right to secrecy as to such matters as costs, profits, wage rates, and working and living conditions.

Supervision and Regulation.—The government must go beyond continuous fact finding and publicity, important and elementary as these functions are.

The fundamental evil in the anthracite industry is that of monopoly—the treatment of limited natural resources as if they were like other private property. Reliance on competition without supervision has resulted in persistence of a permanent level of high prices above which extortionate increases were made whenever a suspension of mining or other disturbances give rise to the phenomenon of premium coal.

In the anthracite industry, we have secured stability—which is desirable—but it has been at high cost to the consumer and has made anthracite a luxury fuel. The public is just now concerned as to whether the increase of 10 per cent in the wages of anthracite miners is to be “absorbed” by operators, carriers, and dealers, or passed on to consumers, just as it was outraged by the abnormally high prices of last winter. But as shown in the report on anthracite, underneath these exceptional surface fluctuations there is a rising flood of costs and of prices which does not recede with the fall in the prices of commodities in general and which does not yield to such measures, entirely justifiable and desirable for other reasons, as the separation of mining from the railroads.

The special report on anthracite discloses that there are such inequalities in the wages of miners as to require a thorough revision of the entire wage scale, some miners obtaining wages much higher than are paid in other comparable occupations, while others fall far short of what is needed to furnish a living in accordance with American standards. It discloses that, together with these relatively low wages and unsatisfactory living conditions of many of the miners, including those who derive least benefit from the recent 10-per-cent increase in wages, there are excessive royalties and differential profits. Limitation of margins to a reasonable return on legitimate investment and the elimination of monopoly profits, whether in the form of royalties, operators’ and dealers’ margins or freight rates, are perfectly reasonable demands of the public.

One remedy, short of price fixing or public ownership, remains in the hands of the government for the protection of the public interest. This is the levy of a graded tax on royalties and differential profits. This would not lower the price of coal but it would secure a public revenue without increasing the price of coal. The present sales tax imposed by the State of Pennsylvania on anthracite gives no such protection, even though it yields some \$7,000,000 to the state. Since it is a percentage on the f.o.b. mine price, it falls on the marginal high-cost producer, as on others, and even more heavily when he is selling at a higher price, and is therefore passed on to the consumer in the form of still higher prices.

GENERAL RECOMMENDATIONS

The main purpose of the federal regulation recommended would be stabilization of the industry and protection of the public. Any incidental advantages should be sought only gradually and as experience shows this to be feasible. The general recommendations are addressed to the government,

the industry and the consuming public. The Congress of the United States has the right to determine under what conditions the products of the mines may pass in interstate commerce over the railways. Greater use of river transportation for coal is urged.

An excess-profits tax, as suggested above, under these monopolistic conditions, would not be added to the price of coal, and thus would not be passed along to the consumer, as it would fall only on those who have differential advantages. Thus, the federal taxes in the 5-year period 1917-21, studied by the Commission, were lenient to the low-profit operator and bore more heavily on the high-profit operator, the range being from 2c. a ton on a non-dividend paying company to 28c. on one of the most profitable companies.

The main remedy, however, against extortionate prices lies in the consumer himself. There are substitutes for hard coal and a readiness to resort to them is the ultimate and effective defense against an unreasonable price.

The mining and marketing of soft coal is the larger and, from the point of view of the national economic life, the more important industry, and here the fundamental evil is overdevelopment, irregularity of operation and consequent enforced idleness of miners and of invested capital. This problem, like that of anthracite, can be solved only by the federal government, in co-operation with the industry, working on a national scale and with a clearly defined national policy. It is through the granting and withholding of transportation service through supervision that an equilibrium can be established between demand and output.

The Interstate Commerce Commission under the existing law already has the responsibility for authorizing a railroad to put in sidings and to furnish cars and transportation. The information collected as above proposed should be utilized as a basis for determining whether at a given point and at a given time the public convenience and necessity do or do not demand further coal supplies. Instead of diverting to high-cost "snow-bird" mines, and away from well-developed and normally functioning mines, a part of the limited and sorely needed car supply and motive power at the moment when scarcity and high prices make mining profitable, the better policy will ordinarily be to concentrate the car supply at the places where it can be used to best advantage, but the still better policy is to secure such regularity of production and storage as to prevent scarcity and high prices. With a steadily increasing demand, encouragement could and would be given to the normal opening of new mines on a permanent rather than temporary basis.

Already there is positive control of the distribution of bituminous coal among the markets inherent in the freight rates, a regulation under the jurisdiction of the Interstate Commerce Commission. The freight-rate differential may in fact exceed the difference in mine costs, so that the rate largely determines both the market and the market price. To this extent there already exists a type of regulation of coal through the regulation of interstate commerce which has a direct effect on prices.

The most convenient and practicable of the various possible methods of exercising the right of control over the interstate commerce in coal would appear to be the licensing of all who desire to ship coal from one state to another or to buy and sell in interstate commerce, whether as operators, wholesalers or jobbers. Reasonable conditions, logically growing out of the inherent power of the government, and implied in its exercise, would naturally be attached to the granting of the license and violation of them would be cause for suspending or revoking.

The main purpose of the federal regulation here recommended would be the stabilization of the industry and the protection of the public interest. Any incidental advantages, however desirable in themselves, should be sought only gradually and as experience shows them to be feasible.

The Commission's findings of fact and its conclusions based thereon are given in detail in the score or more separate reports. The specific recommendations already made deal with all phases of the problem of coal, but these in part are here restated and broadly grouped as they are addressed to the three parties in interest: First, the general public in its governing capacity, whether represented by Congress or other legislative bodies; second, the coal industry itself—operators, mine workers and retail and wholesale dealers; and third, the great body of coal consumers—railroads, public utilities, other industries, and the millions of citizens who buy coal.

Governmental Action.—First among the Commission's recommendations is that Congress make definite provision on a permanent basis for continuing the collection of coal facts both to instruct public opinion and to guide the administrative correction of abuses. Because of the intimate interrelation of coal mining and transportation, the Interstate Commerce Commission is the logical agency to exercise whatever regulatory powers over the coal industry are necessary to the public interest. The Coal Commission has found the facts, and the Congress of the United States in its opinion has the right to determine under what conditions the products of those mines may pass in interstate commerce over the railways of America.

Throughout its investigation this Commission has constantly found points of intimate contact between interstate-commerce regulation and the coal business. Greater use of river transportation would help to get more coal to market with less coal cars. The river movement of coal, considerable at one time, has been discouraged, if not stifled, by artificial rail rates. The long-continued policy of waterway improvements financed by the national government has been ineffective in operation through unfair competition on the part of the railroads, which can now be directly controlled in

REGULATION OF COAL THROUGH TRANSPORTATION

Economy in the use of transportation demands that the long haul of coal be no longer encouraged by favoring rates established without adequate regard to cost and service rendered. If all coal were alike, zoning of the whole country might be desirable. A reversal of the tendency to promote overdevelopment by widening markets with low rates is

called for. Railroads are urged to base mine ratings on commercial factor as an incentive to off-season movement of coal. There is neither constitutional nor economic warrant for the federal government undertaking the distribution of coal in the several communities of the country. Consolidations in soft coal would be an advantage.

accordance with the policy, expressed in the Transportation Act, "to promote, encourage and develop water transportation service and facilities in connection with the commerce of the United States." The use of these powers recently granted to the Interstate Commerce Commission deserves serious consideration.

Economy in the use of transportation also demands that the long haul of coal be no longer encouraged by favoring rates, established without adequate regard to the cost of the transportation service rendered. Thus, much of the soft coal that is now produced and consumed in this country is transported undue distances, in many instances on its way to market passing across other fields producing coal of similar character. If coal were coal so that it could be used for every and any purpose, instead of different kinds being required for special purposes, the zoning of the whole area of this country might be desirable, prohibiting the transportation of any coal beyond its natural market. But without adopting any artificial zoning of coal shipments, such as during the war served the double purpose of saving transportation and controlling distribution, there can be a reversal of the tendency to promote overdevelopment caused by widening the marketing territory through reduction of freight rates relative to those of older and competing fields.

Gradually and without undue violence to established conditions, the rates should be readjusted to re-establish more natural relations between the elements of cost and service which will make for economic zoning. The result will be a reduction in the total cost of transportation to the nation. This proposal is apparently in line with recent decisions of the Interstate Commerce Commission.

With coal the railroad's largest item of freight, and mine capacity far exceeding railroad capacity, the best use of the available car supply and motive power at times becomes a nation-wide problem. Along with the obvious economy in supplying each market with the coal nearest to it, is the need of furnishing an economic incentive for regular off-season purchase and storage of bituminous coal, thus increasing the length of the average working year for both miner and mine, and so reducing costs of production and prices to the consumer.

The most promising method of attaining this end is by giving a controlling influence to the commercial factor in the distribution of railroad cars to coal mines in times of transportation shortage. By this change in practice first consideration would be given to the commercial ability of the producer to sell coal rather than to mere ability to produce and load it into railroad cars. While the primary duty to determine a just and reasonable rating lies with the railroad which distributes the cars, the method of rating here suggested involves a principle of sufficient concern to justify investigation of the entire subject by the Interstate

Commerce Commission on its own motion. Removal of the peak load which the coal mines impose upon the railroads is a task in which the government needs to co-operate with the industry in seeking possible relief from irregular operation and overdevelopment.

As administrator of the public estate which includes 50,000,000 acres of coal lands in the public-land states, the federal government, however, has a direct responsibility in restraining overdevelopment, which exists in the West as well as in the East. The leasing law should be amended to give the Secretary of the Interior full discretion to make his approval of the opening of a new coal mine on the public domain contingent on the showing before the Interstate Commerce Commission that such a mine would serve the public and not involve a needless investment and excessive cost.

In its educational relation to both the general public and the coal industry the government occupies a well-defined field of endeavor. We therefore recommend that the Congress designate an agency to unite with the industry in continuing studies of unemployment as an effect of irregular operation, of the wage structure, serving as the medium of publicity for rate information in the non-union fields as well as of all other basic facts on which industrial relations depend. With continuous investigation of this type the government agency is best prepared to make under authority of the President the special compulsory investigation whenever the prospect of failure to renew an agreement is imminent, and with continuous publicity of this type the people will be best prepared to focus upon the negotiators the irresistible moral pressure implicit in their joint obligation to furnish the public with coal.

In all the investigative work relating to mining the federal government has properly taken the lead. It is true economy for such studies that concern a score or more of states to be prosecuted under federal auspices, but the co-operation needs to go further. To reduce the hazards in coal mining, state and federal governments must co-operate in inspection, revision of mining codes, supervision of compensation insurance and in safety education.

For the betterment of operating methods and working conditions, state inspection must be freed from politics; also, the codes of some states badly need revision, and in this the Federal Bureau of Mines can render special service, since unification is essential to remove unfair competition based on the different operating costs under the widely varying safety standards in neighboring states. The federal government is in a position to contribute to the education of the industry since the Bureau of Mines has gone far in its investigation of every element of mine safety—operating methods, explosives and equipment. What is imperative is rigid enforcement of regulation based on present knowledge.

We look forward to the working out under federal supervision of a national policy commensurate with the importance of the coal industry. This would include not only a natural limitation of marketing area by the adjustment of freight rates to express the true relation of cost to service, with a voluntary division of territory on economic lines, but also the consolidation of mining companies. The consolidation, grouping or pooling of bituminous-mining operations should be not only permitted but encouraged, with a view to securing more steady production, less speculative prices, a wider use of long-term contracts with consumers, better living conditions, more regular employment and lower costs. The existing legal barriers to such an economic arrangement should be removed, retaining, however, the necessary protection to the public interest, by requiring supervision of the financial structure of the consolidation, as is prescribed in the Transportation Act for railroad consolidation.

Consolidations may be utilized to combine low- and high-cost mines, keeping the latter in reserve for periods of emergency and limiting current operation when the demand is normal to low-cost mines. The bituminous industry may thus be brought from its overdeveloped, unorganized and chaotic condition to one more nearly like that of the anthracite industry, which formerly suffered from similar unstable conditions. This would be done, however, under governmental supervision and therefore without the incidental anti-social policies which have created the special problems in the anthracite industry elsewhere discussed.

The economic urgency of encouraging larger units of production is indicated by the fact that the daily output of the average mine is only four cars, which involves a wasteful dilution of transportation service. The railroads justly complain of the extra gathering service required to serve so large a number of small and scattered mines, a service in marked contrast to that given a single mine in Kentucky which in a single day loaded six trains, or 256 gondolas. The opening of so many small mines in recent years has been a contributing factor in the transportation shortage.

There is neither constitutional nor economic warrant for the federal government undertaking the distribution of coal in the several communities of the country. Democracy must pay the price, and one of the prices exacted of it is that the citizens of a community shall look after their own welfare and discharge their own duties. Therefore, it is the function of each community by licensing retail coal dealers, by organizing co-operative associations, by establishing municipal fuel yards, or in whatsoever other ways they may see fit, to take the necessary steps that after the coal reaches the railroad siding the distribution thereof is made to the consumer upon a fair and equitable profit to the distributing agency, whatever it may be.

Action by the Industry.—The Commission realizes that the largest opportunity and the largest responsibility for putting the coal industry in order lies with the industry itself. Self-determination is the ideal.

The coal industry, like other industries, but with exceptional clearness, reveals two distinct and contrasting tendencies in management. There is one that is animated by a purely acquisitive and exploiting spirit that has no other apparent end in view than to make money for the owners. Quick to make the most of any panic among buyers, of any opportunity to pyramid

sales, to sell adulterated coal, or to cut the wages of miners, this type of operator and dealer resents public interference or public knowledge of his business. He is rightly called a profiteer and the public instinct which demands that he be exposed and curbed and ultimately forced out of business is sound. But besides profiteering, there is also in the coal industry, as in other industries which exploit natural resources or other differential advantages, a less conspicuous but equally unjustifiable element in the cost to the consumer.

A substantial part of the amount paid in royalties and in excess profits represents a return to owners of wealth who perform therefore no useful social service and who take no part in production. This form of ownership does not increase efficiency or economy or conservation. It does not contribute to the mining of coal or to making it cheaper. There is no way in which this first deduction from the value of the product can be forcibly prevented, as far as this Commission is aware, except through government ownership, which we believe to be both undesirable and impracticable, or by taxation on the excess profits and royalties, which we recommend, although with no expectation that it will be completely effective as a remedy. Not through governmental coercion but through the enlightened self-interest of producers and consumers, the real remedy is to be sought. The coal industry can reform itself from within.

Management for effective service to the public, rather than exclusively for profit, is the second of the tendencies mentioned and the Commission is convinced that this tendency is clearly in the ascendant; that operators are increasingly coming to realize their duty as citizens and their enlightened self-interest in establishing such a spirit of co-operation as will promote the prosperity of the industry with direct benefit to the public.

To pay fair wages, to remove the causes for the sullen hostility which prevails to an astonishing extent among workers, adding a larger and unnecessary element to the cost of coal, to make mining a safer occupation even if this means slowing down production, to sell at a reasonable price that will bring a fair return to investors with steady operation of the mines, to establish a reputation for clean and well-prepared fuel, to standardize fair practices in contracts between seller and buyer, to lay out and develop the mines in such a way as to conserve and economize the coal and to bring it to the market at the least expense, to come through clean as an industry capable of solving its own problems, with a minimum of governmental supervision—all this is already clearly in the minds of many operators, miners and dealers.

This Commission, after an exhaustive examination of the evidence collected by its own agents and submitted by all interested parties, has greater confidence in such internal organization and such educational work as will promote these remedies than in any which it is within the power of the Congress or legislatures to apply, essential as we believe some legislation to be.

A number of the Commission's studies falling broadly under the head of engineering can be summarized by saying that in the intelligent initial planning of coal mines and their proper management under engineering control will be found the requisites of conservation of the resource, of safety for both men and mine, and of efficient and profitable operation. The best managed mine has the minimum of friction with its employees.

SOCIAL UPLIFT AND BETTER LABOR RELATIONS

The mine worker and operator are urged to work together for mine safety and to co-operate in the betterment of conditions outside of the mine. Training of foremen in management and the centering of responsibility in labor relations are urged. The United Mine Workers is a necessary institution for the protection of the standards of working

and living conditions that have been attained. The Commission does not believe that the public will sympathize with the efforts of the union to organize the non-union field unless the union recognizes that public interest is superior to its monopolistic control and it finds some other way than the "exercise of economic force" for adjusting its controversies.

What engineers can do for the industry is shown in the larger and newer mines, well laid out and equipped with modern machinery. Good engineering, which includes the wise management of men as well as the handling of material, can work out reforms underground far more important than much that is apparent at the surface. To these tasks, the industry should invite the best technically trained men and thus raise the standards of the operating side of coal mining.

We urge upon the industry a fuller appreciation of the common interest of mine worker and operator in most of the problems that the industry faces. In the all-important matter of mine safety, for instance, miners and operators should join forces. The responsibility of the management to equip and operate the mine with every safety precaution must be matched by individual responsibility by every foreman and worker. Through miners' organizations and safety committees, with regular meetings of officials and workers, much can be done by joint action to protect their common interest.

Part-time operation, which causes increased costs to the operator—thus a three-day week compared with a six-day week means a 25 per cent increase in the ton cost of the coal mined—at the same time cuts in half the miners' earnings. This common interest in continuous and successful operation finds a concrete expression in the present British wage agreement, which provides that miners and owners share the profits of the business in the defined proportions, the profits being figured not on a single mine but on the whole district. The plan is equitable and would probably have won even more enthusiastic support in a more prosperous period than the past two years have been in the British coal trade, and after a longer trial this form of adjusting wages to results may prove to bring about the highly desirable full co-operation of employer and employee in seeking efficiency.

Another opportunity for co-operative effort is in the betterment of conditions outside the mine. Living conditions cannot be standardized either in company towns or where miners own or rent their homes independently of employers, but they can be greatly improved. Water should be more generally brought into the houses to save work for housewives and to encourage cleanliness. Bath houses at the mines should be required in all states. There should be more good roads. Sewers should be provided where the expense is not prohibitive and far better sanitary arrangements where sewers are impracticable. Mining camps and towns are not rural in any proper sense even when they are small.

Fresh milk and fresh vegetables should form a larger part of the ordinary diet of the miner's family. The dirty one-cow dairy should be inspected and cleaned up or abolished. Education in the elementary principles of diet, the choice and preparation of foods is sorely

needed. Facilities for healthy outdoor recreation should be very greatly increased. Schools should be improved. Many companies have given attention to this, supplementing the local public resources for education; nevertheless many mining communities do not furnish the amount or kind of elementary education which the public opinion of all our states demands for future citizens.

When all has been said the mining camps and towns are in too many cases dreary and depressing places in which to live. They need not be, as the well-planned and well-maintained camps of successful and progressive operators have abundantly shown, even in the face of difficult topographical conditions. If there were more community spirit and community planning they could be made not only livable but cheerful. Even a short-lived community is likely to last through a generation and some of the worst conditions are in fields having an expectancy of 100 years.

Experience has demonstrated that homes need not be chucked helter skelter together against the tippie and railroad tracks. The community can be laid out attractively with protected lawns and gardens, often with ample space between dwellings, with convenient buildings for common use, and, what is of the greatest importance, with good roads for communication with the outside world. The responsibility is not all on the employer even when he is also the landlord. The miners will have better living conditions when they demand them and do their part in getting them.

In their labor relations, common interest should lead both operators and the miners, through their organizations, to study the problem of unemployment and together seek to stabilize the industry; to study by joint committees the whole rate structure and its relations to the different jobs in the mines; and to perfect the machinery for settling disputes through conciliation or voluntary arbitration, with the adoption in the non-union fields of adequate checks on the exercise of the right to discharge.

On the part of the operators we recommend that more attention be paid to the problem of labor adjustment. The success of many companies in establishing good relations warrants special attention to the training of foremen in management and to the centering of responsibility in labor relations. The operators also need more effective organization for labor relations and we recommend district and national labor commissioners, men of the highest type, who can work out a national labor policy. If the Sherman Anti-Trust law prevents the operators from combining together for the purpose of collective bargaining with the miners, which the Commission does not believe is the case, then Congress should exempt them from the operation of the law for that purpose.

While complete autonomy for the widely separated

districts may be impracticable, we suggest that the two parties in collective bargaining should work out a system of national negotiation with district agreements, which will avoid standard-cutting wars between districts and secure adequate flexibility to meet necessary district conditions.

There are valid objections to the check-off, especially in the collection of fines and assessments, and it has also injurious effect upon the union in divorcing the problem of income from the winning of membership, and in the resulting lack of closeness of contact and of educational service and control by the higher officers to the lower officers, and to the rank and file members of the union; yet the check-off is not vital enough to justify a suspension of operations, whether the union is seeking to extend its use or the operators seeking to throw it out.

The history of the past 30 years affords conclusive evidence that the United Mine Workers of America has been the potent agency in the betterment of the miners' working and living conditions, and it is necessary today for the protection of the standards that have been attained. However, unless the union accepts in practice the principle that the public interest is superior to that of any monopolistic group, whether employers or employees, and gives satisfactory guarantees of a fair and orderly adjustment of controversies in other ways than by the exercise of economic force, the public will not view with sympathy the efforts of the union to extend itself over the whole field of the industry.

Action by the Consumer.—Coal is mined to be used as fuel, and the consumer pays his share of all the extra costs due to any poor functioning of the industry. However, upon the consumer can be placed some responsibility for excessive costs, and the cure for existing bad conditions is partly in his hands. Therefore the Commission addresses some of its recommendations to consumers of coal, large and small.

The immediate cause of high and exorbitant prices of soft coal is a demand from buyers far in excess of the supply. There is no evidence of any combination or monopoly among producers and shippers of bituminous coal, now or at any time, sufficient to control production or prices. As has been repeatedly shown in these reports, the peak demand for coal involves a peak demand for coal transportation too acute to be adequately met by the railroads, except by an unwarranted expansion of rail equipment and facilities. The removal of the peak therefore appears to be the direct remedy, and the consumer can contribute to the removal of the ups and downs of the coal business by buying for regular delivery and balancing seasonal variations in consumption by storage.

Storage of coal by consumers is the balance wheel between fluctuating consumption and variable production. Regular, systematic, large-scale storage of bituminous coal, then, is the public's largest opportunity in helping to solve the coal problem, and the consumer's responsibility may be said to be proportionate to his annual requirements. It is especially gratifying, therefore, that the railroads, the public utilities, the iron and steel industry, and other large users of bituminous coal in the United States have undertaken storage on a large scale. The definite adoption of this policy by the larger railroads and public utilities is plainly in the public interest and never before has the outlook been more promising for the continuation

and extension of this direct method of stabilizing coal production. We commend, also, the present activity of the Federated American Engineering Societies in promoting the storage of coal by practical investigation and popular education.

Another way open to the consumer in aid of more regular mine operation and steadier market is the purchase of coal on contract. In this, producer and consumer can co-operate, and the unusual shifting about by producers for markets and by consumers for tonnage in the past six years has been both effect and cause: The effect of war and strike conditions and the cause of further disturbance of the coal trade. To aid in stabilization, however, the tonnage contract for coal must be more than an option. Coal shippers and coal consumers must become impressed with the idea that a contract means a fixed obligation with respect to both delivery and acceptance of tonnage and that no shipper with contract commitments should enter the spot market until he has fully discharged his contract obligations, or buyer shut off contract shipments while he purchases lower priced spot coal.

Better utilization of coal by the consumer is a field not investigated by this Commission. No report on the coal industry would be complete, however, without reference to the saving in cost of energy and heat that can be effected by more general appreciation on the part of the consumer of the losses and waste for which he is responsible.

Plainly no one can logically complain of wasteful production of coal when his own consumption of coal is even more wasteful. Nor can the consumer justly complain of high prices for coal when he throws away so large a part of the heat units in the coal he buys. Thrift in the use of coal is especially to be commended to the larger consumers, and fortunately it is at the steel plants, byproduct coke plants, and central power stations that the best practice prevails. Last year the electric power stations of the country generated from coal 25 per cent more kilowatt-hours than in 1919, but in doing this burned nearly a million tons less coal—that is fuel economy on a national scale. The super-power project which plans the installation of only the largest power plants would effect even greater savings in the consumption of coal as well as in the transmission of electricity.

These great possibilities in the more efficient and wider use of coal emphasizes the importance of every measure for conserving this most valuable resource which will more and more serve as the nation's dependable source of power. The other substitute fuels, gas and oil, deservedly popular as they are, must be regarded as of passing interest as compared with coal. Indeed, the relative temporary nature of our oil resources should lead us to give priority to the higher uses of the petroleum products and abandon the fuel use of oil. The world has not oil enough to burn under either stationary or locomotive boilers, nor even in household heaters for any period beyond the present time of surplus production.

The field of the fuel engineer is largely unoccupied. The average consumer to whom coal is coal needs technical advice in selecting the coal best suited to his need and in using the coal so selected. Scientific and engineering facts on fuel economy lie within his reach but are mostly unutilized. A few dollars spent for coal information can save hundreds of dollars expended for coal.

That Coal Industry Should Reform from Within Seen As Salient Point of Commission's Final Report

Official Washington Impressed with Counsel of Self-Government Under Federal Supervision — Sees Disappointment in Recommendations to Proponents of Drastic Settlement of Coal Problems in One Swoop

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

"Self-regulation under governmental supervision" are five words which give a comprehensive idea of the scope of the final report of the U. S. Coal Commission. Throughout the report emphasis is put on the conviction that the industry can reform itself from within. While some legislation will be required to carry out the suggestions of the Commission, the remedies proposed are largely non-legislative in character.

Monopoly is cited as the fundamental evil in the anthracite industry. While no hope is held out for material reductions in anthracite price, the Commission believes that wholesome results will follow the imposition of a graduated tax on royalties and differential profits.

Overdevelopment, irregularity of operation, and consequent enforced idleness of miners and of invested capital constitute the Commission's opinion as to the chief evils in the bituminous industry. Very definite control over these evils can be exercised by the Interstate Commerce Commission, under existing law. The Commission points out. The Interstate Commerce Commission already has the power, the Coal Commission believes, to withhold transportation facilities from mines in the public interest. By concentrating car supply at places where it can be used to best advantage, during emergencies, the best interests of the country could be served. In that way regularity of production and storage can be obtained. It is in the carrying out of this plan that the licensing of operators and wholesalers is suggested.

NO CURB ON UNION'S LEGAL RIGHTS SUGGESTED

To one type of mind the report certainly will be a disappointment. To another type of mind it will appeal as the longest stride which has been made in effecting greater stability in the most important of the basic industries. To those who believe in drastic efforts to settle great questions once and for all with one whack, the Commission's report will appeal as having settled none of the fundamental causes of instability. A powerful labor union remains with no suggestion that its legal rights be diminished. No suggestion is made for the apprehension and punishment of profiteers. There is no hint of nationalization. The curtain goes down with the same persons on the stage who were there at the beginning. The presentation was not a tragedy. No one of the actors has been killed off. Nothing in the Commission's report singles out the villain.

There is another type of mind to which the report will appeal strongly,—those who doubt if things ever are settled once and for all, to stay put forever after. They recognize that progress cannot be made any faster than the people involved can progress themselves. Reports of Commissions do not, overnight, make over the thought of millions. All recognize that no government

ever will be able to carry through drastic changes in industrial policies just because some agency is given dictatorial powers. This second type of mind will see in the report an instrument capable of effecting wholesome and far-reaching results.

The Commission has come to the conclusion that the prospect of obtaining adequate coal supplies at reasonable prices lies within the industry itself. They place the responsibility on the industry. The participation of the federal government is limited to observation—because that is all publicity of accounts amounts to. There is government intervention only when the ordinary machinery fails to function.

The purpose of the commission is to have the government concentrate its attention on efforts to encourage the constructive and public-spirited units within the industry rather than spend its time chasing profiteers or trying to convict someone of shipping dirty coal. By strengthening the hand of the decent element which comprise the overwhelming majority of those engaged in the coal industry the profiteer will be eliminated automatically.

PLEA FOR GOOD WILL OF CONSUMERS

The report is not an indictment of employers or of employees. It rather is a plea for good-will and better understanding between them and for better understanding on the part of the consumers. It brings home that the industry is quite as dependent on the public as the public is dependent on it.

Some of the important things which the Commission wants the industry to do are the revision of some of its distribution and transportation practices; more use of engineering talent; better methods of conducting employer-employee business affairs; better forms of wage contracts and better contracts for the sale of coal. Action by the industry itself along such lines is where the Commission pins its hope rather than on the exercise of compulsion from a Washington bureau.

The Commission believes that the industry will not suffer in the slightest degree by abandoning secrecy. If it is to act in large groups, facts which concern the consumer and the transportation agencies must be known. The compulsory setting forth of accounts and the rendition of certain reports is a necessary step in the policy, the Commission believes, to promote better relations between the public and the industry and between employer and employee. The report makes it clear that the whole object is to carry forward the policy of strengthening those in the industry who are forward-looking and public-spirited.

The reason why the making of these returns is made compulsory is because the Commission demonstrated to its own satisfaction that there always would be a few who would not play the game honestly, which made

compulsion necessary to insure fairness to all. At first some of the members of the Commission opposed the idea. It long has been a tradition in the Geological Survey that more information could be obtained without compulsory powers than with them. The Commission came to the conclusion rather reluctantly, however, that it will be necessary to require these reports if the government is to be able to guarantee figures to the public.

The theme of the report is the same which ran through the Commission's anthracite findings. It is that coal is affected with the public interest. The Commission's interpretation of the expression is not that the public has the right to clamp down regulations on the business of coal but that it is a business in which the producer and the consumer are so jointly and mutually and profoundly concerned that they must take common counsel.

One cannot help but be impressed with the different conceptions emanating from this Commission than was prevalent fifteen years ago when trust-busting was regarded as the panacea for most of the country's economic ills. Here is a Commission that hints plainly that the Sherman law has gone too far. It recommends division of territory, consolidation of mining companies, and priority of facilities, in time of emergency, to those in a position to produce most effectively. With those suggestion, however, goes the recommendation that the financing of these consolidations is to be supervised as the Transportation Act provides for financial supervision in the matter of railroad consolidation.

It is certain that the report will not be entirely satisfactory to the Chamber of Commerce of the United States or to the United Mine Workers of America, but those who have had an opportunity to read the Commission's summary of its findings are almost unanimous in the opinion that a monumental piece of work has been done in a remarkably short period of time and with a minimum of funds.

Effect of Pennsylvania Tax on Anthracite Prices Shown in Commission Statement

By way of amplifying its remarks on anthracite prices in its final report, the United States Coal Commission on Sept. 22 issued for simultaneous publication the following statement:

"The price of anthracite coal is directly affected by the state tax of Pennsylvania of 1½ per cent producing a revenue to that state of from seven to eight million dollars a year, which necessarily is borne by the anthracite consumers of the country. The higher the price to the consumer the greater the return to the state. The greater the cost of production entailed by the high price to the consumer, the larger the cash return for distribution within the state, and at the expense of the anthracite consumers.

"This tax is confined to anthracite, the mining of which is practically exclusive to that state, and the monopolistic feature of which is recognized by the policy of that state in taxing anthracite only while its bituminous coal in competition with the great bituminous fields in the country, remains untaxed. In addition to this, the laws of that state are extreme in the precaution taken to prevent workers from the outside entering the anthracite fields of that state, confining the opportunity to work practically to those now engaged in

that field by a licensing system that requires two years' service as an anthracite mine helper before being permitted to enter regular mining operations.

"All this makes for higher prices of anthracite to the consumer. The situation as far as relief is concerned is complicated by the fact that the anthracite supply is a monopoly to one state, while those who consume are practically scattered the country over. Constantly bounding prices inevitably tend to drive the consumer to other forms of fuel, the price of which is controlled by competitive conditions that do not control in the one state monopoly of anthracite."

AN EXECUTIVE ORDER has been issued by the President providing that the records, files and property of the U. S. Coal Commission be transferred to the Department of the Interior. The Secretary of the Interior is designated as the custodian of the files and the Director of the U. S. Geological Survey is designated to perform the administrative duties incident to the closing of the work of the Commission.

Commissioners Pay Tribute to Hammond

Before the adjourning of their final session, the members of the U. S. Coal Commission paid tribute to John Hays Hammond, their chairman, as follows:

"If the records of the U. S. Coal Commission shall be preserved in permanent form, the members thereof will not be content with the record unless there remains the statement that if it has failed in accomplishing its purpose, such failure in no wise can be attributed to its chairman, the Hon. John Hays Hammond; and if it has succeeded, a large measure of that success is justly due to the wisdom, prudence and foresight with which the chairman has presided over its deliberations and guided its investigations.

"There are two grades of presiding officers; one, who leaves the impression upon the members of the body that cool, calm, calculating and deliberative justice has been the measure of his service; the other is one that back of the conscientious discharge of duty there has pulsed the warm and unfailing heart of friendship—a friendship which has touched the dead body of duty and brought to its cheek life and the flush of pleasure. To this latter class our chairman belongs. We part from the attempt to discharge our duty with pleasure that the work is over; we grasp his hand in farewell with regret. Long may he live to be an honor to his country and a delight to his friends."

BEFORE DISBANDING on Sept. 22, the members of the U. S. Coal Commission called at the White House to inform the President formally that they had completed their task. Following the conference Chairman Hammond said: "The President paid a special compliment to the Commission's technical staff, saying that he believes that no more capable, public-spirited and unselfish body of workers ever had been recruited for government service."

AFTER ELEVEN MONTHS' SERVICE with the U. S. Coal Commission, Dr. George Otis Smith, by executive order, was reappointed director of the U. S. Geological Survey. The reappointment became effective Sept. 24. The Coal Commission expired by statutory limitation on Sept. 22. Thus, for one day, after twenty-seven years of continuous public service, Dr. Smith was without official responsibility. P. S. Smith, acting director in Dr. Smith's absence, has resumed his duties as administrative geologist of the Survey.

WHEN THE U. S. COAL COMMISSION went out of existence at midnight Sept. 21 it still had an unexpended balance of between \$20,000 and \$25,000 of the \$600,000 fund appropriated for it by Congress. This will automatically be turned back into the United States Treasury.

*Address of John Brydon
To American Mining Congress*

Curb Labor Monopoly and Other Coal Problems Will Solve Themselves

President of National Coal Association, Speaking Sept. 26 at Milwaukee, Attributes Most of Soft-Coal Industry's Difficulties to Nation-Wide Strikes and Obstructive Tactics of Miners' Union

I have been asked to speak on "Some Problems of Coal." There is only one problem of coal—at least, only one major problem—from the standpoint of the public. That problem is the problem of labor relations. It is my firm belief that all the other problems of the coal industry—engineering problems, marketing problems, transportation problems—are minor ones; are ones which will solve themselves, so far as they affect the public, if the major problem of the industry, that of labor, is squarely met and dealt with. It is the violent conflict in labor relations that alone prevents the public from obtaining the protection and benefits that would otherwise uniformly flow to it from the highly competitive nature of the bituminous-coal business.

For the past year I have been chairman of the Bituminous Operators' Special Committee, which has been representing the bituminous coal producers of the United States before the U. S. Coal Commission. This committee has conducted extensive and exhaustive researches into the various aspects of the coal industry. It has supplemented that practical knowledge of the facts of the industry which is possessed by every well-informed coal man with a wealth of statistical and other information which affords a sound basis for definite conclusions as to the industry. When I say to you that the one major problem of the coal industry is the problem of labor—more specifically, that it is the problem of the labor monopoly of the United Mine Workers of America—I say it not only on the basis of my own personal experience in the coal industry but also on the basis of the material which has been collected by my Committee during the past year and which has been presented to the Coal Commission.

Solution of Main Problem Would Settle All.—What are some of these problems which have commonly been considered the major problems of the coal industry? There has recently been the problem of chaotic and unstable price conditions. There is the problem of the increase in coal prices since the pre-war period. There is the problem of irregular operation. There is the problem of car supply and transportation. There is the problem of the overmanning of the industry. There are various engineering problems involved in securing more efficient production. These are only a few of the problems of the industry, although they have generally been considered among its major ones. And yet I believe I can show to you that in every case, if that central problem were solved, the others would solve themselves.

First let us consider the problem of prices of coal.

The history of bituminous-coal prices during the last ten years has two principal features: One is the wild and unprecedented fluctuations in price which began in 1916 and have only now subsided; the other is the very appreciable amount by which the now stabilized prices of coal exceed the prices of the pre-war period.

It is not necessary to go into detail as to the first of these features. Every one of you is familiar with the sharp rise in coal prices during the war, and with the runaway market which was checked only after the establishment of the U. S. Fuel Administration. You are familiar with how the strike of the United Mine Workers organization in 1919 came at a time to prevent any stabilization following the war. You are familiar with the situation in 1920, where the highest spot market in history resulted from United Mine Workers strikes in the Central Competitive Field in violation of the agreement to accept the award of the Bituminous Commission, and from the tie-up in transportation due to the switchmen's strike. You are familiar with the partial stabilization of the industry during the depression of 1921, and, finally, you are familiar with the national strike of the United Mine Workers organization in 1922, and with its results. You know that during this period from 1916 to 1922, spot prices of bituminous coal have varied in a way they never varied before the war. As the investigations made by the Bituminous Operators' Special Committee show, the spot-price variation from 1906 to 1915 was only 31 per cent on the 1915 basis, while from 1916 to 1922 it was 849 per cent on the same basis.

Price Fluctuations Due to Labor Troubles.—The thing to which I wish to call your attention is the fact that, with the exception of those conditions which were a result of the great war, a cause which we do not now have to reckon with, all of these wild price fluctuations have been the result of labor trouble either in the coal industry or on the railroads. In 1919 it was a nation-wide coal strike; in 1920 strikes in violation of contracts all over the Central Competitive Field in the effort to secure higher wages for daymen, combined with the switchmen's strike; in 1922 it was a nation-wide coal strike, combined with the railroad shopmen's strike. In each case a strike caused an abnormal shortage, a buyers' panic, a runaway market, and resultant charges of "profiteering." The moral to the public is obvious: Prevent nation-wide strikes in the coal and transportation industries, and runaway markets will be a thing of the past.

The bituminous-coal industry is a highly competitive one. Bituminous coal is produced in thirty states.

There are over 6,000 producing companies, scattered from Pennsylvania to Washington, and from Alabama to New Mexico. Data recently submitted to the Coal Commission show that these companies have over 200,000 stockholders. If the stockholders of companies owning coal-producing subsidiaries be included then there are over 360,000 stockholders interested in producing coal. There are thousands of bondholders in addition. The largest company produces less than 3 per cent of the supply.

There has never been and there is today not the remotest possibility of monopoly of capital in the soft-coal industry. As someone has said, "In the bituminous-coal industry, geology has enforced the Sherman Act." There are enormous undeveloped coal reserves. Under these circumstances, supply always potentially equals or exceeds demand, and hence competition may be relied on to prevent high prices. It is only when the competitive processes are reversed by nation-wide strikes in the mines or on the railroads that a runaway market occasioned by competition of buyers is possible. Stop nation-wide strikes, and you prevent runaway markets.

The second marked feature of the history of prices during the last ten years is the fact that normal competitive prices of coal, even in a buyers' market, have practically doubled. On Sept. 1, 1915, at a time of stabilized prices, the *Coal Age* average of spot prices of bituminous coal was \$1.10. At the present time, in a similar time of stabilized prices, the *Coal Age* average is \$2.38. In other words, the normal price of coal has more than doubled.

Why is this? First, it is to be borne in mind that the Federal Fuel Distributor has for months been reporting that the price of coal in district after district has fallen to or below the cost of production for a substantial amount of the necessary supply. Second, it is elementary economics, which I simply wish to recall to the minds of you gentlemen, that in a freely competitive market the price of a commodity is determined by the cost of production of that substantial portion of the supply which is necessary to fill the demand, and that the price in the long run tends to lower itself to the level of the cost of production in the lower cost units. Hence, any increase in any element of cost means an inevitable increase in price. What element of cost is it that has increased and so has been responsible for the price increase we have been discussing, in spite of the drastic operation of competitive laws?

Labor Represents 68 Per Cent of Production Cost.—The chief element in the cost of producing coal is labor. It approximates 68 per cent of the total cost of production, and it is this element of cost which has increased most markedly since the pre-war period. A part of this increase in labor cost is undoubtedly legitimate. The coal operators of the United States do not wish the wages of their men to fall below the normal competitive standard of wages, nor do they wish wages to lag behind any increase in the cost of living.

Neither of these things has been true in the coal industry. On the other hand, wages of bituminous-coal miners have remained on an abnormal and inflated level. They are 182 per cent higher than in 1913. The cost of living is only 69.5 per cent higher. The wages of all other unskilled labor have fallen with the cost of living since the war; the wages of coal miners have not fallen. Their wages are now higher than those of every

other variety of unskilled labor, and they are even higher than those of almost every class of skilled labor.

These statements are not mere assertions. They are the result of careful statistical study by the economists employed by the Bituminous Operators' Special Committee. That study showed that average daily earnings of bituminous miners in the Hocking Field—the base for the union wage scale—in 1922 were \$8.83, while the average for all unskilled labor in twenty-three manufacturing industries was \$3.35, and that for all skilled labor in those industries, was \$4.73. In other words, bituminous miners in 1922 made 163 per cent more than the average unskilled laborer and 86 per cent more than the average skilled worker in the manufacturing industries of the country.

Why is this? Because while labor in other industries is competitive, labor in the bituminous-coal industry is largely a monopoly. The monopolistic organization of the United Mine Workers of America holds under its central control so large a proportion of the coal miners of the country that it is able to sustain an inflated wage scale, and thus keep the cost of coal much higher than it normally should be when considered in relation to other basic commodities. The price of all commodities has advanced 59 per cent since 1913; the price of coal has advanced 97 per cent.

The seriousness of this condition is not generally realized. The panicky markets of 1919, 1920 and 1922 caused much public fear and discomfort, but the abnormal increase in the cost of coal, due to the monopolistic position of the miners' union, has resulted and will result to an increasing extent in the throwing out of adjustment of the economic machinery of the country, just as it is always thrown out of adjustment by any successful attempt to monopolize labor or capital in a basic industry.

Here, then, is our first problem of the coal industry, that of the increase, permanent or temporary, in the price of coal, and it analyzes down to the problem of labor, and, specifically, to the problem of the labor monopoly now maintained by the United Mine Workers.

Causes of Car Shortage.—Let us consider a second problem, a basic problem of the coal industry, the problem of transportation. We all know that the railroads of the country are sometimes overtaxed, and we know that this overtaxing of the transportation facilities has affected the bituminous-coal industry particularly. Car shortage has caused many a sleepless night to many bituminous producers and to their consumers as well. Why do car shortages occur? A detailed study, made by the investigators for the Bituminous Operators' Special Committee, has shown to us beyond all doubt that general serious transportation shortage in peace time is in every case the result of nation-wide labor disturbances in the coal or in the railroad industries.

The two great car shortages from which the country has suffered occurred in the winter and spring of 1920, following the 1919 coal strike and simultaneous with the strikes in the Central Competitive Field, and in the fall and winter of 1922, following the coal strike of that year. It is true that a certain amount of transportation trouble is due to seasonal fluctuation in demand, but the serious trouble is caused by a situation like that in 1922, where the railroads had to haul a year's supply of bituminous coal for the United States in seven months. They did not do it. They could not do it, and

it would be foolish for us to insist that they be put in a position where they could do it, as it would necessitate greatly increased investment and therefore increased rates.

Here again what is apparently one of the major problems of the coal industry resolves itself into a mere aspect of the central problem, that of labor, and, more specifically, that of the nation-wide strike.

Improvement of Mining Methods Obstructed.—Let us take another problem of the coal industry, that of efficient mining. For years engineers and operators have been co-operating in an effort to get out more coal for less money in an effort to increase production per man, by the use of machinery and by improved mining methods. The effort has not been as successful as it might have been. Why? Because of the deliberate policy of limitation of output which has been practiced and enforced in the union fields by the United Mine Workers of America.

Studies made by the experts in the Bituminous Operators' Special Committee show that the efficiency of labor in identical mines in the Kanawha field was 113 per cent greater under non-union than under union operation, due to freedom from union practices limiting output. In the Logan field, under non-union operation, the average production per man per year over a 16-year period was 1,236 tons; in the every way similar Kanawha field, under union operation, it was 819 tons, a difference of 51 per cent in favor of non-union operation. Yet under non-union operation production per man per year in Kanawha went to 1,466.8 tons, or even higher than in Logan. These figures show beyond all doubt the handicap placed upon operators and miners alike in the fields contracting with the United Mine Workers organization by practices fostered and compelled by that organization.

The uneconomic practices of the United Mine Workers' organization are of various kinds: Strikes in violation of contract; opposition to the introduction of labor-saving machinery; limitation on the number of cars a man can load per day; restrictions on working time; limitations on the number of men who may load after a machine; voluntary absenteeism; interference with management and curtailment of the right of discharge; rigid classification of work; and many others, including unduly high wage rates for operation of labor-saving machinery.

Here again the problem comes down to the problem of labor, for if engineering advances cannot be put into practical operation on account of labor opposition, they are of no value.

Traces Cause of Overdevelopment.—Another of the problems of the coal industry is that of overdevelopment, too many mines and too many miners. The inflated prices which have existed at times during the last seven years have brought into being many mines which should never have been opened. There is an overdevelopment in the bituminous industry; but this overdevelopment may be traced back through the intermediate cause of inflated prices to the ultimate cause of nation-wide strikes or the fear of nation-wide strikes in the coal and railroad industries; in other words, back to the problem of labor. Similarly, the problem of the overmanning of the bituminous-coal industry may be traced back.

The United States Coal Commission has told us there

are 200,000 too many bituminous miners. Yet how can it be otherwise in an industry with an inflated wage scale which enables men by working two-thirds of the time to make much more than laborers in other industries who work full time? And, as I have already said, this inflated wage scale is the result of labor monopoly by the miners' union.

Finally, there is the problem of irregularity of operation, long one of the most discussed problems of the bituminous-coal industry. What is the analysis here? Where you have overdevelopment, irregular operation is inevitable until the normal processes of competition have forced out the superfluous units. In the bituminous-coal industry the ordinary processes of competition have never had a chance to force out the superfluous units, because the competitive processes have again and again been interrupted by national strikes. Prevent national strikes for a period of ten years, and irregularity of operation, except in so far as some slight irregularity is made necessary on account of seasonal variations in demand, will be a thing of the past.

I have called your attention to a number of the problems of the coal industry, and have shown you that in every case the real problem was that of labor—that in most cases it was that of the present policies and practices of the United Mine Workers of America. Subject to qualification in so far as the labor troubles have been on the railroads, I believe this statement to be a true one, that all evil hardships which the public have sustained in getting and paying for bituminous coal may be laid at the door of the monopolistic policies of the International organization of the United Mine Workers of America in Indianapolis, and the use of the nation-wide strike as a weapon to secure its ends.

Wage Earner and Farmer Most Affected.—Who are "the public" who are thus affected? It is perhaps the broadest public in America. It is every manufacturer who uses coal, every consumer who purchases manufactured goods or uses domestic fuel. Numerically "the public" is overwhelmingly wage earner and farmer. It is on them that the burdens of industrial dislocation and inequality fall most quickly and most heavily. It is the unskilled laborer with his \$3.35 average daily earnings, the skilled workman with his \$4.73 average daily earnings who in fact pay the unskilled miner his average daily earnings of \$8.83.

In this situation, in which this public ultimately pays the piper, in what direction does its interest lie? First, would it be in the public interest for the operators who do not now contract with the organization of the United Mine Workers to do so? The attitude of the operators of those fields as expressed to the U. S. Coal Commission is that so long as the organization of the United Mine Workers continues its present policies and methods they are firmly resolved not to contract with that organization. They propose to continue to mine coal employing independent mine workers. Is this in the public interest? That is for the public to form its own opinion, but it seems to us to be essential to the public interest to keep these fields free of monopoly control. Suppose that all operations in all fields did contract with the centralized organization of the United Mine Workers. Nothing would then stand between the public and further enormous increases in the cost of coal through wage increases. So long as the competition of the non-union fields continues there is some limit to the power of the labor monopoly to dictate its terms.

Effect of Non-Union Competition.—Further, it is this competition that supplies a motive to the operators who contract with the United Mine Workers to stand out against cost and therefore price-increasing wage demands. Once all operators contracted with the organization of the United Mine Workers, this pressure of competition among themselves being relieved and wage advances affecting all alike, all motive on the part of the operators to resist unreasonable demands would for practical purposes disappear. So long as all were affected alike by the increased costs, there would be an inevitable tendency to pass them along to the consumer rather than themselves to undergo the loss and hardship of a strike. Competition in any substantial degree from coal produced in other countries, or substitute fuels, is remote and would furnish no protection against enormous added burdens to the public.

To meet the evils of the present situation, which result from the fact that the present power of the organization approaches that of monopoly, it is clear that complete labor monopoly is not the remedy. The operators in the independent fields are in effect fighting in the interest of the public, and should receive its support.

It would be idle to claim for them that they are fighting this fight solely or chiefly because of its effect on the public interest. A prime consideration that moves them is that if complete monopoly were established, it would be within the power of the president of the United Mine Workers' organization and his policy committee, through their control of wage differentials, to make or break any set of operators in any district. It is well for the public to remember the words of President Harding during the 1922 strike: "The simple but significant truth was revealed that, except for such coal as comes from districts worked by the unorganized miners, the country is at the mercy of the United Mine Workers."

If complete labor monopoly is not the way out, is the destruction of the United Mine Workers' organization the objective to be sought in the interest of the public? There is not, has not been, and at present there appears to be no prospect of any campaign by the operators in the bituminous industry for the destruction of the United Mine Workers' organization. The Bituminous Operators' Special Committee, composed in equal proportions of operators who contract and operators who do not contract with the United Mine Workers' organization, squarely took the position before the U. S. Coal Commission that the problem was not one requiring the destruction of that organization, but the acceptance by that body of standards of responsibility and methods of dealing and contracting which are already in successful use among the more progressive labor unions of the country.

Combinations Limit Freedom of Action.—The Committee urged as fundamental upon the Commission this proposition: That if capital or labor by combination create an artificial power to deal with labor relations, such artificial power carries with it definite limitations. Individuals, if they desire to combine, cannot have their cake and eat it too. If they desire the power which artificial combination gives, they have got to lay aside a certain freedom of action which the community could otherwise safely let them exercise. It does not affect the public when small numbers of employees use the strike as a weapon to secure wage increases and refuse to accept impartial arbitration. But where,

through the artificial power obtained by nation-wide combination, the weapon of the strike is used to tie up the nation's industries, then it becomes a very different story. The use of such a nation-wide strike to enforce demands becomes intolerable and the acceptance of the principle of voluntary arbitration where employers and employees cannot reach an agreement becomes inevitable.

The Bituminous Operators' Special Committee made definite suggestions to the U. S. Coal Commission as to changes in methods of contracting which would eliminate the recurring crises occasioned by the periodic termination of wage agreements and would provide for the responsible living up to agreements. In this it was merely following proposals which have from time to time been put forward by the operators contracting with the United Mine Workers' organization, notably the proposals drafted by them in December, 1922, and submitted to the United Mine Workers as a basis for the negotiation of new wage-scale agreements. These proposals definitely provided a plan under which there should be no interruption of mining by strike or lockout pending negotiations in the various districts for wage agreements. They further provide that in the event of such negotiations failing, the matters at issue should be submitted to voluntary impartial arbitration which should be binding upon both sides. The adoption of such a system last winter would have been an enormous step toward safeguarding the interests of the public and solving what, as I have said, is the one great problem, from the public's standpoint, in the coal industry.

Favors Voluntary Arbitration of Differences.—Instead the public is faced with the termination of United Mine Worker contracts in the bituminous fields next April 1. It has just been through the experience on relatively small scale in the anthracite fields, with results to the public which you gentlemen can appraise for yourselves. The operators who contract with the United Mine Workers of America have not yet outlined their policy to meet the critical situation which will presently come upon the country, and it is not my province to forecast their action. But from the standpoint of the public there is one clear principle which it seems to me must sooner or later receive recognition: If the artificial power of combination in labor relations is to continue to be permitted, it must recognize that this very power carries with it certain limitations; that one of those limitations is that it shall not beat the public over the head with the bludgeon of a nation-wide strike; that one of those limitations is that it must in the event of failure to agree by negotiation be willing to submit differences of opinion to voluntary impartial arbitration. There must be a system of contractual relationship in which responsibility for observance of contracts will be enforced and recurring crises in the industrial life of the nation eliminated.

If this problem is to be solved, if the interest of the public is to be served, you cannot expect to have the operators bear the whole brunt of fighting this battle. If you accept my analysis of the situation, then in this matter your interest as members of the public and that of the operators coincides. It is for the public to bear a hand and to make sure that the representatives of the public in official position do not befog or run away from the issue, but meet it squarely and vigorously.

National Strikes an Extravagant and Unfortunate Method of Settling Disputes

Nationalization Might Be Dangerous Venture—Temporary Seizure Hazardous—Continuous Investigation and Publicity on Industrial Relations Warranted—Might Resort to Mediation at Instance of President

Mutterings are already heard of a soft-coal strike next April. Here is the only direct statement of the Coal Commission on national strikes. The remedy offered is continuous investigation and publicity to force the inherent statesmanship among operators and miners to agree without strikes. Mediation is suggested as a last resort. This is a section of the Report on Labor Relations.

For reasons in part set forth in the section on The Unit of Negotiation, it is believed that the public interest will be better subserved by having practically all the agreements in the unionized part of the bituminous industry expire at the same time. This, it must be recognized, opens the possibility for a general cessation of operations in that part of the bituminous industry which is organized. The people of the United States suffer more seriously from a national strike in the coal industry than from any of the outlaw strikes that happen within the agreement period, or from the irritations and annoyances of both sides which are more or less continuous, and they seldom if ever recoup their losses.

Consumers, smarting under the acute fuel shortages of the last few years, too easily take on the impression that the men mining coal prefer to strike. Resentment at being bothered, moreover, makes it wholly comfortable to hold this opinion. Investigation shows, as common sense would of course infer, that this is not a true picture. A general tie-up of the coal industry by hundreds of thousands of adult men in the trade is always a serious matter never to be lightly undertaken. Furthermore, any man who has had experience attempting to get consistent uniformity of action out of an organization scattered over the whole country, knows that some force of cohesion must exist to make the nation-wide unionization of miners possible.

In spite of all these conditions within the union which tend to reduce the danger that a national strike will become habitual and will occur, they do occur, and the loss to the country as a whole may be far greater than the loss to either operators or men. Indeed, conditions are easily imagined under which operators and union might both welcome a temporary cessation of work. There was considerable suspicion that a condition approaching collusion obtained in some territories in connection with the strike of 1922. Certain it is that interruption of production might easily make possible the marketing of a given supply of coal at a higher price than would obtain if no such interruption occurred, and it is entirely conceivable that under those conditions the interruption would not greatly reduce the total amount of employment or the total production of coal during the year in which it occurred.

Whatever the circumstances under which a general strike occurs, it is at best an extravagant and unfortunate method of settling disputes. Fuel, whether we use it to heat homes or to run factories is a vital public necessity. The requirement that a dependable flow of this commodity shall at all times be available and the seriousness of any interruption of that flow, has led people of widely differing views to join in a well-nigh unanimous demand that some protection against what is universally regarded as a national disaster shall be found.

Certain citizens in seeking a remedy advocate the nationalization of mines, the result of which they believe would lead automatically to placing the full power of the Government behind their operations at all times. Others believe that Government should compel some form of compulsory arbitration and outlawry of strikes. Approaching the question from opposite angles, these two are perhaps the

most extreme remedies that have been suggested. With respect to anthracite, the Commission has already recommended giving the executive branch of the government power to operate the coal mines temporarily in an emergency.

Following is a list of the preventive measures that at one time or another have been proposed to forestall the dangers of a national strike.

Nationalization of the mines. Seizure and national operation of the mines in emergencies. Compulsory arbitration with compulsory acceptance of the award. Compulsory arbitration without any further compulsion upon the acceptance of the award than is offered by public opinion created by its publication. Compulsory investigation of the causes of disputes without the proposal of any award. Continuous investigation of labor relations in normal times as well as after disputes developed. Timely and discriminating publicity. Report to the President of the United States and subsequent mediation.

Nationalization.—In spite of active agitation carried on in some quarters looking toward early nationalization of coal mining, we do not believe the country is ready for any such hazardous venture in public administration. In so far as nationalization is offered as a remedy for national strikes, it would be effective only to the extent that national administration could remove the conditions out of which the strike develops. We find no basis for the belief that it could do this more effectively than private administration brought up to the best standards of present day industrial and union practice. Until the present management of the mines and of the union has shown clearly that it is incapable of bringing its administration up to these standards, a policy of government ownership would involve the addition of grave problems of administration without any evidence that certain grave problems of the present would be ameliorated.

To the extent to which national administration failed to remedy the "conditions which tend to create strikes," the only guarantee it could give against their actual occurrence would be the guarantee of superior force—the guarantee of a government strong enough to command men to work and make them do it. We do not believe this kind of coercion would constitute a progressive American way of meeting a difficulty. Public administration of bituminous mining at present, therefore, appears to offer no solution to the difficulties under discussion.

Seizure.—As regards temporary seizure it must be recognized that the obvious hazards of such a measure, however much it might be justified as applied to the more or less localized anthracite mines, would develop palpable impossibilities if attempts were made to bring the whole bituminous industry within the purview of such a drastic emergency procedure. The most that could possibly be undertaken would be to operate enough mines to prevent a coal famine. The situation in the industry to-day does not make it likely that any such drastic or dubious venture will have to be seriously contemplated.

Compulsory Arbitration.—A Joint Conciliation Board, an Umpire and resort to adjustment machinery under one form or another is accepted practice in coal mining. It is perhaps not easy to understand why, if an Umpire or Joint Conciliation Board can adjust differences during an agreement, it cannot equally adjust the differences necessary to making an agreement. When, however, we direct our attention to the political field, we find that throughout our history as a nation, we have been willing to have courts interpret our laws, while at the same time we have been insistent that the making of those laws should be left to balanced representative bodies. Compulsory arbitration is an attempt to set up judge-made law, and as such, is essentially unsound. There is no logical parallel between arbitrators, umpires and conciliation boards functioning as interpreters of the law under an agreement that constitutes the fundamental law of an industry, accepted by both parties, and arbitrators placed in the position of dictators of such law. Moreover, it is entirely logical that one or both parties to negotiations may in an emergency consent to refer to an arbitrator or board, specific questions such as wages which their negotiations have been powerless to resolve and yet, at the same time, be entirely unwilling to put themselves in the position in which they are powerless to decline the service of such a board.

There is still deeper reason than the logical desire to have their representatives influential in determining basic conditions why workers should object to compulsory arbitration. Circumstances did not make it easy for workers to unite in efforts to redress their grievances. Many obstacles had to be overcome before the miners of the United States and Canada were brought together into one organization. In the beginning, the unifying force was an almost universal recognition of severe oppression. This bond, together with the bond of fellow-craftsmanship, realization that others in the same occupation were experiencing the same difficulties as themselves, was the influence that brought them together. Having joined their interests, whether in small groups or in nation-wide areas, they found that the one effective weapon by which, when other means failed they could secure attention to what they considered their just demands was the right collectively to quit work. After once discovering the effectiveness of this weapon, it is but natural that the habit of its use should grow.

Especially is this true as long as there is lacking a competing bond which tends to dissolve the bond of common suffering. The lack in many cases of any sense of leadership on the part of mine management, repeated attempts to "put one over" on the men, victories which may at times be deserved but which are so won as to cost dearly in ill-will, irritation of mean and short-sighted management—all these conditions make striking easy and peace hard, and give rise to the view that the only defense against the meanness of the boss is to be meaner yet. Much of the strength of the union and its readiness to strike, of its difficulty in being fair, of its lack in cool, constructive leadership, is attributable to that philosophy of management which however much it may prate to the contrary, and talk of common interests, has unconsciously perhaps been based on the belief that the conflict of employer and employee is necessary and eternal, and that the nature of mankind has little of importance in it beyond its economic motivation.

The militant literature of the two sides to which we have taken occasion to address ourselves in another section gives ample proof of the mutual attitude of conflict which is far too much in the foreground in the coal mining industry. In these circumstances, taking away from miners the right to strike can scarcely make for peace and a continuous dependable supply of coal. The fact that workers have taken a leaf from the book of management and have themselves in many instances become aggressive and truculent, does no mean that it will be either just or expedient for the public to attempt forcibly to make them remain at work. It is impossible to make men work against their will, and the public should recognize it in planning its own policies. Even if there were promise that an effort in this direction would ultimately meet with formal acquiescence on the part of workers—which is extremely doubtful—it would not result in real peace or efficiency in the industry. Compul-

sory arbitration, even though it should by chance bridge over some serious conflicts, would give rise to the almost overwhelming difficulties of obtaining by force effective service from men who do not want to work or effective management from men who do not want to operate.

Compulsory Arbitration with Optional Acceptance of Award.—Compulsory arbitration without compulsory acceptance of the award escapes these difficulties. However, by issuing an actual award worked out by persons not directly in the industry it sacrifices its best chances to effect a true settlement by joint agreement. It is not so much the actual terms upon which two sides get together as it is the mutual working out of the terms which should tend toward a true acceptance of an agreement and toward enduring peace. It, however, may frequently in certain circumstances be a useful form of mediating tactics, even though it would be inexpedient to use such a plan in every case still less to make it compulsory.

Compulsory Investigation.—Compulsory investigation is the method embodied in the Canadian Industrial Disputes Act, which has perhaps had the most successful experience of any. The drawbacks, however, of any investigation which must start after disputes have taken form and the emotions of conflict have been aroused, are very considerable. Facts which might have been effective in preventing a strike, had they been effectively marshalled before a conflict had reached an advanced stage, may even serve to develop greater heat if brought to bear when a conflict is far advanced.

Continuous Investigation.—The dependence of the country upon a steady supply of fuel is so great as to warrant an attempt to overcome this handicap by providing that investigation of industrial relations and of the basic facts upon which industrial relations depend shall be continuous. Such continuous investigation should not be thought of as principally critical. Wisely administered, it would not be so much concerned with noting cases of bad practice as with noting those of the opposite sort. It should, however, be on the alert in discovering facts and conditions which if not corrected might result in conflict. An efficient agency for continuous investigation would tend to bring about such an exchange of information within management as to stimulate constantly improving practice and it would make the union more heedful than it now is of the public responsibilities that attach to its position of achieved power.

Timely and Discriminating Publicity.—In order to be effective, however, continuous investigation would have to be accompanied by timely and discriminating publicity. The question as to what type of report concerning conditions in the various fields upon which labor relations depend, would be most advantageous, is a subject to which a permanent coal commission would need to give careful attention. Another subject in regard to reports, to which it would need to address itself would be the quality—to what extent should they be regular and periodic and to what extent special reports should be made, either upon subjects which, if not taken in hand, might lead to strikes, or upon conditions which furnish occasion for special commendation.

Progress in the improvement of management and the effectiveness of agencies which management might employ to bring about better labor relationships would need to be periodically reported. Likewise, public notice should be made of the progress of the union in maintaining discipline and securing the full adherence of locals and individual members to the terms of the agreement, and in meeting their responsibilities under the agreement. It would be helpful, also, to have publicly noted, the progress of the national organization in rendering special service to the district and local organizations, and in promoting and supporting activities for the general education of members, not only in their responsibilities under the agreement, but in other matters intended to promote the progress of miners as citizens and as a functioning part of their industry.

It would, of course, be equally essential to keep the public

informed as to the work of adjustment machinery, including the extent to which differences are settled between the parties, the speed in making adjustments and in general, the efficiency of the joint administration.

These are suggestions concerning the kind of publicity which if it occurred in the natural course of events and not merely as an emergency measure to prevent a conflict, should have a tremendous restraining influence upon those whose activities would make for a general strike or escape from a general strike.

Report to the President of the United States Followed by Mediation.—If with such continuous investigation and publicity as has just been described, a disagreement should still be carried to the point of threatening an early cessation of work, we think that a special report of the situation should be made to the President of the United States. To this end it is suggested that all agreements between operators and union should contain a clause which would provide for automatic renewal of all agreements except in regard to such provisions as one party or another may have given notice to the other ninety days in advance of the date of termination of the agreement. In case of failure to agree, a report, setting forth the factors at issue, should be made by each side to the President not later than 60 days before the expiration of the agreement. It is recommended that when such a report is made, the President immediately designate a person or persons whose duty it shall be to inquire into the factors at issue and make a report and award thereon to the President on or before the date of expiration of the agreement. Such an award would be made public or not as the President would deem wise in the particular circumstances. It should be the purpose of such a report to focus upon the negotiators the irresistible moral pressure implicit in their joint obligation to furnish the public with coal.

We are confident that with a continuous orderly process of investigation and report, and if advisable with the timely injection of a definite representative of the public into the situation in case of disagreement, it will become very much more difficult for either side to adhere in any captious way to a contention that will precipitate a tie-up of the industry.

As earlier set forth, the best approach to a remedy for the evils of the general strike will not, in our judgment, be found in an immediate resort to drastic prohibitory measures. Whatever artificial gap may have developed between employer and employee—they must work together or there can be no peace and no real efficiency. The weight of opinion among operators and union officials alike is that they themselves desire to fix the fundamental terms, upon which the industry shall operate. The most thoughtful and best advised among them express great confidence of their ability to do this in an orderly way. From our survey of the statesmanship that exists in the industry, it is believed that the operators and the union are equal to this task, if once they recognize the finality of the public insistence on continuous operation and address themselves single-mindedly to bring that object to pass. It will be necessary, however, for them to find means of bringing their best statesmanship to the front in connection with the general negotiations. They cannot perform this indispensable public duty unless they emancipate themselves from the atmosphere of truculent militancy that too often characterizes their proceedings.

The Commission believes that the combination of continuous investigation and publicity with the possible resort to mediation at the instance of the President of the United States, will remove the necessity for more drastic emergency measures. The process here outlined should have a sobering influence that will make strongly for enforcing responsibility to the public among representatives of both the operators and the union. Until measures for holding both sides to their responsibilities have been exhausted, it will be unwise for the public to embark on more far-reaching measures of regulation of labor relations.

The above suggestions are intended to encourage mutual accommodation and agreement at the time of the renewal of negotiation and thus to lessen the chances of national strikes or suspensions. The fundamentally constructive

opportunity however lies in the building up of the day-to-day relations within the agreement period. Improvement in industrial relations during the life of the agreement would very considerably lessen the probability of a national strike.

One-Third of Soft Coal Lost in Mining, Says Commission

Report on Waste in Production Cites Improper Methods and Carelessness as Prolific Causes of Avoidable Losses

More than a third of the soft coal is left behind and lost in mining, according to the conclusions contained in a summary report of the U. S. Coal Commission on "Waste in Mining," published Sept. 20. The complete report includes a full description of the fields visited in each state with the details of the field investigation, as well as 53 illustrations and 20 tables, and will be published by the Bureau of Mines.

The engineers making the examination and study included Carl A. Allen, of the Bureau of Mines, whose valued contribution was cut short by his death as a result of pneumonia contracted while in the field after completing the work in several states; James D. Sisler, of the Pennsylvania Survey; J. J. Forbes, the Bureau of Mines district engineer in the South, and F. E. Cash, another mining engineer of the Bureau. Messrs. Rice and Paul, of the Bureau of Mines, co-operated with Mr. Leshner, of the Commission's staff, in planning and conducting this extremely painstaking and successful study.

"The principal causes of losses," says the summary, "were found to be coal left on the roof and bottom, coal lost in room, entry and panel pillars, coal lost in oil and gas-well pillars, coal lost under buildings, railroads and boundaries, coal lost in handling and preparation—underground and surface—coal lost by rolls, thin or dirty areas, and streams. The losses of coal in undeveloped beds overlying beds that are first extracted is not treated at length in this report since each particular case would involve detailed engineering study and it is believed that with proper methods of mining loss from this cause should not be large.

"The coal lost in mining based upon the production of coal in 1921, is summarized in the table which follows:

SUMMARY OF COAL LOSSES IN STATES INVESTIGATED

State	Production in 1921 in Thousands of Tons	Loss of Coal, Per Cent			Loss of Coal, Thousands of Tons		
		Total	Avoidable	Unavoidable	Total	Avoidable	Unavoidable
Alabama.....	12,600	32.9	18.0	14.9	6,150	3,370	2,780
Illinois.....	69,600	49.0	29.7	19.3	66,900	40,550	26,350
Indiana.....	20,300	42.2	26.7	15.5	15,800	10,000	5,800
Kentucky.....	31,600	30.7	11.8	18.9	14,000	5,380	8,620
Maryland.....	1,827	30.7	12.7	18.0	808	328	480
Ohio.....	31,900	40.0	26.0	14.0	21,300	13,740	7,560
Pennsylvania.....	116,000	28.6	15.5	13.1	46,400	25,100	21,300
Tennessee.....	4,400	24.7	13.2	11.5	1,440	770	670
Virginia.....	7,500	20.0	5.0	15.0	1,870	467	1,403
West Virginia.....	72,800	22.8	10.5	12.3	21,500	9,900	11,600
Totals and Averages....	368,527	34.7	19.4	15.3	196,168	109,605	86,563

"Among the causes responsible for avoidable losses are listed the following:

- (1) Improper methods of mining.
- (2) Carelessness or bad engineering in carrying out those methods.
- (3) Careless cleaning of the coal in the mines or at the tipple above ground.
- (4) Excessive blasting blowing small coal and larger pieces into the goaves or gobs.
- (5) Poor methods of transportation, such as loading pit cars high above the sides so that the coal rolls off or is knocked off in transit, and is ground under foot; also the use of cars with large cracks or poor doors so that the fine coal sifts out, and this also being ground into dust increases the danger of coal-dust explosions.
- (6) (a) Leaving pillars either to keep the surface intact, where back-filling methods might be employed.
- (b) Leaving boundary pillars, especially panel and entry pillars.
- (c) Leaving pillars to protect oil and gas wells which might be taken care of by other means.
- (d) Coal used for ballasting track in the working places.
- (e) The irregularity of the workings without "sight," which leads to coal being left behind.

"A number of the field reports mention the fact that many mines are not laid out according to good engineering methods, and entries and rooms are not driven on 'sights.' Also, too many rooms are turned off butt headings in order to increase production of coal when the market is active. When workings are not opened by survey, the whole mine becomes very irregular (as is shown by some of the plans in this report), the cost of mining increases, and the recovery of coal is lower than it should be. In times of slack demand, these excess number of rooms are allowed to stand idle, the roof caves, and frequently large areas are abandoned because these falls cost too much to remove. Creeps and squeezes are induced by driving too many rooms, especially when the pillars are left too narrow.

"The greatest loss in mining is in room, entry, and panel pillars, this varying from 5 to 45 per cent. But of this loss, from 3 to 36 per cent is avoidable, therefore here is a problem requiring considerable study.

"It is not always wise to attempt to mine too much coal in the advance, and generally, from 50 to 60 per cent should be left for the retreat. This necessitates calculating the width of rooms and pillars to allow of such a system.

"Sometimes pillar-drawing is done more or less carelessly, and stumps containing from say 30 to over 100 tons are left therein, and are never recovered. At times this is unavoidable, but if these stumps were removed with the pillars, and not allowed to remain and become covered with the 'break' of the roof, there would be less loss of coal.

"Temporary cessation of work, caused by strikes, by the mining system employed, or by market conditions, results in general deterioration of timbers and gradual collapse of workings, many of which are not reopened."

Delegates from 20 States and Mexico at Sessions of American Mining Congress

MILWAUKEE, WIS., Sept. 25.—At the end of the first two days' sessions it was apparent that the 26th annual convention of the American Mining Congress and the machinery show that goes with it, had awakened as much interest as usual. Three problems of the mining industry of the country are getting attention—industrial co-operation, the need for standardizing of equipment, methods and processes and for intelligent readjustment of mine taxation. A long list of speakers in the sessions are treating these subjects. The machinery exhibits overflow the main floor of the public auditorium. Delegates are here from about twenty states and Mexico.

At the formal opening exercises last night, presided over by Max Babb, vice-president of the Allis Chalmers Manufacturing Co., Mayor Daniel W. Hoan of the city welcomed the convention. E. L. Phillip, former Governor of Wisconsin, made an address of welcome on behalf of the industries of this region in which he took a fling at the government policy of rigidly limiting immigration when the country could get a great deal of much needed labor by carefully selecting an unlimited number of immigrants at their home ports. He discouraged the movement of negroes from South to North. Sidney Jennings, president of the Mining Congress, replied to the welcomes and declared the convention and exhibition formally opened. Two other speakers who said friendly things about American mining were Señor Moises Perogordo Y. Laso, representing the Mexican Secretary of Commerce, Industry and Labor, and Señor F. Roel, Mexican Consul General.

A message was read from President Coolidge in which he called to mind the fact that this country leads the world in the production not only of coal but of iron, copper, petroleum, zinc, lead, phosphate rock and sulphur and that its mining importance is tremendous. He sent good wishes to the congress and bade the mining interests of the country produce the nation's minerals and metals with the minimum hazard to life and a minimum of economic waste. In his annual report this morning President Jennings of the congress said the congress primarily is interested in mining but it does not urge the claims of mining against those of agriculture, transportation and manufacture, all of

which must progress abreast. Two great problems face the mining industry, he said. One is the waste of mining and the other is the economic disorder caused by the reckless speed at which the country's resources are being extracted. Overproduction of gold was especially mentioned.

Labor relations in coal, he said, are bad largely because the miners' union is "trying to impose an absentee directorship of labor upon the coal-mining industry. I cannot believe the American people will tolerate this domination of a small body of men whose interests lie in perpetuating their own power." He said, "the American Mining Congress is working hand in hand with the National Coal Association, that relationship between the employer and employee in the coal industry should be adjusted so that capital should be adequately rewarded, that labor should receive sufficient remuneration to live and save, and that consumers should get coal at the lowest price compatible with the above two requirements."

The sessions of the convention run all week, closing with the annual banquet Friday night.

Pennsylvania Soft-Coal Operators Prepare To Fight for District Settlements

Notice was served on the U. S. Coal Commission on Sept. 19 by the Central Pennsylvania Coal Producers' Association that the bituminous operators of Pennsylvania intend "going to the mat" with the miners next April on the subject of national agreements.

Declaring that the United Mine Workers has enjoyed a monopoly of labor "through their ability to make a nationwide settlement the law for the bituminous industry," the Pennsylvania operators sound this warning:

"The time is here when operators will be able to have some say about what form and in what manner their relations with the United Mine Workers shall continue. One of the greatest calamities, in our opinion, that could happen to the coal-mining industry is to have the mark of approval placed upon nationwide agreements by any considerable number of the large coal-producing districts of states."

The "monopoly of labor" which the union now holds, according to the operators' statement, can be destroyed only by having the operators refuse to assist in the maintenance of the nationwide agreements.

In addition to outlining the operators' views on the form settlements should take, the presentation deals extensively with the "opposition of organized labor to proper police forces maintained by government," the cost of production, the earnings of mine workers and the number of men in the industry.

The workers, the operators say, have been "able to divide and rule" them during the period of the past five years because of the great activity and abnormal situation in the coal industry created out of war and post-war conditions.

"The United Mine Workers have exercised the vast power placed in their hands by reason of these abnormal conditions in a way that has been detrimental to the unionized coal fields and to the advantage of the non-union coal fields," the statement declares.

The power of the union, it is added, will be lessened with the return to normal conditions in the industry. The operators in the more weakly unionized districts, the statement says, will be able to make wage agreements based upon competitive conditions and will immediately restore their proper competitive relations as compared with the non-union fields.

"Normal economic conditions in the bituminous industry will bring about the destruction of the power which the United Mine Workers so badly used during the past five years," is disclosed as part of Pennsylvania operators' strategy.

An explosion, Sept. 24 in the main shaft of the Reden coal mines at Dombrova, Poland, is believed to have resulted in the death of 110 miners. Fifty bodies have been recovered. As the explosion was followed by fire there was little hope of rescuing alive any of the men who were entombed.

Purchase of Coal on Contract, Says Commission Report, Is to Advantage of Both Producer and Consumer

Purchase of coal on contracts makes for regularity of mine operation and steadies the market, according to a report issued by the Coal Commission Sept. 21. "It is to the advantage of both coal producer and coal consumer that their relations be more or less permanent," says the report. "Every time a producer abandons a market that has been educated to his product, or a large consumer changes his source of supply there is introduced an incentive for more mine development. This shifting about in the search for more profitable outlets or for cheaper and better coal must always continue in a competitive business such as the bituminous coal industry, but the degree to which it has taken place in the past six years has greatly disturbed the trade.

"This unusual shifting about by producers for markets and by consumers for tonnage has been the result of complications in the production and distribution of soft coal introduced by the war and by the nation-wide strikes in the organized coal fields. The measures that have been recommended to eliminate such strikes and reduce irregularity of mine operation and overdevelopment of the producing industry will again make it feasible for consumers to establish firm relations with dependable sources of soft-coal supply. The coal contract is the basis on which that relationship must rest. The Commission, through C. E. Lesher, H. M. Search and Sydney Hale, of the engineering staff, has investigated the nature of coal contracts, the extent of their use, and the performance of both shippers and buyers on their contracts in the calendar years 1920 and 1921. In a subsequent chapter the details of this study will be discussed but the general conclusions are presented here.

"Shipments on Contracts—A majority of the coal producers make contracts for the sale of their product. In 1920, 91 per cent of the commercial coal shipped was from companies that sold all or part of their tonnage on contracts for six months or more, and 9 per cent was from companies that made no contracts. In 1921 the companies making contracts for all or part of their output represented 93 per cent of the total commercial shipments and those companies selling on the spot market had 7 per cent of the total tonnage. The companies making contracts shipped in 1920 79 per cent of their coal on these contracts and in 1921 74 per cent. The total commercial shipments were divided in 1920, 71 per cent on contracts for six months or more and 29 per cent on spot sales or short-term agreements; in 1921, 72 per cent on long-term contracts and 28 per cent on spot sales or short-term agreements. Sales agreements covering less than six months have been considered as equivalent to spot sales. The larger companies sell a larger proportion of their total output on contracts than do the smaller companies.

"Producers contract to sell their coal either directly with consumers or with an intermediary, a selling agent or wholesaler, who in turn resells to the consumer in whole-sale quantities either by contracts or in the open market. In 1920, sales agencies took 42 per cent of the tonnage shipped under contract by producers; in 1921, 45 per cent. This should not be construed as a measure of the quantity of coal handled by jobbers. It is instead a measure of the extent to which producers, notably small operators, contract for the disposal of their product through separately incorporated or independent selling departments. The merchandising of coal is a separate function from its production. Between 40 and 45 per cent of the commercial tonnage that is sold on contract by the producer is handled by selling departments or sales agents distinct from the operating company. The remainder, or between 55 and 60 per cent, is contracted for sale by selling departments of the producing companies.

"Contracts direct with consumers may be either 'output' contracts, by which the entire production is taken, 'require-

ment or surplus-tonnage' contracts or definite tonnage contracts. The definite tonnage contracts represented 41 per cent of the total contract shipments in 1920 and 36 per cent in 1921; requirement or surplus-tonnage contracts were 9 per cent in 1920 and 10 per cent in 1921; and output contracts took 7 per cent in 1920 and 8 per cent in 1921. The remainder, 1 per cent in each year, not classified, was that contracted by the smallest group of producers.

"The larger consumers depend mainly on the definite tonnage contract. The railroads have been the largest buyers using output contracts, in which class are those dependent on assigned cars; the public utilities have used the requirement or surplus-tonnage contract more than any other class of consumers. Retail dealers do not, as a rule, buy their coal on contracts, but when they do it is largely on definite tonnage contracts. Producers sell some coal to wholesalers on definite-tonnage, surplus-tonnage, and output contracts, but between 85 and 90 per cent of the contracts between producers and middlemen are sales-agency contracts that in effect make the middleman the selling department of the producer as respects the tonnage contracted.

"That such a large portion of the output is handled through a selling agent or a wholesaler instead of being sold directly by the producing company to the consumer or retail dealer is significant of the complex machinery of distribution that has been built up in the bituminous-coal industry.

"Performance on Contracts—Performance can be measured only on those contracts calling for definite tonnage. The percentages in the following summary set forth the relation of actual shipments to quantity due on definite tonnage contracts.

PERCENTAGE PERFORMANCE ON DEFINITE TONNAGE CONTRACT
(As reported by producers of bituminous coal representing 68 per cent in 1920 and 72 per cent in 1921, of the total commercial shipments.)

EAST OF THE MISSISSIPPI												
Size of Producer Class	Railroads		Public Utilities		Retail Dealers		Industrials		Wholesalers		Total	
	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921	1920	1921
I	94	92	81	91	72	62	89	79	73	69	86	83
II	88	93	77	85	84	84	75	68	75	61	81	80
III	95	91	71	64	74	60	71	94	79	81	84	86
IV	87	94	84	56	56	94	90	94	80	96	85	91
V	100	46	100	63			100	97	63	101	81	69
All Sizes	92	92	80	90	73	64	86	78	74	69	84	83
WEST OF THE MISSISSIPPI												
I	100	101	106	90	100	100	87	84	100	100	97	96
II	103	101	96	92	100	100	98	100	100	100	101	99
III	100	99	100	100			100	100	100	100	100	99
IV	100	100	100	100			104	100	100	100	60	95
V	100	73					100	100	100	100	100	77
All Sizes	101	101	99	91	100	100	91	90	100	100	98	97
Grand total	94	93	81	90	76	68	86	79	75	70	86	84

Note—Class I includes producers having shipments of 500,000 tons per year or more; class II shipping between 100,000 but less than 500,000 tons; class III shipping 50,000 but less than 100,000 tons; class IV shipping 10,000 but less than 50,000 tons; and class V those shipping less than 10,000 tons per year.

"Considered from a purely statistical standpoint, the performance on definite-tonnage contracts east of the Mississippi River, where the bulk of the coal is both mined and consumed, is not a record to excite admiration, and for some classes of producing companies the performances shown was deplorable. Figures showing a 60 to 85 per cent performance on definite tonnage contracts suggest either external interference with performance, the recurrence of which, if possible, should be guarded against, or loose practices within the industry that should be corrected if the stabilization that might reasonably be expected from contract sales is to be attained. . . .

"If contracts, and particularly definite-tonnage contracts are to have the stabilizing influence in the industry that might reasonably be expected, it is patent that there must be a decided change in mental attitude upon the part of both consignor and consignee. To effect this and to give

contracts the place to which they are entitled, the Coal Commission makes the following recommendations:

"Recommendations for Reforms in Contract Practices.—

(1) Every definite-tonnage contract should be recognized by both parties to an agreement as a fixed obligation upon the part of the seller to ship and the buyer to accept the tonnages called for in the contract, except when prevented by causes beyond the control of the parties. These causes should be definitely stated and the number should be cut to the irreducible minimum. Causes excusing the shipper for failure to deliver must of necessity include:

"(a) Strikes and transportation disabilities, *subject to the limitations later set out*, and breakdowns.

"(b) Government interference with performance. While the shipper is entitled to protection in this regard, every effort should be made by government officials to discourage, and if possible eliminate, all forms of government regulation in times of emergency that interfere with contract performance.

"Upon the part of the purchaser:

"(a) Strikes at the plant of the consumer.

"(b) Plant breakdowns.

"It will be noted that no provision is made for suspension or reduction in the case of changed business conditions. To recognize such an exception and to permit errors in judgment to be used as an excuse for contract avoidance would defeat the primary purpose of contracts.

"(2) Contract tonnage in every and all cases should have precedence over spot-coal deliveries. All spot-coal orders should be taken subject to contract priority. Moreover, the purchaser should be given a yardstick by which to measure contract performance. He should know the estimated annual output of the shipper and the actual monthly

shipments. He should also be kept informed as to the total contract obligations of the shipper, and, in the event that the actual performance was less than the contract commitments, then adjustment should be made upon a percentage basis. . . .

"(3) No fixed rules may be laid down in respect to price. There are contracts which name a definite price for the period of the contract, others which provide for a sliding scale, still others that give the buyer the benefit of lower spot prices, but protect him against higher quotations, and some in which the price is a sum over and above the cost of production. With the tonnage obligation definitely fixed, the question of price becomes subordinate. If the seller knows he must ship and the buyer that he must accept the tonnages specified, it is reasonable to assume that there will be a firm meeting of minds upon the question of price. This recommendation is made, however: Where the price is not definitely named at a fixed sum per ton in the agreement, the manner in which it is to be determined from time to time and the basic data to be used in such determination should be so clearly stated and understood that it will become impossible for either party to use subsequent disputes or disagreements as to price as an excuse for avoiding their contract obligations on delivery and acceptance. A like recommendation may be made with respect to quality. . . .

"Coal shippers and coal consumers must become impressed with the idea that a contract means a fixed obligation with respect to both delivery and acceptance of tonnage and that no shipper with contract commitments should enter the spot market until he has fully discharged his contract obligations, or buyer shut off contract shipments while he purchases lower priced spot coal."

Operators' Committee Reports on Number of Investors in Bituminous Coal Industry

In a memorandum filed with the United States Coal Commission Sept. 12, the Bituminous Operators' Special Committee reports that the number of individuals who have their money at stake in the coal business probably is greater than the number of employees in that business. The figures indicate that there are about 202,618 persons who hold stock directly in coal companies. They also show that there are at least 200,000 more who are indirectly interested in coal companies through shares of stock in holding companies.

"That would give," says the memorandum, "a total of over 400,000 as the number of individual holdings of investors who are interested in the bituminous coal industry."

"The various forms of business organization represented," says the memorandum, "are given in the following table:

TYPES OF ORGANIZATIONS

Class*	Corporations (Not Subsidiaries)	Partnerships	Individual Enterprises	Subsidiary Corporations	Total
I	124	0	0	24	148
II	558	22	9	39	628
III	409	36	15	17	477
IV	972	222	89	24	1,307
V	368	143	93	5	608
Total	2,430	423	206	109	3,201

"The results as to number of investors, exclusive of investors in holding companies, are as follows:

NUMBER OF INVESTORS

Class*	Stockholders	Partners	Individual Owners	Total
I	39,632	0	0	39,632
II	35,599	80	9	35,688
III	16,294	136	15	16,445
IV	25,649	837	89	26,575
V	7,082	452	93	7,627
Total	124,256	1,505	206	125,967

* This refers to the Geological Survey classification. It is as follows: Class I, Companies producing over 500,000 tons a year; class II, companies producing 100,000 to 500,000 tons a year; class III, companies producing 50,000 to 100,000 tons a year; class IV, companies producing 10,000 to 50,000 tons a year; class V, companies producing under 10,000 tons a year.

"According to this tabulation the total number of in-

vestors in 50.18 per cent of the companies, exclusive of investors who own stock in holding companies, is 125,967. It would seem proper to estimate the number of investors in the companies which have not reported on the assumption that the number of investors in each company that has not reported will average the same as the number of investors in the companies of the same class that have reported. On this basis, we may compute as indicated by the following table:

ESTIMATED NUMBER OF INDIVIDUAL HOLDINGS

Class	Individual Holdings in Companies Reporting (Exclusive of Subsidiary Corporations)	Per Cent Total Companies Reporting	Total Individual Holdings (Estimated)
I	39,632	74.74	53,026
II	35,688	74.14	48,136
III	16,445	67.47	24,374
IV	26,575	51.17	51,935
V	7,627	30.33	25,147
Total	125,967	50.18	202,618

"This gives the figure of 202,618 for the total number of individual investments in the bituminous-coal industry, exclusive of investments in companies which own stock of subsidiary corporations which are engaged in the coal business, and exclusive of bond holders and similar indirect investors.

"It is a difficult matter to estimate with any exact degree of accuracy the number of stockholders in companies which own the stock in subsidiary corporations engaged in the production of bituminous coal. . . .

"There are no doubt a number of inevitable duplications in these tabulations, due to the same persons being stockholders in several companies, or partners in several firms. We do not believe these duplications to be very numerous in the aggregate. A liberal estimate would, we believe, be 10 per cent. If we deduct 10 per cent from the figure given above, which is the estimated total number of individual holdings, we arrive at the final figure of more than 360,000 as the total number of individual investors in coal companies in the United States.

"This figure does not include the very large number of persons who own bonds of coal companies, and the still larger number who have an indirect but highly important interest in the coal industry through banks and other institutions which participate in the financing of the coal business."

Urges Large-Scale, Regular Storage Of Soft Coal by Consumers

Commission Report Advises Heaviest Buying Between April and September, When Price and Consumption Are Low

Storage of coal by consumers is the all-important balance wheel between fluctuating consumption and variable production. It is the consumers' insurance against temporary failures of transportation, such as caused by storms. It is the only protection yet devised for the consumer against protracted general stoppage of coal mining or of railroad deliveries.

After the experience of this country in 1917-1918, in 1920, in 1922 and finally in 1923 in the storage of bituminous coal, it seems hardly necessary to call attention to the subject. In 1918 some 63,000,000 tons of soft coal were in consumers' storage piles on armistice day, an unprecedented quantity. In 1920 the lack of storage, for which the consumers were in part responsible, having so generously burned up their surplus coal in 1919, cost the buyers of soft coal millions of dollars when they precipitately sought to refill their bins during the summer of that year.

In anticipation of the general strike of soft-coal miners on April 1, 1922, the country bought and stored more than 60,000,000 tons of soft coal in the fall and winter of 1921-22. This huge stockpile, largely depleted during the 5 months' strike, has been nearly rebuilt in the past spring and summer. More than 50,000,000 tons were on hand Sept. 1, 1923.

These facts about storage by industries, public utilities and railroads, the large users of bituminous coal, are recited to show that storage has been and can at any time be undertaken on a large scale in this country. The consumer of anthracite, the householder, years ago learned the distinct advantage of putting all or a large part of the winter requirements into his cellar during the warm months. The fact of summer buying of anthracite, assisted by the summer discounts in price, was a large factor in regularizing the anthracite industry. This should be continued and perhaps extended to the bituminous-coal industry.

Regular, systematic, large-scale storage of bituminous coal by consumers during the seasons of low consumption is the public's largest opportunity and responsibility in solving the coal problem. Another direction in which the buyer can and should help not only himself but the coal business, is in proper selection of his fuel. The direct bearing of consumers' storage in regularity of mine operation, the reduction of overdevelopment and the lengthening of the mine workers' year are discussed in other chapters of this report. The Commission seeks here to emphasize what it means to the consumers—that is, the public.

The proper methods of soft-coal storage, the depth of piles, protection against fires and spontaneous combustion, reclamation, loss of heating value, degradation, are technical questions on which this Commission has made no investigation. These subjects have been studied intensively by the Bureau of Mines and state and private institutions, as the Illinois Engineering Experimental Station, the Carnegie Institute of Technology and the International Railway Fuel Association. The results of their investigations are published and available to all.

The conclusions of those who have studied the technical question of soft-coal storage are that there is a proper, safe way for the storage of any and all kinds of soft coal and that improper methods will render the best coal liable to spontaneous combustion. For most coals the losses in heating value and degradation are comparatively small.

The Commission made a systematic field investigation among industrials, railroads and public utilities of methods and costs of storage of soft coal. In this study, which was conducted by R. H. Kudlich, mechanical engineer of the Bureau of Mines, under the direction of F. R. Wadleigh, Federal Fuel Distributor, particular attention was given to

the policy of these buyers toward accumulation of reserve coal. It was found that in general the larger railroads and the public utilities have a definite policy on storage. It is, briefly, that small reserves must always be maintained and that unusual reserves are only to be accumulated against impending stoppages in supply. In areas as remote from the mines as New England and the Northwest what might elsewhere be considered a large reserve becomes inadequate insurance against interrupted supply, and the reserves in these distant markets are nearly always the largest in the country both in tons and in terms of days' supply.

The cost of storage is an indefinite figure. Hundreds of firms storing coal were interviewed and their records examined, but it is found to be difficult, if not impossible, to give even rough general figures on the cost of storing coal. Two neighboring plants may each store 3,000 tons. One plant, with hand-fired boilers has a trestle bunker adjacent to the boiler house where this tonnage can be dumped at an additional labor cost of, say, 5c. a ton for trimming. The bunker is used for the ordinary "car-to-boiler" operation and the handling of this additional tonnage does not add to the interest or maintenance charges on the equipment. When reclaiming from this storage the fireman wheels the coal as he would ordinarily, so that reclaiming represents a little extra labor to him but no additional operating expense. The only items which can properly be charged to storage here are labor cost of trimming, interest on investment (coal and freight), say 25c., and deterioration and shrinkage, say 25c., a total of 55c.

The adjoining plant is equipped with overhead bunkers with capacity for a week, receiving the coal by elevator from a track hopper. Here the existing equipment cannot be utilized for storage, additional mechanical equipment must be installed or the coal handled by hand labor into and out of storage. In this case the labor charge may run from 5c. or 10c. per ton with mechanical equipment in and out of storage, to 50c. or \$1 per ton with hand labor.

STORAGE COST RANGES FROM 50C. TO \$1.50 PER TON

Considering interest and maintenance of the extra mechanical equipment, interest on the coal, cost including freight, and deterioration and shrinkage of coal, the costs range from 50c. to 75c. for large storages, 50,000 tons or more, to \$1 to \$1.50 per ton for small storages of a few hundred to a thousand tons; these costs are on the quantity of coal actually stored. Spread over the total tonnage used in a year, and figured as cost per ton for all coal used, the figure is much less. This is the fair basis for calculating the cost of storage.

The consumer who has learned to store coal only as a necessary measure of self-protection should undertake it as regular business practice. In every year of normal business and industrial conditions, the six months from April to September, the price of bituminous coal is lower than in the fall and winter. In these months the consumption of coal is lowest. It is the part of good business for the buyer to take in during the summer months more coal than he burns, to put it into storage and use the reserve thus accumulated during the winter months when requirements are above the average. The best practice, not only for the buyer but for the seller, is to have the year's coal produced and shipped in 12 equal monthly installments. The buyers who wait until fall or winter to place their orders may expect to pay a higher price.

Carrying this idea to the consumer in an effective way calls for continuing educational efforts. This Commission has reported at length on the costs to the coal producer of irregular production. It has offered suggestions and made recommendations looking toward regularizing the production of coal but it must leave to others the encouragement of consumers to do their part by proper, timely storage.

The Federated American Engineering Societies is now preparing a report on coal storage that is to be addressed to the consuming public. In this work the Coal Commission is co-operating by making available to the engineers the detailed results of its investigation.

Brydon Committee Completes Presentation Of Bituminous Operators' Case

The Bituminous Operators Special Committee filed its last statement with the U. S. Coal Commission on Sept. 22. The work of this committee, headed by John Brydon, now the president of the National Coal Association, began in November, 1922, immediately after the organization of the Coal Commission. H. L. Stimson and G. H. Dorr were engaged as counsel. Under their direction, and with the assistance of a large staff of economists, statisticians, engineers and field men, the Special Committee prepared and transmitted to the Coal Commission more than thirty printed documents in the form of letters, memoranda and briefs. On important matters the Special Committee represented every bituminous coal field in the United States except Iowa. A number of local associations submitted statements of their case directly to the Commission. The following is a list of documents submitted to the Coal Commission by the Bituminous Operators Special Committee:

Reply of the Bituminous Operators' Special Committee to the Letter of the United States Coal Commission. Date of filing, Nov. 10 1923.

Letter and General Brief on the Policy and Methods of the United Mine Workers of America. Date of filing, April 5, 1923.

Letter and Brief on Campaign of Aggression of United Mine Workers in State of Ohio. Filed April 16, 1923.

Northeastern Kentucky: Labor Monopoly versus the Open Shop. Date of filing, April 25, 1923.

Letter to the United States Coal Commission on the Check-off. Date of filing, April 30, 1923.

Letter and Statement on Herrin. Filed May 16, 1923.

Letter Suggesting a Method of Analyzing the Data as

to Cost and Realization Furnished by the Operators on Forms C-1 and C-2. Date of filing, May 25, 1923.

Letter and Memorandum on Methods of Determining the Rate of Profit in the Bituminous Coal Industry. Date of filing, June 14, 1923.

Memorandum on Labor Relations in the Coal Industry with Suggestions for Constructive Action. Date of filing, June 26, 1923.

Summary of Suggestions for Constructive Action as to Labor Relations in the Coal Industry. Date of filing, June 26, 1923.

The Campaign of the United Mine Workers of America Against the Non-Union Mines of Utah in Aid of Its 1922 Nation-Wide Strike. Date of filing, June 28, 1923.

Proposed Findings as to Certain Aspects of the Bituminous-Coal Mining Industry. Date of filing June 30, 1923.

The Campaign of the United Mine Workers of America Against the Coal Mines of Alabama in 1920 and 1921. Date of filing, July 30, 1923.

Summary of the Oral Argument made before the United States Coal Commission, July 30-31, 1923. Date of filing, Aug. 15, 1923.

The United Mine Workers in West Virginia. Date of filing, Aug. 18, 1923.

Appendices to West Virginia brief. Date of filing, Aug. 18, 1923.

Memorandum on the Treatment of Income and Excess Profits Taxes in Determining the Margin of Profit. Date of filing, Aug. 31, 1923.

Memorandum on the Proper Treatment of Coal Reserves in Determining the Fair Present Value of Mining Properties. Date of Filing, Aug. 31, 1923.



BITUMINOUS OPERATORS' SPECIAL COMMITTEE

Left to right: Colonel Stimson, G. H. Dorr, A. M. Ogle, Philip Penna, J. G. Bradley, John Brydon, Tracy Guthrie, H. W. Little, F. W. Lukins, Allan H. Willett

Economics, Accounting and the Constitution in the Coal Industry. Date of filing, Sept. 1, 1923.

Statement to the United States Coal Commission on Coal Transportation. Date of filing, Sept. 4, 1923.

The Campaign of the United Mine Workers of America in 1922 against the Wagon Mines in Indiana. Date of filing, Sept. 6, 1923.

The Company Town. Date of filing, Sept. 8, 1923.

Letter on Pascoe Affair. Date of filing, Sept. 7, 1923.

Comparative Efficiency of Labor in the Bituminous-Coal Industry under Union and Non-Union Operation. Date of filing, Sept. 10, 1923.

Memorandum on the Number of Investors in Bituminous Coal Properties. Date of filing, Sept. 12, 1923.

Memorandum on the Strike of 1922. Date of filing, Sept. 15, 1923.

Memorandum on Variation of Living Costs in the Bituminous-Coal Fields. Date of filing, Sept. 17, 1923.

Maryland: The Campaign of Violence Conducted by the United Mine Workers of America against the Open-Shop Mines in the Georges Creek and Upper Potomac Fields. Date of filing, Sept. 18, 1923.

Summary of Statement on Comparative Efficiency of Labor in the Bituminous-Coal Industry under Union and Non-union operation. Date of filing, Sept. 18, 1923.

Comparison of Wages of Bituminous Miners with Wages of Employees in Other Industries. Filed Sept. 18, 1923.

Living Conditions in 14 Coal Fields in 11 States. Date of filing, Sept. 20, 1923.

Monthly and Daily Earnings of Bituminous-Coal Miners. Date of filing, Sept. 21, 1923.

The Influence of Labor Cost on the Prices of Bituminous Coal. Filed Sept. 22, 1923.

STATEMENTS TO THE COMMISSION BY LOCAL ASSOCIATIONS

Brief of the Central Pennsylvania Coal Producers' Association and the Association of Bituminous Coal Operators of Pennsylvania. Date of filing, June 12, 1923.

Statement by Non-Union Operators of Southern West Virginia. Filed June 12, 1923.

Series of Statements by Illinois Coal Operators. Filed June 18, 1923.

Brief of Montana and Southern Wyoming Coal Operators.

Statement of the Southwestern Interstate Coal Operators' Association of Missouri, Kansas, Arkansas and Oklahoma. Date of filing, June 23, 1923.

Statement to the United States Coal Commission by the Somerset County Coal Operators' Association. Date of filing, Aug. 4, 1923.

Statement to the United States Coal Commission by the Kanawha Coal Operators' Association. Filed Aug. 6, 1923.

Statement to the United States Coal Commission by the Southern Appalachian Coal Operators' Association. Date of filing, Sept. 11, 1923.

Statement of Alabama Coal Operators to the United States Coal Commission. Date of filing, Sept. 11, 1923.

Supplemental Brief of Central Pennsylvania Coal Operators. Date of filing, Sept. 19, 1923.

Union Fights Use of Modern Machinery In Illinois Coal Mines

There has been a continual fight against the introduction of modern mining machinery in the bituminous coal mines of Illinois on the part of the United Mine Workers—and all the mines in the state are unionized—part of the fight being conducted by strikes, a selected list of which has been submitted to the U. S. Coal Commission by Illinois coal operators.

In some instances, where operators for greater efficiency and safety sought to install machines, the miners flatly refused to change from hand to machine mining. There were numerous instances of arbitrary limitation of the method and manner in which the machines should be used. The union, powerful enough to force concessions, has made of the demanded conditions for machine mining established practice now. A list of the strikes brought on by the intro-

duction of mining machinery sent to the Coal Commission includes the following:

A strike at St. David against changing from hand mining.

A strike lasting eleven weeks at St. David and Dunfermline for the same reason.

A strike at Hillsboro by machine men, who refused to accept regular machine scale of pay for cutting and loading coal where an entry was being widened to put in a switch.

At Sparland a mine was idle twenty-five work days because the men refused to handle clay cuttings after the machines without extra pay.

After a change in the machine mining rate had been agreed to at a mine at La Marsh, 161 men struck in protest against the change, staying out two days.

At Kortkamp refusal to double shift the machines shut the mine down for ten days when 336 men struck.

Brydon Committee Files Brief on Influence Of Labor Cost on Soft-Coal Prices

The Bituminous Operators' Special Committee submitted to the U. S. Coal Commission on Sept. 22 the last of its series of briefs, entitled "The Influence of Labor Cost on the Prices of Bituminous Coal."

Colonel Henry L. Stimson and Goldthwaite H. Dorr, of counsel for the Special Committee, who had prepared the brief, summarize their conclusions as follows:

"(1) From 1886 to 1922 the average price of bituminous coal in the United States at the mouth of the mine was lower than in any other civilized country in the world.

"(2) In the 30-year period from 1886 to 1915 the average price of coal in the United States actually declined, while prices of bituminous coal in the four other principal coal producing countries increased to more than double the 1886 prices.

"(3) The decline in bituminous coal prices in the United States during this period was due to the opening up of hitherto untouched coal reserves and to the introduction on a large scale of modern mining machinery.

"(4) This decline in prices was brought about in spite of the fact that labor cost, as represented by wage rates of miners, rose steadily during the entire period.

"(5) Only after 1915, due to the increase in the centralized power of the United Mine Workers of America during and after the war, did the item of labor cost rise so steadily that it overbalanced the increases of mining efficiency and caused a rise in the price of bituminous coal.

"(6) Labor cost is the principal element in the cost of production of coal, and amounted to 67.7 per cent of the total cost of mining in 1921.

"(7) The labor cost of production of bituminous coal in 1921 was more than the total cost of production in 1916, due to the heavy increase in wage rates forced on the operators by the monopoly power of the United Mine Workers in the intervening years.

"(8) Due to the fact that wage rates in the bituminous coal industry have not been deflated since 1920, as have the wages of labor in other industries, the labor cost of bituminous coal mining still remains at or above the war-time peak, and the public must continue to pay the increased prices due to this inflation until such time as these wages are deflated to the levels of wages paid for similar work in other industries."

THE EDITOR OF *Coal Age* is in receipt of the following letter from F. R. Wadleigh:

"The official existence of the Federal Fuel Distributor will end on Sept. 22, as required by the act creating the office. Before going out of office, let me take this opportunity to express my hearty thanks and appreciation, officially and personally, for the co-operation and assistance that you have given me in my work as Federal Fuel Distributor. Only through the voluntary help and good will of those engaged in the coal industry has it been possible to bring about such satisfactory results as have been attained, and I wish to make formal acknowledgment to that effect."



Production and the Market



Weekly Review

Anthracite production has been resumed and shipments are going forward at the new "company" prices which at the mine are from 70c. to 90c. higher on egg, stove, and nut than before the strike, and from 15c. to 30c. higher on pea coal. The miners were in no particular hurry to start work, and after the agreement was signed last week but half the mines were able to start up the first day and those were short-handed. Coal arrived in New York tidewater within 48 hours after mining started.

The demand for domestic sizes of anthracite is almost as strong as before the strike. That the trade expects a continuation of this active market for some time to come is indicated by the independents pricing the family sizes up to \$11.50 per ton.

Steam coal demand is sluggish. The anthracite fine sizes are moved with the greatest difficulty. The soft-coal market is flat with a tendency toward even lower prices. Coal Age Index spot coal prices at the mines on Sept. 24 was 200, a slight decline from the previous week.

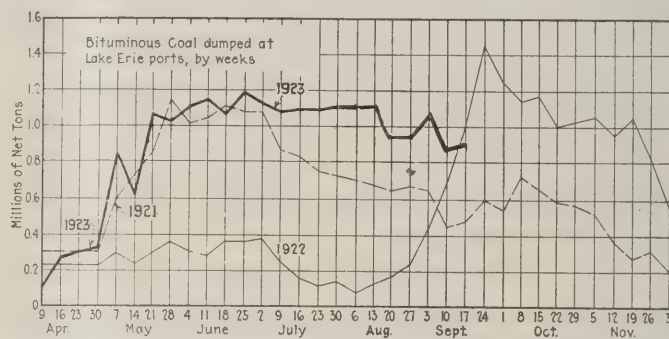
RAILROADS INCREASE RESERVE STOCKS

Production of bituminous coal is holding up above the 11,000,000 tons per week level. The cumulative total of soft-coal production to date, 391,000,000 tons, is less than two per cent below the average for the same period in the three boom years of 1917, 1918, and 1920. Ten million tons of this production has been added to railroad storage since the first of January. The railroads now have more coal on the ground than they ever before had in total storage.

In Chicago the market for domestic coals is recovering slowly, while screenings and middle sized prepared coals drag heavily. No activity is expected for at least thirty days. In Ohio the steam coals are not showing strength, but there is a fair demand for domestic sizes. The market there was more or less affected by the early termination of the anthracite strike as well as by warm

weather. In New England the buying of steam coals is practically at a standstill.

There is practically no market for bituminous screened coals. Producers of some of the better grades report demand dull with no immediate prospects of betterment. The coke situation had a setback following the reaching of the agreement in the anthracite fields. Quotations dropped and new orders are scarce.



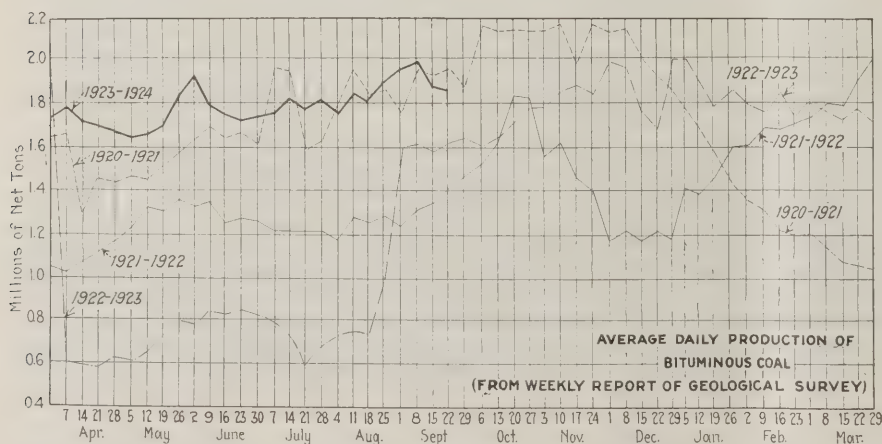
LAKE COAL DUMPED
(Net Tons)

	Week Ended Sept. 17	Season to Sept. 10
Cargo	787,509	20,404,360
Fuel	55,861	1,087,443
Totals	843,370	21,491,803

Export demand has slumped. Chartering was quiet throughout last week. At Hampton Roads dumpings for all accounts during the week ended Sept. 20 was 369,153 net tons, as compared with 327,871 tons the previous week.

Steam Coal Drags in Midwest

Domestic market in the Chicago region is slowly recovering while screenings and middle sized prepared coals drag heavily. There is little in the present state of the market to enliven selling agencies' spirits for nothing active is expected to develop for at least another month. Meanwhile steam buyers hang back and screenings sink. No southern Illinois producer can get anywhere near the



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Sept. 1	9,359,000	11,737,000
Sept. 8 (a)	8,791,000	10,485,000
Sept. 15 (b)	9,737,000	11,386,000
Daily average	1,623,000	1,898,000
Calendar year	1,149,000	1,790,000
Daily av. cal. year	251,446,000	390,681,000

ANTHRACITE

Sept. 1	37,000	1,893,000
Sept. 8	51,000	3,000
Sept. 15	1,127,000	2,000

COKE

Sept. 8	137,000	347,000
Sept. 15	317,000	124,000
Calendar year	4,484,000	13,847,000

(a) Subject to revision. (b) Revised from last report

recent top price of \$1.85 for screenings. The top now is about \$1.60, with the average below \$1.50. Some sells down to \$1.25. Central Illinois bumps along at 90c.@\$1.15 and Standard District hardly ever rises above \$1. The accumulation of no-bills in the middle prepared sizes is a real source of trouble to most mines. Railroads are urging the producers to do something about it.

Day-to-day buying for domestic needs holds lump prices up fairly well. Franklin County Association mines producing the best prepared coal in Illinois are able to stick closely to the top price of \$4.35, though the range on this coal runs down to \$4. Central Illinois is now able to get \$3.25 for most of its lump. Good Fourth Vein Indiana lump brings about the same with Fifth Vein trailing along about 50c. to the rear. The state of the market makes it necessary to get full price for lump or shut down the mines.

Pocahontas continues to come into the territory in considerable volume, meeting a light demand at no increase in the mine run price of \$2.75@\$3. A small quantity of lump sells for about \$6. There is only moderate interest in anthracite. Yards are said to be about empty. No

fresh coal is due to reach Chicago for another week and no circulars have been officially announced yet. However, one old line company is reported to be mailing out a price list showing an increase of 90c. on grate, egg, stove and nut and 75c. on pea.

Southern Illinois fields are working about two days a week on an average, though the bigger mines with the stronger selling forces are able to beat this. Very little coal is moving south through the Thebes and Cairo gateways for southern coal and oil have taken those markets. Standard District could not hold the pick-up that favored that region a week or so ago. Big lump is all that will move. Mt. Olive field feels a little improvement.

In St. Louis the market has returned to sluggishness. Steam buyers take a little wagon load stuff from day to day but that is about all. Dealers' yards are full with nothing moving out but a little low and middle grade lump such as Standard and Mt. Olive. No interest has been shown in anthracite, smokeless or coke.

Kentucky Is Fairly Busy

While some complaint is being heard concerning lack

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Market Quoted	Sept. 25 1922	Sept. 10 1923	Sept. 17 1923	Sept. 24 1923†
Smokeless lump.....	Columbus....	\$6.65	\$5.95	\$5.95	\$5.75@ \$6.15				
Smokeless mine run.....	Columbus....	6.00	3.00	3.00	2.75@ 3.25				
Smokeless screenings.....	Columbus....	5.75	2.35	2.35	2.25@ 2.50				
Smokeless lump.....	Chicago....	6.50	6.25	6.10	6.00@ 6.25				
Smokeless mine run.....	Chicago....	5.85	3.35	2.85	2.75@ 3.00				
Smokeless lump.....	Cincinnati..	6.30	6.25	6.10	6.00@ 6.25				
Smokeless mine run.....	Cincinnati..	5.70	3.25	3.00	2.50@ 3.50				
Smokeless screenings.....	Cincinnati..	5.30	2.35	2.25	2.00@ 2.50				
*Smokeless mine run.....	Boston.....	8.05	5.05	5.05	4.90@ 5.25				
Clearfield mine run.....	Boston.....	4.50	2.15	2.15	1.85@ 2.50				
Cambria mine run.....	Boston.....	5.00	2.85	2.85	2.50@ 3.25				
Somerset mine run.....	Boston.....	4.75	2.50	2.35	2.00@ 2.75				
Pool I (Navy Standard).....	New York....	5.75	3.25	3.25	3.00@ 3.50				
Pool I (Navy Standard).....	Philadelphia..		3.20	3.25	3.00@ 3.50				
Pool I (Navy Standard).....	Baltimore....	5.90							
Pool 9 (Super. Low Vol.).....	New York....	5.00	2.55	2.50	2.40@ 2.75				
Pool 9 (Super. Low Vol.).....	Philadelphia..	5.35	2.55	2.65	2.40@ 2.75				
Pool 9 (Super. Low Vol.).....	Baltimore....	5.50	2.45	2.45	2.40@ 2.50				
Pool 10 (H.Gr.Low Vol.).....	New York....	4.65	2.20	2.15	2.00@ 2.30				
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	5.10	2.15	2.20	2.00@ 2.20				
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	4.85	2.25	2.25	2.25@ 2.30				
Pool II (Low Vol.).....	New York....	4.10	2.05	1.85	1.75@ 2.00				
Pool II (Low Vol.).....	Philadelphia..	4.60	2.15	2.10	1.80@ 1.90				
Pool II (Low Vol.).....	Baltimore....	4.35	2.00	2.00	2.00				

Midwest					Market Quoted	Sept. 25 1922	Sept. 10 1923	Sept. 17 1923	Sept. 24 1923†
Franklin, Ill. lump.....	Chicago....	\$5.40	\$4.20	\$4.05	\$4.00 @ \$4.35				
Franklin, Ill. mine run.....	Chicago....	4.75	3.00	3.00	2.75@ 3.25				
Franklin, Ill. screenings.....	Chicago....	4.10	1.75	1.55	1.25@ 1.60				
Central, Ill. lump.....	Chicago....	5.10	3.10	3.00	3.00@ 3.25				
Central, Ill. mine run.....	Chicago....	4.55	2.20	2.20	2.10@ 2.35				
Central, Ill. screenings.....	Chicago....	3.35	1.40	1.20	.90@ 1.10				
Ind. 4th Vein lump.....	Chicago....	5.25	3.35	3.35	3.25@ 3.50				
Ind. 4th Vein mine run.....	Chicago....	4.85	2.60	2.60	2.50@ 2.75				
Ind. 4th Vein screenings.....	Chicago....	3.85	1.60	1.45	1.25@ 1.50				
Ind. 5th Vein lump.....	Chicago....	5.10	2.75	2.75	2.50@ 3.00				
Ind. 5th Vein mine run.....	Chicago....	4.65	2.10	2.10	2.00@ 2.25				
Ind. 5th Vein screenings.....	Chicago....	3.85	1.40	1.25	1.00@ 1.15				
Mt. Olive lump.....	St. Louis....		3.10	3.10	2.75@ 3.25				
Mt. Olive mine run.....	St. Louis....		2.05	2.25	2.20@ 2.30				
Mt. Olive screenings.....	St. Louis....		1.45	1.35	1.20@ 1.30				
Standard lump.....	St. Louis....	4.90	2.60	2.80	2.65@ 3.00				
Standard mine run.....	St. Louis....	3.90	2.05	2.05	1.80@ 2.30				
Standard screenings.....	St. Louis....	2.50	.95	.95	.75@ .85				
West Ky. lump.....	Louisville..	4.90	2.60	2.35	2.25@ 2.50				
West Ky. mine run.....	Louisville..	4.25	1.95	1.95	1.75@ 2.10				
West Ky. screenings.....	Louisville..	4.00	1.05	.80	.80@ .90				
West Ky. lump.....	Chicago....	4.25	2.75	2.75	2.50@ 2.75				
West Ky. mine run.....	Chicago....	4.25	1.96	1.95	1.85@ 2.10				

High-Volatile, Eastern					Market Quoted	Sept. 25 1922	Sept. 10 1923	Sept. 17 1923	Sept. 24 1923†
Pool 54-64 (Gas and St.).....	New York....	4.70	1.80	1.75	1.65@ 1.90				
Pool 54-64 (Gas and St.).....	Philadelphia..	4.60	1.85	1.80					
Pool 54-64 (Gas and St.).....	Baltimore....	4.75	1.75	1.75	1.75				
Pittsburgh s&d gas.....	Pittsburgh..		3.00	2.95	2.75@ 2.90				
Pittsburgh gas mine run.....	Pittsburgh..		2.50	2.50	2.35@ 2.50				
Pittsburgh mine run (St.).....	Pittsburgh..	4.50	2.30	2.25	2.10@ 2.20				
Pittsburgh slack (Gas).....	Pittsburgh..		1.55	1.50	1.35@ 1.45				
Kanawha lump.....	Columbus....	6.40	3.15	3.15	2.85@ 3.50				
Kanawha mine run.....	Columbus....	5.75	1.90	1.90	1.75@ 2.10				
Kanawha screenings.....	Columbus....	5.65	1.25	1.25	1.00@ 1.10				
W. Va. lump.....	Cincinnati..	6.50	3.75	3.60	3.50@ 4.00				
W. Va. Gas mine run.....	Cincinnati..	6.50	1.80	1.60	1.50@ 2.00				
W. Va. Steam mine run.....	Cincinnati..	5.35	1.80	1.60	1.50@ 2.00				
W. Va. screenings.....	Cincinnati..	5.10	1.20	1.05	1.00@ 1.25				
Hocking lump.....	Columbus....	6.25	2.85	3.10	3.00@ 3.25				
Hocking mine run.....	Columbus....	4.75	1.90	1.95	1.85@ 2.10				
Hocking screenings.....	Columbus....	4.25	1.20	1.20	1.00@ 1.10				
Pitts. No. 8 lump.....	Cleveland....	5.00	2.65	2.60	2.25@ 3.00				
Pitts. No. 8 mine run.....	Cleveland....	4.60	2.10	2.05	2.00@ 2.10				
Pitts. No. 8 screenings.....	Cleveland....	4.35	1.35	1.25	1.15@ 1.30				

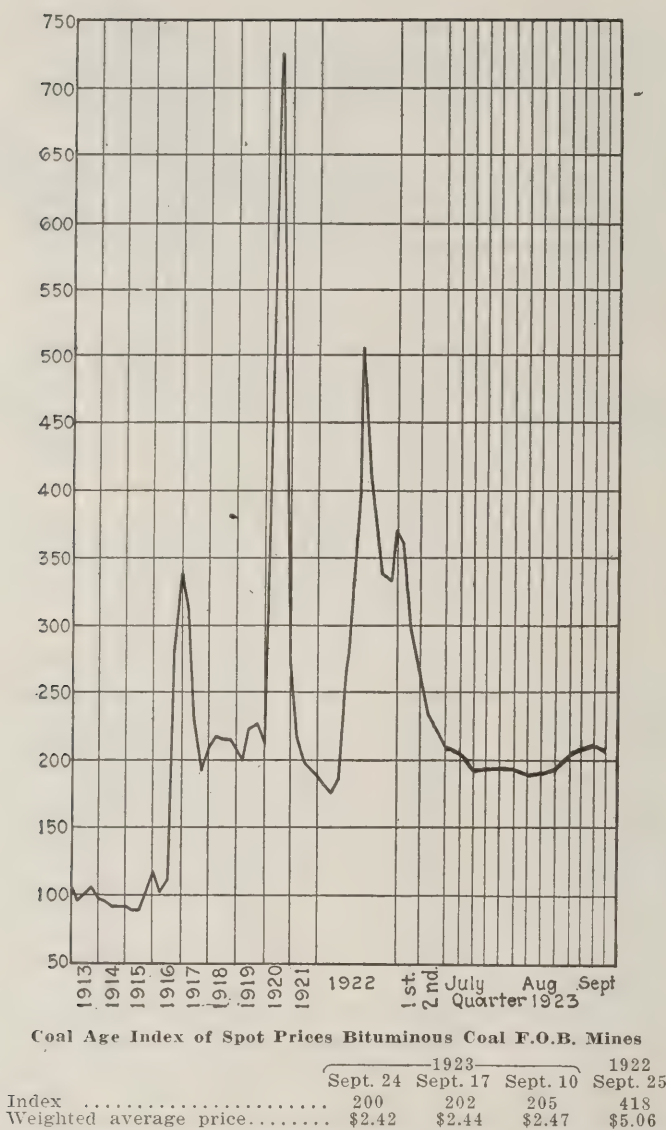
South and Southwest					Market Quoted	Sept. 25 1922	Sept. 10 1923	Sept. 17 1923	Sept. 24 1923†
Big Seam lump.....	Birmingham..	3.75	3.75	3.75	3.65@ 3.90				
Big Seam mine run.....	Birmingham..	2.80	1.95	1.95	1.75@ 2.15				
Big Seam (washed).....	Birmingham..	3.45	2.35	2.35	2.25@ 2.50				
S. E. Ky. lump.....	Chicago....	6.00	3.20	3.35	3.25@ 3.50				
S. E. Ky. mine run.....	Chicago....	4.75	2.30	1.85	2.00@ 2.50				
S. E. Ky. lump.....	Louisville..	6.90	3.10	3.10	3.00@ 3.25				
S. E. Ky. mine run.....	Louisville..	5.65	2.00	2.00	1.75@ 2.25				
S. E. Ky. screenings.....	Louisville..	5.50	1.20	1.05	.90@ 1.25				
S. E. Ky. lump.....	Cincinnati..	6.85	3.75	3.35	3.25@ 3.75				
S. E. Ky. mine run.....	Cincinnati..	5.50	1.75	1.55	1.50@ 1.75				
S. E. Ky. screenings.....	Cincinnati..	5.10	1.30	1.00	1.00@ 1.10				
Kansas lump.....	Kansas City..	6.25	4.50	4.50	4.50				
Kansas mine run.....	Kansas City..	5.00	3.50	3.50	3.50				
Kansas screenings.....	Kansas City..	2.60	2.60	2.60	2.50@ 2.75				

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Sept. 1, 1923		Sept. 24, 1923†	
			Independent	Company	Independent	Company	Independent	Company†
Broken.....	New York....	\$2.34	\$9.00	\$7.75@ \$8.25	\$7.75@ \$8.35	\$7.75@ \$8.35	\$8.00@ \$9.25	\$8.00@ \$9.25
Broken.....	Philadelphia..	2.39		7.90@ 8.10	7.90@ 8.10	7.90@ 8.10		
Egg.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	\$8.50@ 14.00	8.00@ 8.35	\$9.60@ 11.50	8.75@ 9.25
Egg.....	Philadelphia..	2.39	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	8.50@ 12.00	7.25@ 7.45		
Stove.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 14.50	8.00@ 8.35	9.85@ 11.50	8.75@ 9.25
Stove.....	Philadelphia..	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.75@ 9.25
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	8.50@ 12.00	7.25@ 7.45		
Chestnut.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	8.50@ 14.00	8.00@ 8.35	9.85@ 11.50	8.75@ 9.25
Chestnut.....	Philadelphia..	2.39	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.75@ 9.25
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	8.50@ 12.00	7.25@ 7.45		
Range.....	New York....	2.34		8.25		8.30		9.00
Pea.....	New York....	2.22	7.00@ 11.00	6.15@ 6.30	7.50@ 9.00	6.00@ 6.30	6.75@ 7.50	6.15@ 6.65
Pea.....	Philadelphia..	2.14	7.00@ 8.00	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20	6.75@ 9.00	6.25@ 6.60
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	7.00@ 8.50	5.30@ 5.65†		
Buckwheat No. 1.....	New York....	2.22	4.00@ 5.00	4.00@ 4.10	3.50	3.50@ 4.15	2.75@ 3.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14	5.00	4.00	3.50		3.00@ 3.50	3.50
Rice.....	New York....	2.22	3.00@ 3.25	2.75@ 3.00	2.50	2.50	2.25@ 2.50	2.50
Rice.....	Philadelphia..	2.14	2.50@ 2.75	2.75@ 3.00	2.50	2.50	2.00@ 2.50	2.50
Barley.....	New York....	2.22	1.75@ 2.00	1.50@ 2.00	1.50	1.50	1.25@ 1.50	1.50
Barley.....	Philadelphia..	2.14	1.00@ 1.75	2.00	1.50		1.50	1.50
Birdseye.....	New York....	2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

of demand which appears to be general in most markets, the mines are fairly busy on prepared sizes and are holding and getting fair to good prices. A good many operators of eastern Kentucky are holding for \$3.75@4 for prime block coal and are said to be getting it, although some have sold for \$3.50. There is a fair demand for all grades of prepared size coal, as domestic consumers are stocking, and retailers are being forced into buying more coal.

Steam coal is a bit draggy, as heavy production of prepared has resulted in an oversupply of screenings. While industrial consumption is good, many buyers are well stocked, and are only taking a little. Very little mine run is being produced as there isn't much demand for it at a time when cheap screenings are in good supply.

Lake movement from East Kentucky continues good and is accounting for some of the oversupply of screenings. However, screenings at from 80c. in western Kentucky, to \$1.40 for best gas screenings in eastern Kentucky, are not as low as is frequently the case in the summer and early fall.

Northwest Trade Quiet but Steady

Throughout the Northwest there is steady movement of coal but without special interest in any particular grade. In Duluth and the Twin Cities anthracite was in strong

demand until the hard coal settlement was made. Since then consumers have quieted down. However, a good deal of the approximate 900,000 tons of anthracite thus far received has been shipped off the docks. Good Illinois coal by rail into the southern part of Minnesota is stiffening from \$3.75 to about \$4. The fight for business keeps dock soft coals from advancing, however.

At Duluth no more cargoes of hard coal are expected for another twenty days. Shipments of bituminous have continued heavy, piling up a total of about 5,000,000 tons. This does not count railroad or steel corporation coal. The Head-of-the-Lakes harbor is piled high with coal and unless buying starts out briskly soon, there is danger of a tie-up.

Duluth prices of bituminous remain fairly firm, with a slight decline in screenings. They are as follows:

Youghiogheny, lump, \$6.50; run of pile, \$5.50; screenings, \$4; Splint, lump, \$7; run of pile, \$6; screenings, \$4.25; Hocking, lump, \$6.25; run of pile, \$5.25; screenings, \$3.75; Kentucky, lump, \$7.50; run of pile, \$7; screenings, \$4.50; Pocahontas, lump, \$10; run of pile, \$6.50; screenings, \$6.

Briquets, made of Pocahontas screenings have been priced at \$10 and coke is selling at \$10.50. Anthracite remains firm and is quoted: Egg, \$12.50; nut and stove, \$12.80; pea, \$11; buckwheat, \$8.50.

Milwaukee receipts of soft coal by lake in September show a marked falling off as compared with the previous months, but there is plenty of time in which to pile up more coal. Cargo receipts thus far aggregate 630,419 tons of anthracite, and 1,999,278 tons of bituminous coal.

Western Market Picks Up

Colder weather in the Rocky Mountain region and in Utah has stirred up some buying of domestic sizes and circulars on large coal are well maintained. Industrials are not taking much however. Prices have not changed and car supply throughout the region is good. In the Southwest steam coals are especially slow but Kansas and Arkansas mines are placing a good deal of prepared stuff.

Ohio Steam Coal Market Dull

The steam grades are not showing much strength in the Ohio markets. At Columbus domestic sizes are in fair demand, while the demand for the steam coals is not so strong as it was a few weeks back. The settlement of the anthracite strike together with warmer weather is attributed as the reason for this dullness. Dealers' stocks are reported as fair. Household buying is fair, with retail prices steady. Steam coal users are mostly ordering for current consumption. Reports to the Southern Ohio Coal Exchange from 443 mines indicate a production of 176,026 tons during the week ended Sept. 8. The position of domestic block and smokeless lump and egg coals in the Cincinnati market is firm. Retail buyers were more numerous on the market during the past ten days than for some time past and are urging quick shipments. While the demand for smokeless lump and egg continued strong, run of mine and screenings weakened. West Virginia 2-in. lump was quoted at \$2.75@3, and southeastern Kentucky 2-in. lump at \$2.50@2.75.

Steam coal consumers in the Cleveland market are pursuing a hand to mouth policy in buying, and see nothing to jeopardize their safety in continuing to do so. During the last week there was a decided let up in inquiries from steam consumers, and retail dealers who stocked up in anticipation of prolonged idleness in the hard coal fields are not active. They are however active in Pocahontas and anthracite for domestic consumption.

The market at Pittsburgh is dull. Consumers are not inquiring for coal and do not seem to care to know about prices. This situation is due in part to the settlement of the anthracite difficulties and the disposition on the part of business to be conservative in making commitments. Sales of steel are also light and the immediate future is uncertain. Production in Central Pennsylvania continues heavy and car supply is good. Buffalo reports little activity, with quotations for soft coal weak. There are many complaints of poor business.

New England Market Quiet

In New England the market for steam coal shows no redeeming quality. Buying seems practically to have been wiped out, and persistent efforts to dispose of cargoes on the market have no result. A few venturesome shippers sent coal forward all-rail in anticipation of the anthracite shutdown, but latest reports show the coal still on hand at destination awaiting sale. The same extent applies to cargoes afloat in Boston harbor that have been here now for several weeks.

Neither all-rail nor by water is there any inquiry worth mentioning. Prices are depressed on what coals offer, and only specialties are securing new business and those only in a much restricted sense.

No. 1 Navy grades at Hampton Roads are still in the doldrums. While contractors are accepting deliveries in fair volume there is next to no spot business. When any inquiry is developed most of the agents are inclined to quote \$4.90 or less in order to save car service. Factors at this end are asking from \$6.40@ \$7 per gross ton on cars, but only a very light tonnage is changing hands at those figures.

A diminishing volume from West Virginia and from Central Pennsylvania is being dumped at the Philadelphia and New York piers for movement coastwise. Most of the holes are being rapidly filled, however, and even the gas companies have reserves far beyond what would be regarded as normal for this season. New England as a whole is extremely well stocked against any possible contingency the coming winter.

Seaboard Soft-Coal Buying Slow

Soft coal buying along the Atlantic seaboard continues slow and inactive. Contract coals move in good volume although some consumers indicate a desire to receive slower shipments. Demand for the cheaper grades at tidewater points is easier and some of these mines have stopped operations. Some houses report an increase in inquiries and admit they are doing a normal business. Railroad buying is quieter and present shipments are said to be on old commitments. The trade at Birmingham is dull. Increased activity expected in September did not materialize. Consumption of steam coals is light and there is little bunker business being offered. A minimum of contract requirements are being taken by the railroads, and several furnace stacks have been blown out, which reduces the tonnage of coal required for coke manufacture.

Although the lake season is drawing to a close the movement of soft coal across the Lakes increased about 37,000 net tons during the week ended Sept. 16, when compared with the previous week, according to the Geological Survey reports. During the present season the cumulative dumpings of cargo coal amount to 20,451,238 net tons, as compared with 17,104,787 tons in 1921 and 13,170,068 tons in 1920. Last year the cumulative dumpings for the corresponding period was 7,077,670 tons.

Anthracite Coming Forward Slowly

Shipments of anthracite are coming forward slowly, due to the mine workers not having returned to the mines in large numbers until early this week. The advance in prices for the domestic coals at the mine, was not surprising to

the trade. No change in prices for buckwheat, rice and barley coals is expected in view of the low prices at which bituminous coals can be purchased. Demand for the egg, stove and chestnut coals is heavy, some of the independent producers and selling agents refusing to accept new orders until the old orders already entered have been nearly cleaned up. Retail dealers in most instances are waiting until all producers have announced their prices before adjusting the retail schedules.

There is little demand for coke, as a result of the resumption of mining in the hard-coal fields and the poor outlook in the iron and steel industry. A few contracts have been made for the current quarter, and the furnacemen involved have no disposition to contract for the fourth quarter. Asking prices for heating coke are around \$3.75, furnace coke, \$4.50, and foundry coke \$5.50@ \$6, which prices are practically nominal. Production of beehive coke, says the Geological Survey, decreased in the week ended Sept. 15 to 317,000 net tons as compared with 345,000 tons the previous week. The decline was felt in the Pennsylvania-Ohio and West Virginia districts.

Consults Retailers on Closing Fuel Yard

Secretary of Interior Work has asked the National Retail Coal Merchants Association for its views as to continued operation of the Government Fuel Yard, operated by the U. S. Bureau of Mines, believing that the government should not conduct business which an individual or firm can better perform. Retailers have been asked if they have facilities in the District of Columbia for storage of coal to supply fuel for government departments; whether they can supply the government more cheaply than the fuel yard; whether they are able to bid and meet other problems connected with delivery and handling government contracts; whether they will give assurances that the government will be better served and local residents will not suffer if the fuel yard is abolished; how much lower prices per ton to the government and to local consumers would result from retailers supplying government requirements; at what margin per ton retailers are prepared to sell coal of various grades in the District of Columbia. The Secretary says that it is possible that legislation will be obtained from Congress to permit contracts for more than one year, and he asks for what term retailers are prepared to contract.

Twenty Firms Bid on Coal for Army Posts

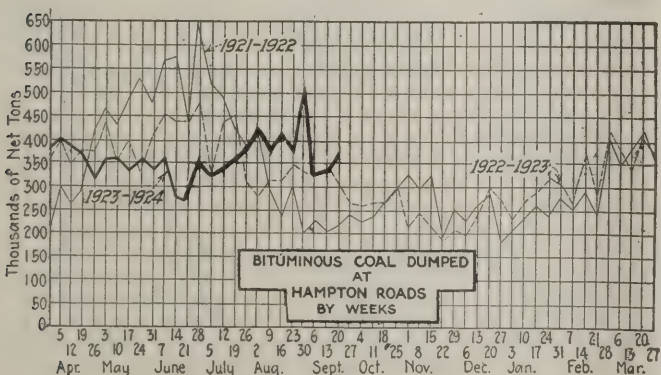
Twenty coal firms submitted bids on Sept. 21 to the U. S. Army Quartermaster's Department, Brooklyn, for furnishing and delivering 14,115 net tons of bituminous 2-in. lump coal to various army posts, forts and arsenals in Virginia and Maryland and to the Middletown (Pa.) Air Intermediate Depot. The prices submitted ranged from \$2.04 to \$3.50 f.o.b. mine, according to quality and analysis of coal. For furnishing and delivering forty net tons of smithing coal to Fort Hoyle, Maryland, eight bids were received, the prices quoted ranging from \$2.48 to \$3.50 per ton, f.o.b. mine.

THE INTERSTATE COMMERCE COMMISSION began Sept. 24 at Pittsburgh an investigation of the reasonableness of anthracite transportation rates. The investigation is being conducted by Bell Disque, one of the veteran examiners of the commission.

Car Loadings, Surpluses and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Sept. 8, 1923.....	928,858	152,996
Previous week.....	1,092,567	206,610
Same Week in 1922.....	823,247	139,207

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Sept. 7, 1923.....	67,651	13,501	10,211	5,595
Same date in 1922.....	43,168	34,685		
Aug. 31, 1923.....	66,559	3,922	9,441	4,891



Foreign Market And Export News

Greco-Italian Crisis Aids British Coal Market; Foreign Inquiries Stronger

While the South Wales coal market has been irregular, the outlook is regarded as optimistic. After the slackness of the last three months and the big drop in prices, operators believe that values have touched rock-bottom levels, and that there will be a recovery of at least several shillings per ton during the next few weeks. Some pits have stiffened quotations for delivery in the middle of September and over the remainder of the year.

The Greco-Italian crisis has also aided the market. Welsh anthracite pits are well booked up to the end of the year. Inquiries are stronger from Canada, the United States, and Italy is buying more freely.

The Newcastle market is firm, influenced by the Italian crisis and the outlook and business is much brisker than for some months, steam and gas coals being in good demand.

Coal output for the week ended Sept. 8, accordingly to a cable to *Coal Age*, was 5,320,000 tons, an increase of 40,000 tons from the previous week.

French Coal Production and Imports

Coal production in France during July, according to statistics recently made public, amounted to 3,148,169 metric tons of coal and 66,653 tons of lignite, as compared with 3,254,903 tons of coal and 70,873 tons of lignite in the previous month. During the same period the output of coke was 178,427 tons in July, and 161,132 tons in June. Production of coal and coke in the non-devastated mines of the Arras district in July was 749,198 metric tons and 39,336 tons respectively, as compared with 792,738 tons of coal and 39,119 tons of coke in the previous month. The devastated mines of the Pas-de-Calais and of the Nord produced 974,502 tons of coal and 79,354 tons of coke in July, a decrease of 18,525 tons of coal and an increase of 9,924 tons of coke when compared with the month of June.

According to the French Information service of the Bankers Trust Co. of

New York, French coal imports during the first half of this year amounted to 12,353,000 tons as compared with 11,335,000 tons during the corresponding period of last year. Of this tonnage the United States furnished 298,000 tons and Great Britain 9,025,000 tons, as compared with 19,000 and 5,966,000 tons, respectively, during the same months of 1922. Coke imported into France during the same period totaled 1,700,000 tons, as compared with 2,429,000 tons in 1922.

Hampton Roads Market Slow

Business at Hampton Roads was unusually slack last week. Export trade fell off materially, and coastwise business showed a decrease. Bunkers trade alone held its own, while movement at the piers was slower.

After effects of the strike were held responsible for the slack trade, consumers having stored large quantities in anticipation of protracted interruption of mining. Shippers, however, expected a revival in trade in about two weeks.

Prices were weak, good coal being available at considerably below \$5 for the first time in many months. The tone of the market was exceedingly dull.

Coal Paragraphs from Foreign Lands

All coal imported into Greece from countries not enjoying the conventional tariff rates of Greece will hereafter be dutiable at 15 gold drachmas per ton, according to a decree published in the Official Greek Gazette of June 23, 1923. Under the conventional tariff coal is exempt from duty. The conventional rates apply to goods from the United States, Consul J. G. Erhart states in a report to the Department of Commerce.

Swedish coal mines in Spitzbergen, according to estimates, will this year produce about 80,000 tons of coal. A fleet of Swedish colliers has been busy bringing the coal to Sweden.

Imports of coal at the port of Hong-kong for 1922 amounted to 1,048,175 tons, as compared with 1,175,871 tons for the previous year, and 1,018,870 tons in 1920, according to Consul Leroy Weber, at Hongkong. About 75 per cent of the bituminous coal is imported from Japan and the remainder comes from China. All of the anthracite, which makes up only about 10 per cent of the total imports, comes from French Indo-China. Nearly 25 per cent of the total imports is re-exported to nearby ports for use by small steamers, launches and manufacturing plants.

Export Clearances, Week Ended Sept. 22, 1923

FROM BALTIMORE		Tons
For Cuba:		
Dan. SS. Phoenix	.....	3,560
For Argentina:		
Swed. SS. Hogland	.....	6,995
For Porto Rico:		
Am. SS. Delina	.....	304
For France:		
Nor. SS. Basis	.....	5,195

COKE		Tons
For Chile:		
Jap. SS. Hofuku Maru	.....	5,307
FROM HAMPTON ROADS		Tons
For Canada:		
Amer. Sch. Marguerite M. Waymss.	.....	805
For Cuba:		
Nor. SS. Lisbeth, for Havana	.....	4,017
For Porto Rico:		
Amer. Sch. Orleans, for San Juan	.....	1,105
For Africa:		
Ital. SS. Lanuvium, for Sfax, Tunis	.....	6,389
For Italy:		
Ital. SS. Valverde, for Porto Ferrajo	.....	6,338
For Dominican Republic:		
Amer. Sch. Lillian E. Kerr, for Macoris	.....	614

FROM PHILADELPHIA		Tons
For Cuba:		
Amer. Sch. Mary H. Diebold, Cay Francis, Caibarien	.....	614

Hampton Roads Pier Situation

N. & W. Lamberts Pt.:	Sept. 13	Sept. 20
Cars on hand	1,597	1,255
Tons on hand	94,408	71,058
Tons dumped for week	108,420	112,753
Tonnage waiting	600	5,500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,806	1,816
Tons on hand	108,720	107,040
Tons dumped for week	81,597	130,026
Tonnage waiting	2,228	9,748
C. & O. piers, Newport News:		
Cars on hand	1,843	1,897
Tons on hand	97,300	98,435
Tons dumped for week	102,725	86,822
Tonnage waiting	3,050	3,250

Pier and Bunker Prices, Gross Tons

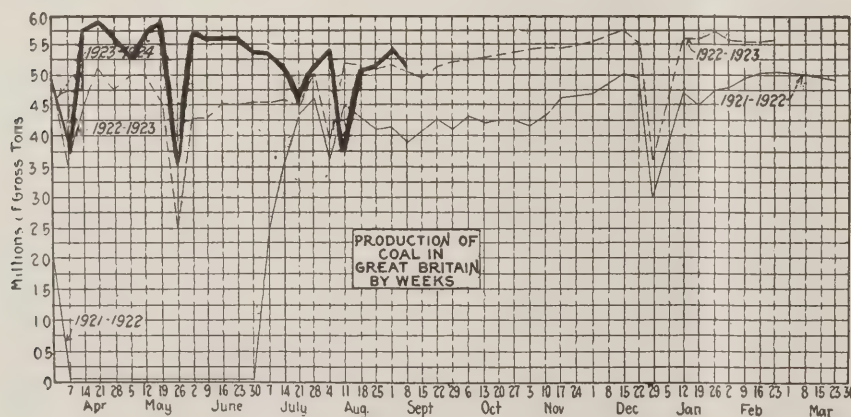
PIERS		Sept. 15	Sept. 22†
Pool 9, New York	.....	\$5.25@ \$5.60	\$5.25@ \$5.60
Pool 10, New York	.....	4.85@ 5.10	4.85@ 5.10
Pool 11, New York	.....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia	.....	5.30@ 5.75	5.30@ 5.60
Pool 10, Philadelphia	.....	4.65@ 5.30	4.65@ 5.15
Pool 11, Philadelphia	.....	4.35@ 4.80	4.35@ 4.70
Pool 1, Hamp. Roads	.....	5.15@ 5.25	5.00@ 5.15
Pools 5-6-7 Hamp. Rds.	.....	4.50	4.30@ 4.60
Pool 2, Hamp. Roads	.....	4.85@ 5.00	4.75@ 4.90
BUNKERS		Sept. 15	Sept. 22†
Pool 9, New York	.....	5.55@ 5.90	5.55@ 5.90
Pool 10, New York	.....	5.15@ 5.40	5.15@ 5.40
Pool 11, New York	.....	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia	.....	5.65@ 6.10	5.60@ 6.00
Pool 10, Philadelphia	.....	5.10@ 5.60	5.05@ 5.45
Pool 11, Philadelphia	.....	4.70@ 5.00	4.65@ 5.00
Pool 1, Hamp. Roads	.....	5.15@ 5.25	5.00@ 5.15
Pool 2, Hamp. Roads	.....	4.85@ 5.00	4.75@ 4.90

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Sept. 15	Sept. 22†
Admiralty, large	28s. 6d.	28s. @ 28s. 6d.
Steam smalls	20s.	19s.
Newcastle:		
Best steams	24s. @ 24s. 6d.	24s. @ 24s. 6d.
Best gas	24s. @ 25s.	24s. @ 24s. 6d.
Best bunkers	23s. @ 24s. 6d.	22s. @ 23s. 6d.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

One thousand acres of coal lands at Tidewater, Tuscaloosa County, has been acquired by F. W. Hopkins, J. W. Lewis and others. These lands are on the Warrior Southern R.R. and also adjacent to the Warrior River, making both water and rail transportation available. It is understood that the property will be developed extensively at an early date by the new owners, who are experienced operators in the district. There are at present a large number of tenant houses on the property available for the use of employees, situated on the Vandergraft tract, which is included in the acreage transferred.

After three years of idleness Mine No. 1 of Townley was recently put into operation. The daily output of this newly equipped mine will be about 2,000 tons or more. The Corona Coal Co. has spent an immense sum of money in repairing mine No. 1 with which mine No. 2 has been consolidated under ground. Townley No. 1 is said to be one of the best equipped mines in northern Alabama.

The Stouts Mountain Coal Co., which has been operating a mine near Hanceville, Cullman County, for a number of years, has closed down the mine and removed live stock and other transferable equipment. No reason for suspension was assigned. The mine has been operating on a basis of two to three days per week for some time.

The little town of Carbon Hill, a coal-mining centre in Walker County, experienced a disastrous fire Sept. 10 which destroyed seven of its principal mercantile establishments, entailing a loss of about \$45,000. All were frame structures.

COLORADO

To imbue its men with a realization of the value of first-aid training the Colorado Fuel & Iron Co. has posted the following circular in its mines: "Prompt First-Aid Treatment Saves Man's Life.—Joe Gurule, a nipper on one of the mine motors at Frederick mine, came in contact with the trolley wire on Aug. 27, losing consciousness immediately. John Arbo, motorman, who had first-aid training, began working on him. Robert Brownrigg and Luke Egan, also experienced in first-aid work, reached Gurule in a short time and the three worked on him until the arrival of Dr. Seyfarth from Segundo. The Doctor was taken into the mine and used the inhalator for resuscitation. Gurule was unconscious for 5 hours and 20 minutes and Dr. Seyfarth, stated that without doubt, had it not been for the very excellent work of Arbo, Brownrigg and Egan, the boy would have lost his life. These men deserve much credit for their knowledge of the right thing to do at the right time. Certainly this points out the real value of first-aid training."—D. A. Stout, Manager.

The Prairie Canon mine, a slope operation of the Prairie Canon Coal Co. at Vallorso, Las Animas County, has reopened after a shutdown which began Feb. 1, 1923.

ILLINOIS

What is said to be the record lump of coal mined at No. 2 mine of the Bell & Zoller Co., Ziegler, is 11 ft. long, 5 ft. 8 in. high and 4 ft. 8 in. wide, and weighs more than eleven tons.

The Board of Education of Peoria has awarded a contract for approximately 6,000 tons of 14-in. lump coal and 2,500 tons of 14-in. screenings to the LeMarch Coal Co., Peoria. The LeMarch bid was \$3.85 per ton for the lump coal and \$2.25 for the screen coal.

Aug. 11 was observed as a holiday at the general offices of the Sullivan Machinery Co. at Chicago. On that day the new western works of the company at Michigan City, Ind., was formally opened and manufacturing begun. The buildings were completed some time ago, and during the past month the machinery and equipment have been moved from the company's old plant at Chicago to the new quarters. The general office force and officials of the company, members of the board of directors, the company's bankers, railway officials and

others spent the day at Michigan City inspecting the new plant.

The Chicago Coal Merchants' Association at a meeting held recently, voted to stand behind the new city ordinance providing for public weighmasters, designed to curb short-weighting under the double delivery ticket system. The association also went on record as favoring an intensive advertising campaign to let the public know what the members are doing to check fraud. Building materials men have contested the legality of the ordinance and have obtained an injunction against its enforcement. The ordinance provides that all deliveries of coal and other bulk commodities be weighed by a public weighmaster and that official seals be placed on the weighing tickets to designate the correct weight and as a safeguard against short-weighting. Delivery of the ticket must be made before the coal or other commodity is unloaded. The coal dealers, in voting for the ordinance, gave the president, L. W. Ferguson, and the board of directors of the Chicago Coal Merchants' Association authority to take such action as may be wise in setting aside the present injunction restraining the enforcement of the law. Regardless of the result of the test case, a large number of the coal men will continue the weighing of coal by a public weighmaster and the issuance of a delivery ticket with an official seal, it was declared.

Six teams took part in a first-aid contest held at Belleville Sept. 3 by Joseph A. Holmes Safety Chapter 59, sponsored by the F. J. Boetcher & Son Coal, Coke & Mining Co. and J. J. Guest, of the B. B. Coal & Mining Co. A handsome silver loving cup was presented as a trophy by W. M. Hoppe, of the Continental Casualty Co., and there also were cash prizes. The cup for the best first-aid team was won by B. B. Coal & Mining Co. team No. 1, with a score of 298, Capt. Chas. Goring; second place by B. B. Coal & Mining Co. team No. 2; third place, Avery Mine team, of Son. Coal & Mining Co., fourth place by Shiloh mine team of Son Coal & Mining Co.; fifth place by Quality mine team of Quality Coal & Mining Co. and sixth place by Radium mine team of Aluminum Ore Co.

The following report has been made public by Edward Flynn, mine inspector of Perry County, for the fiscal year ending June 30, 1923: Total tons produced, 2,267,421; total men employed, 3,923; total number shipping mines, 20; total number wagon mines, 15; total all mines, 35. The Majestic Coal & Mining Co., of Du Quoin, heads the list of producers with a total of 339,175 tons; the Paradise Coal Co. follows with 280,930 tons, and the Security Coal & Mining Co. comes next with 187,628 tons, both the latter mines located at Du Quoin, also. The Scott-Smith Coal Co., of Du Quoin, operating a strip mine and employing only 49 men, shows a remarkable record, standing sixth in the list with the other mines which employ from 300 to 500 men.

James P. Hickey and W. M. Ryan, both of Springfield, who are interested in the Prairie State Coal Co., have purchased a mine at Pontiac and have organized a company to handle the operation. The name of the new company is the Pontiac Coal Mining Co. H. H. Webb is president. Other officers are: Cass Fremgen, vice-president and general manager; James P. Hickey, treasurer; W. M. Ryan, secretary. The Prairie State Coal Co. will distribute the output.

Colonel Samuel N. Hunter, of Du Quoin, who is widely known through his connections with the Herrin massacre of last year, has been reported as a candidate for the Republican primaries as Lieutenant Governor. It is stated that he has the support of Frank Farrington, president of the Illinois miners union, and of John H. Walker, president of the Illinois Federation of Labor.

News of the purchase of the Victory Collieries Co. mine at Tamaroa by the Chicago Coal Co., Chicago, has been made public. The value of the mine is approximately \$200,000. The Chicago Coal Co., a new concern, is headed by Edward J. Hartenfeldt, president, formerly connected with the Aladdin Coal Co., which company operated several mines at Tamaroa and Pinckneyville until a few months ago.

A Herrin massacre suit—that of the Southern Illinois Coal Co., owner of the

strip mine which was damaged at the time of the Herrin riot of June, 1922, against the County of Williamson for damages—cannot be held outside of Williamson County. Circuit Judge Somers at Harrisburg, in Saline County, denied the petition for a change of venue. The company claimed it couldn't get a fair trial in Williamson County and the judge held that, in view of the notoriety Williamson County had received, a fair trial couldn't be had anywhere else.

INDIANA

The Southwestern Indiana Coal Corporation, Evansville, has been incorporated with a capital of \$200,000 to mine and deal in coal; directors, William F. Quarrie, Frederick E. Reeve, Tom J. Phillips, Loris G. Julian and L. C. Oliver.

The Rader Coal Co. of Indianapolis, capitalized at \$100,000, has been incorporated to deal in coal and other materials. The incorporators are: C. L. Rader and C. E. Henderson, both of Indianapolis, and James H. Persons, of Terre Haute.

Eight Gibson County coal miners who were convicted of connection with the Francisco mine riots of June, 1922, and sentenced but who appealed to the state board of pardons for relief from their sentences, were denied clemency by Governor McCray and the board, it has just been announced. Each of the miners was sentenced to serve three months on the State Farm and fined \$100 and costs. The miners were Vivian White, Arville Duke, Joseph A. Vickers, Frank Bolin, Roscoe Erwin, Hamilton Erwin, Bert Dowd and Lawrence Evans.

KANSAS

A new coal plant for Hutchinson is to be built by the Rock Island, according to an announcement made by R. R. Bragg, division engineer at Pratt. The present coal plant at Hutchinson is to be replaced by a 300-ton plant, one of the largest of its type on the system in Kansas. The Pratt plant now has 200-ton capacity.

KENTUCKY

The first coal operation to produce coal on the new main line of the Illinois Central Ry., which is approaching completion of the stretch between Madisonville and Dawson Springs, will be the Dawson Daylight Coal Co., a combined open-work and underground operation. The shovel equipment of this company will consist at the outset of three Bucyrus revolving shovels. The Morrow Manufacturing Co. is building the machinery for a tippie and for conveying coal from the concrete hopper which will receive it from the mine cars. The tippie and the track facilities will be constructed to handle 50 to 60 cars per day. The property of the company consists of about 1,400 acres owned in fee and containing four seams of coal, all of which are strippable over considerable areas. Construction is in charge of W. J. Borries, general manager.

The Denmark Coal Co., Madisonville, Hopkins County, Ky., capital \$20,000, has been chartered by Wayne Plym, J. C. Hurt and R. P. Cox, all of Madisonville.

The Green River Fuel Co., of Mogg, has increased its capital stock from \$20,000 to \$75,000.

MASSACHUSETTS

The establishment of "coal savings funds" similar to Christmas and vacation savings clubs, and the co-operation of employers with their employees in temporarily financing the domestic supply of coal, are among the recommendations of the Western Massachusetts Coal Storage Committee of the Federated American Engineering Society.

Governor Cox again has urged Governor Pinchot to effect the repeal of the Pennsylvania tonnage tax on anthracite which raises the cost 15c. a ton. He also asks legislation fixing quality and size to protect the public.

The Joint Special Coal Investigating Committee of the Massachusetts Legislature in a recent statement says "The anthracite industry is like a spoiled child. Every time it frets we toss it candy. Let us quit this practice. Let us give it the spanking which it deserves. You and your neighbors, if you insist on having anthracite regardless of the price and will take nothing else, are to blame for the high price of anthracite. The remedy is to establish in New England a competitive market for domestic fuels by turning from anthracite to other fuels and learning how to use them and, should there be further increase in the price of anthracite, by instituting a boycott or buyers' strike against anthracite."

MISSOURI

The Lingo Coal Co. has been incorporated at Kansas City with a capital of \$35,000. The company will mine and sell coal at wholesale and retail. The incorporators are H. G. Kellogg, D. L. Sprecher and M. E. Morris.

Harry N. Taylor, formerly vice-president of the Central Coal & Coke Co., and Mrs. Gertrude Coumbe, formerly of Kansas City, were married recently in New York, where Mr. Taylor is now president of the United States Distributing Corporation.

The Mosby Coal Co. plant at Mosby, has been leased by the Centerville (Ia.) Coal Co. and steps will be taken at once to start production. The Mosby company has had a checkered career, much difficulty being experienced with quicksand that threatened many times to engulf the enterprise, but successful operation now seems to be assured.

NEW JERSEY

Governor Silzer in a letter to Governor Pinchot calls upon the Pennsylvania executive and the federal government to see to it that settlement of the coal strike does not result in further gouging of the consumer. In his letter Governor Silzer says that "In 1921 Pennsylvania imposed a tax of 1½ per cent on coal, and openly admitted that its purpose was to make the coal consumer of neighboring states pay the running expenses of Pennsylvania. At a price of \$9 a ton this tax would be 13½c. a ton, but what did you do to our neighbors? The Pennsylvania Fuel Commission ruled that 50c. a ton be added to the mine price on account of the state tax and expenses incidental. If you take off this tax, it will practically equalize the 60c. added by the strike settlement. We will hold the dealers down if Pennsylvania and the federal government will do their full duty, having in mind, however, that the added 60c. came from the settlement and not from the dealers."

OHIO

The Fearn-Hirst Co., Canton, has been chartered with a capital of \$10,000 to mine and deal in coal and coke. The incorporators are E. E. Fearn, Margaret Fearn, Ida Hirst, C. A. Hirst and Frank Jones.

The Peabody Collieries Co., of Cleveland, has been incorporated with an authorized capital of \$10,000 to mine and deal in coal at wholesale. Incorporators are C. H. Brown, Hugh Younger, James B. Dolphin, Catherine Stelker and E. E. Thiele.

The Reilly Coal Mining Co., Cleveland, has been chartered with a capital of 500 shares of no par value, designated to mine coal and also to do a general jobbing business. Incorporators are Read McKuhns, Roland R. Foley, Elmore L. Andrews, Thomas E. Lipcomb and Stanley L. Orr.

Armour Sizer has been appointed Western sales manager of the Flat Top Fuel Co. with headquarters in Cincinnati, taking the place of Victor White, who died last month. Mr. Sizer is a native of Bluefield and is familiar with the company's operations through having been associated with Mr. White for several years.

PENNSYLVANIA

The Cranberry Creek Coal Co. has started removal of twenty houses from Old Cranberry to a new location, to make room for a big anthracite coal stripping.

Former Mine Superintendent T. C. Davis, of the Rainey plant at Mount Braddock, was recently presented with a \$125 fine gold watch, and his wife with a \$75 silver set, by the employees of that plant. The Oliver & Snyder Co. has engaged Mr. Davis in a position similar to the one he had held at Rainey's. Mr. Davis is a member of the North Union School Board.

The universal eight-hour day at the mines and collieries in the anthracite field has already caused a controversy about the carpenters employed on the remodeling of the Sandy Run breaker of the M. S. Kemmerer Co. The mine workers' committee at the colliery posted a notice which stated that carpenters should quit when their eight hours were up or the entire job would be tied up, contending that the carpenters are members of the miners' union and have no right to work more than eight hours a shift. Although the company has not conceded their demands, those who do not want to work ten hours have been given the right to quit at four o'clock.

The Pennsylvania Federation of Labor has purchased a private residence, with

complete furnishings, to be used as offices. The building is located near the Capitol at Harrisburg, and federation offices will be moved there in the immediate future.

Of the 216 fatal accidents reported to the State Workmen's Compensation Bureau during the month of August, 93 were in the mines of the state, 85 in other industries and 38 in public-service operations. There were 18,668 accidents reported for the month, the highest number reported since August, 1917. The bureau during the month approved agreements to pay compensation in 158 fatal cases, 301 permanent disability cases and 6,974 temporary disability cases, making a total of 7,433 cases. The total amount of compensation paid during August amounted to \$745,872.

A state charter has been issued to the Camp-Osgood-Sleppy, Inc., of Scranton, at Harrisburg. The corporation's purpose is mining, buying and selling coal, and its capital stock is \$100,000. The incorporators are Byron W. Sleppy, Kingston, treasurer; Irving L. Camp, Johnstown, and William J. Osgood, Bird Mill, Wellesley Hills, Mass.

The Rupert Coal & Coke Co., Pittsburgh, has been incorporated, its purpose being mining, producing, buying and selling coal and coke. The company's capital is \$25,000 and the incorporators are Wayland Rupert, Pittsburgh, treasurer; S. N. Birney and H. C. Henderson, Pittsburgh.

The Watson-McManigle Coal Co., Franklin, has been incorporated, its capital being \$10,000. The purpose of the company is to mine, produce and market coal and its products. The incorporators are Florence A. Watson, Franklin, treasurer; J. Howard Watson and Alexander C. Sheasley, Franklin.

Richard W. Gardiner, formerly chief accountant of the Federal Trade Commission and for the past six years commissioner of the Pittsburgh Coal Producers' Association, has opened an office for the practice of accounting in Room 241 Oliver Building, Pittsburgh. Special attention will be given to cost system and statistical work for coal operators.

The Dorr Co., engineers have removed their office from Scranton to Wilkes-Barre, where they will be located in the Miners Bank Building. The company has offices in New York, Denver, and London, England. John Griffin, who was in charge of the Scranton office, will continue in charge of the Wilkes-Barre office.

C. S. Goldborough, president of the Pennsylvania Coal Co., has reappointed Frank H. Coughlin, of Dunmore, as assistant to the president, which position Mr. Coughlin held during the presidency of the late Captain William A. May. In addition to his other duties Mr. Coughlin will serve as purchasing agent for the company and will have as his assistant F. W. Hess, of New York, who has been with the company a number of years, and will remove his headquarters to Dunmore.

Shipments of anthracite during August, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,672,855 gross tons, as compared with 6,260,053 tons during the preceding month of July, an increase of 412,802 tons or 6.6 per cent. Comparing last month's shipments with August, 1921, when 5,575,115 tons were shipped to market, an increase of 1,097,740 tons is recorded, or 19.7 per cent. The shipments last month established another record for August, which was only exceeded during that month in the years 1917 and 1918, when maximum shipments of over 7,000,000 tons were made. Shipments by originating carriers were as follows:

	August 1923	July 1923
Phila. & Reading....	1,277,770	1,155,701
Lehigh Valley	1,154,004	1,124,400
Jersey Central	496,725	494,254
Del., Lack. & Western	1,004,507	965,446
Delaware & Hudson..	943,143	879,772
Pennsylvania	555,064	520,423
Erie	759,711	661,120
N. Y., Ont. & Western	154,586	152,543
Lehigh & New Eng...	327,345	306,394
Totals	6,672,855	6,260,053

Officers of the United Mine Workers of Districts 1, 7 and 9, have sent circular letters to the local unions refuting charges against John L. Lewis, international president, which accuse him of insincerity in the demands of the anthracite mine workers. The letter states that a circular containing these charges was now being distributed in the anthracite region by representatives of the "progressive international committee," a dual labor organization antagonistic to the principles of the United Mine Workers.

TENNESSEE

Petition for charter has been filed by the Eagle Coal Mining Co. at the office of the County Court clerk at Knoxville. Incorporators are J. E. Wood, J. H. Hodges, W. A. Montgomery, H. O. Bales and O. J. McNeil. Mining operations will be started near Oliver Springs in the near future. Capitalization is \$25,000.

UTAH

Three townships in Carbon County, embracing some of the most valuable developed coal properties in the state, have been withdrawn from entry in order to permit a resurvey of the area, through an executive order signed by President Coolidge. The camps of Standardville, Storrs and Helper are located in the withdrawn townships, but land already filed is not affected.

The Black Diamond Fuel Co. has incorporated at Salt Lake City for \$1,000,000. It is formed to take over property in Carbon County which Ezra B. Jones is lessee. The officers and incorporators are W. E. Hubbard, president; J. B. Lamb, vice-president; Bruce M. Loos, secretary-treasurer; John Cain and H. White additional directors.

VIRGINIA

J. Cloyd Byars, formerly a well-known figure in the coal trade, probably will be a candidate for a position on the State Corporation Commission of Virginia in the November elections, it is announced. He is a native of Arlington County and has served in the State Senate.

Foundation work has been completed and construction of the steel framework of the new \$3,000,000 coal pier of the Virginian Ry. at its Sewells Point terminal, here, began Sept. 24. The contract for the work has been placed with the Bethlehem Steel Co. This addition to the coal handling equipment of Hampton Roads will be the most modern of its kind in the country, officials said. It will have a capacity of dumping over 70,000 tons of coal every 20 hours, and will be able to accommodate 6 vessels alongside the chutes at one time.

WEST VIRGINIA

L. C. Hutson, in charge last year of mining extension work in the Mt. Hope District of West Virginia has accepted the position as assistant director of the mining department of Maryland.

The Erbacon Gas Coal Co. has been organized to mine coal in the Monongalia field, headquarters of the company to be at Morgantown. This company is capitalized at \$25,000. It was organized by A. Carl Slagle, P. C. Kiernan, Paul Kiernan, William Coburn and Charles C. Baker, all of Morgantown.

E. E. Criswell, former head of mining extension work in the Beckley district, has resigned his position as such to go with the New River company at Mt. Hope as editor of the magazine published for employees.

Announcement has been made that so far as mining extension work in southern West Virginia is concerned the Mt. Hope and Beckley districts will be consolidated under one head. Resignations of several instructors of former years necessitated the consolidation. R. H. Magee, mining extension instructor from the University of West Virginia, will take the place of E. E. Criswell former head of the Beckley district, and of L. C. Hutson, in charge last year of the Mt. Hope district. Mr. Magee expects to visit Glen Jean, Mt. Hope, Minden, Stanaford, Skelton, Price Hill, Summerlee, Carlisle, Pax, Glen White, Helen, Cranberry and a number of other places within a short time and organize his classes for the present year. It will be necessary to consolidate the classes, as Mr. Magee will be unable to conduct more than six at one time.

Preparations are being made by Robert Talbott & Co., of Fairmont, to develop a large tract of Sewickley coal land in the vicinity of Arnettsville, in Monongalia County. Soon after operations are begun it is expected that it will be possible to produce coal at the rate of between 1,200 and 1,500 tons a day. The coal land to be developed is on Indian Creek and is made accessible through the Indian Creek & Northern R.R., a subsidiary of the Baltimore & Ohio. It is proposed to sink an air-shaft and to drive a slope opening of about 500 ft. in order to reach a seam about 7 ft. thick. Preparations are under way for the erection of a modern tippie with shaker screen and other equipment for preparation.

Defective wiring is thought to have been responsible for starting a fire which destroyed a company boarding house and a double dwelling on the property of the Gay Coal & Coke Co., one of the pioneer companies in the Logan field. The loss is estimated at \$10,000.

Phil Williams and others of Elkins, have effected a preliminary organization of the **Roaring Creek Coal Co.**, which has just been granted a charter to operate in the Roaring Creek field of northern West Virginia. Though the office of the company will be at Elkins, the company will have its mine near Norton. The Roaring Creek company has an authorized capital of \$50,000.

Howard R. Harrah, foreman of the jury which disagreed in the murder accessory trial of William Blizzard, was convicted in Lewisburg, Sept. 20, of taking \$600 from **G. C. Hickey** union man and defense witness. The maximum penalty—six months in jail and a fine of \$500—was pronounced on Harrah Sept. 22. Notice of an appeal was given and Harrah was placed under bond. Judge Sharp overruled a defense motion asking that the verdict be set aside. Hickey was tried and found guilty of bribery Sept. 21 and released under bond. His bond was forfeited when he failed to appear in court where summoned Sept. 22.

Dan R. Lawson, of Fairmont, has resigned as manager of sales of the Appalachian Fuel Co., effective at once. During the war Mr. Lawson was district representative of the United States Fuel Administration for the Fairmont region.

A new steel tippie which is in course of construction at the mines of the **E. E. White Coal Co. at Glen White, W. Va.**, will soon be completed. A steel tower, 200 ft. high, has been constructed and slipped into place, replacing a wooden structure, with the loss of only a few hours' work. When improvements at Glen White are completed the company will be able to materially increase its daily capacity.

In accordance with the provisions of Senate Bill No. 348 creating "The West Virginia School of Mines," of which Senator A. L. Helmick, of Tucker County, was the patron, **Governor E. F. Morgan on Sept. 17 announced the personnel of the commission** which will determine where the school shall be located. Senator Helmick has been named as a member from the Senate; S. R. Garvin, of Mt. Hope, as the representative of the House of Delegates; V. E. Sullivan, of Charleston, as representative of the Department of Mines; Ira Marks of Flemington, as representative of the miners, and Walter H. Cunningham, secretary of the West Virginia Coal Association, as a representative of the operators. The commission will be required to report to the next Legislature whether in its opinion the school shall be carried on as an independent institution or in connection with one or more of the present existing educational institutions of the state. The new law provides that the school of mines shall contain departments of mining engineering, mining extension, mining geology and chemical engineering as well as the mining experiment station already authorized by the mining laws of the state.

New shaker screens, picking tables, loading booms and all the latest mechanical inventions to insure efficient preparation of coal have just been installed at Rachel Mine, Downs, near Fairmont, and Frances Mine, at Cresaps, near Moundsville, on the Baltimore & Ohio R.R. by the Bertha-Consumers Co., of Pittsburgh, Pa. All mines now operated by this company have been similarly equipped.

The repair shops of the **E. E. White Coal Co.** at Stotesbury, were recently destroyed by fire entailing a loss approximating \$100,000. A new and modern structure will replace the one destroyed.

J. W. Dawson has been elected vice-president in charge of operations of the Main Island Creek Coal Co. and will have his headquarters at Omar. Until recently Mr. Dawson was in California engaged in railroad-building enterprises, but came originally from West Virginia.

The suit of the **Norfolk & Western Ry.** against fifteen coal shippers with offices at Norfolk, to collect demurrage charges alleged to be due, will be called again in the City Circuit Court during the first week in October. The suit is based on different methods of computing demurrage, the shippers' figures based on their method being considerably lower than the railroad's figures. The railroad has agreed to accept the amounts computed by the shippers in part payment of the charges, and the remainder will be made the subject of litigation. Approximately \$500,000 is involved in the suits.

WISCONSIN

Governor Blaine, in a letter to Gov. Pinchot of Pennsylvania, declared that "not one cent of the increase in wages granted to miners should be passed on to the consumer, and until the federal government effectively deals with the coal mines and their operations, state efforts will effect small relief, if any, to the consumer." The Wisconsin Governor was replying to a request of Governor Pinchot that state executives act to prevent coal price "gouging."

WASHINGTON

The Bureau of Mines reports that sales of explosives throughout the United States in July, 1923, amounted to 516,785 kegs of black blasting powder, 4,177,832 lb. of permissible explosives, and 16,758,927 lb. of other high explosives. Each of these figures represents a large increase over sales in July, 1922, and 1921. The figures are based upon reports from manufacturing companies whose yearly sales represent 85 per cent of all black powder used in the United States, 88 per cent of all permissibles, and 81 per cent of all other high explosives. The July sales of black powder brought the total sales of this class of explosives during the first seven months of 1923 to 4,159,878 kegs. Of the total sales in 1923 to date, 84.8 per cent were for use in coal mining, 2.8 per cent for other mining, 5.6 per cent for railway and other construction work, and 6.8 per cent for miscellaneous purposes. For each thousand tons of coal mined since Jan. 1, 378 lb. of explosives were used, of which 239 lb. were black powder. The quantity of permissibles sold in 1923 to the end of July was 33,304,984 lb. The 1923 sales were for use as follows: Coal mining, 96.5 per cent; other mining, 0.8 per cent; railway and other construction work, 0.3 per cent; miscellaneous purposes, 2.4 per cent. For each thousand tons of coal produced since Jan. 1, 33 lb. of permissible explosives have been used. Sales of high explosives other than permissibles in 1923 to the end of July amounted to 131,914,873 lb. Coal-mining operations consumed 16.7 per cent of the amount sold from January to July 1923; other mining work used 35.3 per cent; 12.4 per cent was for railway and other construction work; and 35.6 per cent was for miscellaneous purposes.

E. Foster Bain, director of the U. S. Bureau of Mines, has resumed his duties in Washington after an absence of more than two months during which he assisted the Department of Commerce in its inquiry into nitrate export conditions in Chile. The inquiry in which Director Bain assisted is one of a number of subjects undertaken by direction of Congress to determine the effect of foreign control on commodities for which the United States is largely dependent upon imports for its supply.

Chairman John Hays Hammond of the U. S. Coal Commission and other members of the Commission gave a reception to the members of the Commission's staff of employees, Sept. 22, from 5 to 7 p. m. at the residence of the chairman, 2301 Kalorama Road.

CANADA

The possibility of developing Alberta coal fields to compete with American anthracite fields has been abandoned as impossible because of geographical conditions and the length of the necessary haul according to J. E. Dalrymple, vice-president of the Canadian National Ry. As a result, he said, the experimental low rates on the railway, proposed some months ago by Sir Henry Thornton, also have been abandoned.

Charles Stewart, Canadian Minister of the Interior and Mines, states that briquetting operations at Bienfait, Sask., which have been costing \$8,000 per month, have passed the experimental stage and that the experts of the Mines Department believe that it would be advisable to commence the making of lignite briquets in commercial quantities. This will be done as soon as possible. The serious difficulty which has developed is the withdrawal of Manitoba, which refuses to continue its contribution toward the cost. Hitherto the charges for experimenting have been divided between the Dominion, the Saskatchewan and the Manitoba governments and have cost Manitoba in all \$230,000 without return for the outlay. W. R. Chubb, Manitoba Minister of Public Works, adheres to his position as regards withdrawal from the enterprise, and Manitoba will turn over its part of the equipment to the Federal and Saskatchewan officials.

The British Empire Steel Corporation, it has been announced, plans to put into operation the battery of coke ovens erected two years ago at its Sydney (N. S.) plant by the Koppers Corporation. These ovens have been idle since their erection, the company obtaining a sufficient supply of coke from the other two batteries constructed early in the war years. There are 120 ovens in operation at the British Empire plant at present, and according to present plans eighty more will be put into operation. With this extra production the company hopes to be able to supply the upper Canadian market with coke for domestic use. Another blast furnace is to be blown in at the plant within the next few weeks. At present three furnaces are operating, but not since the war has the company operated four.

The East Kootenay Mine Safety Association of British Columbia held its Fourth Annual Mine-Rescue and First-Aid Meet in Michel, Aug. 25, when seven teams entered for the mine-rescue events. Three of these teams represented Coal Creek Colliery, using the Gibbs rescue apparatus, two represented Michel Colliery, using the Draeger apparatus, one team from Bellevue and one from Lethbridge, both of which used the Proto rescue apparatus. Following is the result of the mine-rescue contest: First, Coal Creek No. 1 team, 97.8 per cent; second, Michel No. 2, 96.4 per cent; third, Fernie No. 1, 95.4 per cent; fourth, Michel No. 1, 92.8 per cent; fifth, Fernie No. 2, 92 per cent; sixth, Bellevue, 89.6 per cent; seventh, Lethbridge, 88.1 per cent. Six teams took part in the first-aid contest, with the following result: First, Fernie, 97.25 per cent; second, Michel No. 1, 96.25 per cent; Lethbridge and Bellevue tied for third place, 92.25 per cent; fifth, Michel No. 2, 90 per cent; sixth, Coal Creek, 89.25 per cent.



EXPERIMENTAL MINE, EAST KOOTENAY MINE SAFETY ASSOCIATION, MICHEL, B. C.

Obituary

Paul J. Rainey, a director of W. J. Rainey, Inc., big game hunter, explorer and motion picture photographer, died on the steamship Saxon en route from Southampton to Cape Town and was buried at sea Sept. 18, according to a radio message received at the office of the Rainey company in New York City. Mr. Rainey, who was forty-six years old, was born in Cleveland, the son of the late W. J. Rainey, known as "the coke king." He was unmarried. When in this country he divided his time between New York and Mississippi, where he had a big farm. He had a worldwide reputation as an explorer and hunter of big game. His brother, Roy Rainey, is chairman of the board of W. J. Rainey, Inc. He also left a sister, Mrs. Grace Rainey Rogers.

Recent Patents

Apparatus for Devolatilizing Coal. Claude M. Garland, Chicago, Ill.; 1,460,414. July 3, 1923. Filed Jan. 28, 1920; serial No. 354,531.

Mine-Car Skid. Thomas L. Campbell, Berlin, Pa.; 1,460,885. July 3, 1923. Filed Aug. 4, 1920; serial No. 401,159.

Air Separator. Wm. A. Gibson and Charles E. Needham, Allentown, Pa., assignors to the Bradley Pulverizer Co., Boston, Mass.; 1,460,960. July 3, 1923. Filed Nov. 16, 1921; serial No. 515,511.

Railroad Mine Tie and Rail Fastener. Thomas Richards, Sr., Portage, Pa.; 1,461,069. July 10, 1923. Filed April 17, 1922; serial No. 553,400.

Carbonaceous Fuel. Walter Edwin Trent, Washington, D. C.; 1,461,167. July 10, 1923. Filed June 19, 1922; serial No. 569,329.

Automatic Mine-Car Cager. Ferdinand F. Brasche, Edwardsville, Ill., assignor of one-third to Charles Holding and one-third to Wm. Palacke, both of Collinsville, Ill.; 1,461,513. July 10, 1923. Filed Nov. 25, 1921; serial No. 517,673.

Miner's Lamp Clip and Stay. Newton Farley, Lillybrook, W. Va.; 1,461,607. July 10, 1923. Filed April 28, 1922; serial No. 557,081.

Coal-Tipple Gate. Edward H. Herish, Altoona, Pa.; 1,461,844. July 17, 1923. Filed Jan. 4, 1922; serial No. 526,881.

Mine-Car Coupler. Frank S. Barks, St. Louis, Mo., assignor to the Lincoln Steel & Forge Co., St. Louis, Mo.; 1,462,188. July 17, 1923. Filed June 10, 1921; serial No. 476,445.

Flotation Apparatus. Joseph Ruth, Jr., Denver, Colo.; 1,463,405. July 31, 1923. Filed Oct. 4, 1919; serial No. 328,448.

Automatic Wheeled Scraper. John R. Grayson, Kakebeka Falls, Ont., Canada; 1,463,690. July 31, 1923. Filed April 6, 1922; serial No. 550,175.

Association Activities

A number of operators were in Louisville on Sept. 11 for the monthly meeting of the **West Kentucky Coal Bureau**. The meeting was given over to traffic and car-supply matters principally, along with statistical reports concerning operating time of the field, and causes for slow operation. Among those at the meeting were Frank D. Rash of the St. Bernard Mining Co., Earlington; A. W. Duncan, Duncan Coal Mining Co., Greenville; W. A. Wickliffe, of the Greenville Coal Co., Greenville; N. E. Jones, of the Southland Coal Co., Henderson; P. D. Berry, of the Providence Coal Mining Co., Providence; Brent Hart, of the Hart Coal Corporation, Mortons' Gap; M. B. and Sterling Lanier, of the Norton Coal Mining Co., Nortonville; J. D. Overall, of the Reinecke Coal Mining Co., Madisonville; H. L. Tucker, of the Rockport Coal Co., Rockport, Ky.; George S. Miles, of the Gibraltar Coal Mining Co., Memphis; Alex Blair, of the Pittsburg Coal Co., Basket.

The feature of the weekly meeting of the **Columbus Coal Bureau** held Sept. 17 was a talk by Frank H. Tanner, secretary of the Ohio Millers Association, on the problems which confront farmers and millers. Mr. Tanner also told of the fuel used by a majority of mills and said that coal was far in the lead, although some fuel oil, gasoline engines and natural gas was used. Several new members were received. The asso-

ciation together with a number of coal men of central Ohio had an outing at Spring Lakes, near Columbus, Sept. 20 with about 100 present. A number of guests from outside of the state were present. T. C. Collins, C. M. Anderson, B. F. Nigh, Homer Gill, F. W. Braggins and Leo Roberts composed the committee on arrangements.

Traffic News

Assurance that the **Southwest will not suffer from coal-car shortage this winter** was given in Kansas City the other day by J. B. Campbell, agent for the car service division of the American Railway Association in the Southwest. "Cars required by the coal mines the week ending Aug. 18 numbered 11,137 in the Southwest and we furnished 11,233 cars, or 101 per cent," Mr. Campbell declared. "A survey of car surpluses and car shortages from Aug. 15 to Aug. 22, showed a surplus of 527 cars in the Southwestern district ready for hauling."

Fewer freight cars were in need of repair on Sept. 1 this year than on any date since November, 1920, according to the Car Service Division of the American Railway Association. The total on Sept. 1 was 175,327, or 7.7 per cent of the number on line. This was a decrease of 13,308 cars since Aug. 15, at which time there were 188,635 or 8.2 per cent.

The Mid West Retail Coal Association, St. Louis, Mo., has written the Interstate Commerce Commission, protesting against the second postponement to Nov. 1 of the effectiveness of the decision abolishing assigned cars. "October is, one of the months in which coal cars are short," says the letter. "This shortage creates an unusual demand for coal, which is taken advantage of by unscrupulous shippers and jobbers to raise the price of fuel to dealers and steam plants and in many instances the increase is carried on to the general public. It has always been an unjust and unreasonable method of distributing cars and it is a matter of sincere regret to the members of this Association and its officials that the public must continue to suffer, and there is no adequate remedy up to the present for the evil excepting that of a promise that has yet to be fulfilled by your Commission. The contention made in the press of the country that the special interests are still the favored seems to be well maintained."

Issuance of \$1,000,000 additional capital stock by the Greenbrier & Eastern R.R., sanctioned by the Interstate Commerce Commission, means additional development of the smokeless coal resources of the Greenbrier field of West Virginia. The Greenbrier & Eastern is operated between Marfrance in the western part of Greenbrier County and Greenbrier & Eastern Junction, where the road connects with the Sewell Valley R.R. That road in turn connects with the main line of the Chesapeake & Ohio and furnishes an outlet for the coal mined in the Greenbrier field. Since the Greenbrier & Eastern was opened to traffic there has been rapid development of the Greenbrier coal field, especially at Quinwood, where several mines are operating and producing smokeless coal.

Double tracking of the Norfolk & Western on the Big Sandy Division is in prospect, the company now being engaged in securing options on property along the road for use as rights of way for the additional trackage. According to general reports, the additional track would extend from Kenova to a point east of Williamson in the heart of the Kenova coal field. With an additional track, the company would be able to increase materially its facilities for moving coal originating in eastern Kentucky and in southern West Virginia and additional facilities would greatly stimulate the development of the territory along the main line of the road.

Freight traffic in July amounted to 38,513,263,000 net ton miles, according to tabulation of reports filed by the carriers with the Bureau of Railway Economics. Except in July, 1920, when this figure was exceeded by nearly 5 per cent, and July, 1918, when it was exceeded by about 2 per cent, this was the greatest freight traffic for any July in previous years. Compared with July last year, when freight traffic fell off somewhat due to the strikes of both miners and railway shopmen, freight traffic in July this year was an increase of 42 per cent. The average load per car in July was 28½ tons, an increase of three-tenths of a ton over the average for June this year and the highest average for any July since 1917, except in July,

1918, when the average was 30.1 tons, and in July, 1920, when it was 29.5 tons. The average movement per freight car during July was 27.8 miles, a decrease of ¾ mile compared with the average for June, but the highest average for any July in previous years except in 1917, when it was 28.3 miles.

The Interstate Commerce Commission will hold a hearing at Norfolk Oct. 22, under Examiner Disque, on **complaints against the Norfolk & Western, Virginian and Chesapeake & Ohio railways**, and several other subsidiary coal-handling concerns, by towing and barging concerns, charging that these coal handlers charge excessive rates on dumping and trimming coal at the piers. It is charged these rates are in violation of the Interstate Commerce Act.

Railroads of the United States during the month of August placed in service 19,167 new freight cars, as well as 362 new locomotives, according to the Car Service Division of the American Railway Association. They also had on order on Sept. 1, with deliveries being made daily, 72,906 new freight cars and 1,517 new locomotives. During the month of August the railroads placed in service 7,478 new coal cars, which brought the total number placed in service from January 1 this year to Sept. 1 to 46,659. Of the new freight cars on order on Sept. 1, box cars numbered 31,807; coal cars, 29,203; refrigerator cars, 6,989, and stock cars, 3,079.

Locomotives in need of heavy repair on Sept. 1 totaled 9,392, or 14.7 per cent, according to the Car Service Division of the American Railway Association. This was the smallest number in need of heavy repair at any time since Aug. 1, 1920, when the Car Service Division began the compilation of these reports. The number in need of heavy repair on Sept. 1 was a decrease of 1,095 compared with the number on Aug. 15. A new high record also was established from Aug. 15 to Sept. 1 in the number of locomotives repaired and turned out of the shops, the number for that period being 23,056. The railroads on Sept. 1 had 53,438 serviceable locomotives, an increase of 1,100 over the number on Aug. 15, while they also had 2,714 locomotives in good repair but stored for future use, which was an increase of 47 since the middle of August.

It required exactly a week, from Monday morning, Sept. 10, to Saturday night, Sept. 15, for Commissioner Henry C. Hall and Examiner W. J. Koebel for the I. C. C. to hear at Denver, Colo., all the testimony in the **complaint of the Colorado and New Mexico Operators Association charging rate discrimination by 41 railroads**. It was set up that rates on Colorado and northern New Mexican coal to South Dakota, Iowa, Nebraska, Missouri and Kansas are unduly prejudicial in favor of coal producers both in Illinois and in Wyoming. The complainants presented an array of statistics to prove it and railroad and Eastern coal traffic association men attempted to refute it with arguments based on comparative traffic densities on Western and Eastern lines, directness of haul and the like.

Hearings in coal traffic cases have been assigned as follows: United Collieries, Inc., vs. Southern Ry., Big Stone Gap, Va., Oct. 11, before Examiner McGrath; M. K. Piper Coal Co. vs. Blair R.R., Harrisburg, Pa., Oct. 12, before Examiner Witters; Pioneer Coal & Coke Co. vs. Pennsylvania R.R., St. Louis, Oct. 23, before Examiner Witters.

Coming Meetings

National Safety Council will hold its twelfth annual safety convention at the **Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5**. Secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

Fifth annual general Western meeting, Canadian Institute of Mining and Metallurgy, Oct. 3-5, at Estevan, Saskatchewan, Canada. Secretary, G. C. Mackenzie, Drummond Building, Montreal, Que., Canada.

American Gas Association, annual meeting Oct. 15-19, Atlantic City, N. J. Secretary-Manager, Oscar H. Fogg, 342 Madison Ave., New York City.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Pritchard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, OCTOBER 4, 1923

Number 14

The Strike That Failed

HISTORY probably never recorded a bigger strike than that staged by Germany in the policy of passive resistance in the Ruhr. For eight months a whole industrial population has been on strike and has been receiving strike benefits from headquarters. The Ruhr is the densest, most active mining and manufacturing area in Europe, and when last January the French began to encircle it with troops and sought to turn its products to payments on reparations the world was circled with the phrase "You can't mine coal with bayonets."

The French did not mine coal with soldiers but they did wear out the resistance of their opponents. The Berlin government could not print paper marks fast enough or the trains run often enough to take them into the Ruhr to maintain the strike benefits. The passive resistance has been declared a failure. The greatest strike has been crushed, and with a minimum of bloodshed. Strikes, even large ones, can be won in opposition to determined, organized, well-financed forces, providing there is unity on the other side.

Premier Poincare united his side by assuming an aggressive policy and by controlling the policy of his nation. One may wonder how the coal strike in this country would have ended in 1922 had the operators all been following one leader and he been aggressive.

"Dear Governor Pinchot"

FIRST it was the Governor of Massachusetts, then the Governor of New Jersey and now it is the Governor of New York that is dictating this line, following it with his compliments on the anthracite settlement. If they don't stop plaguing him Pinchot will hate the sight of a crested letterhead.

On Sept. 10 the Governor of Pennsylvania wrote to the executive heads of all the anthracite-consuming states modestly calling attention to the fact that "by a slight wage increase the production of anthracite is now assured for two years," and suggesting that these several other governors look to it that the increase in wage cost was not passed on to the consumers in these other states. Pinchot admitted to "a special responsibility on himself in this matter" of seeing that consumers everywhere are not "gouged."

Governor Smith is meekness itself. He would not for a moment question the action of the Governor of Pennsylvania, where the coal is produced, of granting more wages to the miners "if in your opinion this was necessary." "But"—O! the suavity—"I do not believe that any public official should lead the people to believe, or attempt to lead the people to believe [*italics ours*], that the price of producing any commodity can be increased without increasing the cost to the ultimate consumer, unless profiteering can be proven." And then

the stinger—"Have you any evidence of profiteering so far as your state is concerned?"

Mr. Pinchot is reminded that if, as he wrote President Coolidge, some operators could absorb all the increase and yet make a profit, then "in the discharge of the special responsibility" which he acknowledges, he should make them do it. He is asked whether from his "intimate knowledge" of the coal business and the experience he "must have gained in the recent settlement" he has been able to gain any information from the report of the Hammond Coal Commission. Governor Smith seems to think that he has not.

Mr. Smith, like the other governors, recalls that the State of Pennsylvania has itself added to the cost of coal, as he puts it, "by the tax imposed at the mines and the addition of 50c. a ton imposed by the State of Pennsylvania upon production," and "now the settlement of the coal strike giving a further increase of 60c. a ton has made you assume the responsibility for these additions to the cost of coal to the consumer." Not just "Robbing Peter to pay Pinchot," as the *Wall Street Journal* aptly put it, but to pay Pennsylvania as well.

My Dear Governor Pinchot—"It seems clear to me that the duty and responsibility rests upon you and the State of Pennsylvania." And as an aside, not for publication of course, "As between aspirants for Presidential honors, now really don't you think it an awful blunder to raise the price of such a common necessity and then advertise it to the voters?"

The Mining Congress' Future

THE impression should not get abroad that the American Mining Congress is about to collapse for want of proper support. It is true that the convention of the Congress last week in Milwaukee drew a small attendance, that some of the scheduled meetings of minor divisions did not take place, and that part of the program lacked virility. But the Congress performs other services to the mining industry than merely to hold conventions and machinery exhibitions. As discreet and well-informed spokesmen for the mining industry in public places, the men representing the Congress are valuable. Their services should continue—and will—in spite of the fact that the organization has a hard time making ends meet, though the receipts for the past year totaled close to \$200,000.

The proposal to hold separate Congress conventions for coal- and metal-mining groups hereafter is a plan with obvious advantages and might prove successful even though a certain division of strength and lack of unity within the organization is almost sure to develop. It certainly is logical to assume that a convention held in some important coal center, with a program concentrating on coal and with an exhibition restricted to machinery used in coal mining and preparation, should

awaken more enthusiasm among coal men and exhibitors than one essaying to cover all mining. It is just as logical to assume the same thing for the metal-mining industry.

In recent years the Congress' meetings have held more of interest for coal men than any other class engaged in mining. The three most recent conventions have been close to the centers of coal mining. Yet coal men's interest has flagged. It needs stimulation. The Congress should be able to make itself a valuable clearing house for ideas about operation in coal. No other national organization is in a better position to do it. If the men at the helm within the Congress will devote themselves to developing a three-days' convention of discussion really vital to coal, and if the key men in coal will awake to the possibilities in such work for the improvement of the industry, then future conventions of the American Mining Congress will again become noteworthy.

What Do Miners Earn?

ON THIS question, around which such heated controversy raged in 1922, there is now a wealth of precise information. There is so much information, we fear, that the controversy is likely to break out afresh, unless the unfinished work of the Coal Commission is properly carried to a conclusion.

The report of the Coal Commission on Earnings of Mine Workers in the Bituminous-Coal Industry has just been published. It is a voluminous document, but not more so than the subject demanded. It represents the analysis of earnings of 332,668 mine workers in the soft-coal fields at 1,177 union and 751 non-union mines in 23 coal-producing states in 1921, with supplemental comparison of earnings of a smaller number in 1920. The report is a veritable mine of information, representing a more complete, comprehensive, scientific analysis of earnings of a larger number of employees than has ever been produced by any other investigation for any industry in this country.

Too much credit cannot be given the statistical experts who have given us this mine of information on earnings. There will be some, no doubt, who will assail the report as too scientific, too technical. In so far as this is true, it is the fault of the Commission, not those who prepared the report. The only credit that attaches to the Commission is for selecting highly competent people to do the work, a purely technical and very complicated job.

There seems to have been considerable misapprehension on the part of the Coal Commission as respects its duty and responsibility here. Appointed as a public body to report to the President and the Congress—that is, to the people; “in the public interest,” as it were—on the coal industry, this Commission assembles data on what the mine workers earn. The public is interested. It is curious to know what an impartial investigation of the miners' pay checks shows—how large they are, whether they are ample to give the worker and his family a decent living and how the earnings of these mine workers compare with earnings of workers in other industries. But the public is not told. The curtain is drawn over the results of this exhaustive study.

The Coal Commission takes the staff report, claps on a preface of three paragraphs, adds its signatures at the end and the incident is closed. It says that

in a study of earnings in so vast and so widely scattered an industry as bituminous-coal mining and one reflecting such a wide variety of both physical and social conditions, “it is not possible to give, in a few lines, figures or averages that are either typical or honestly representative.” Thus forewarned, who will dare generalize from this report! Continuing, “Nothing is to be gained in either accuracy or truthfulness of presentation by endeavoring to make appear simple that which is essentially complex. Such an effort merely blurs the picture and misleads the reader.”

The Commission goes on to say that the staff report here presented has not been “prepared for the casual or hurried reader, but for the serious student who desires to study all the elements in the industrial situation.” We concur. But what was the matter with these Commissioners—were they not the public's “serious students?” What was this Coal Commission for if not to “study all the elements in the industrial situation that characterizes the coal industry”? The Commission is convinced that the method of presentation here adopted is one that furnishes the basis for a series of enlightened studies that will go far “to stabilize and improve the labor conditions in this great basic industry” and to make it “a desirable social as well as industrial asset”—they might have had grace enough to say *more* desirable. This “rich mine” of statistics on earnings is bequeathed for exploitation by “competent students of our industrial and social problems.”

Dear Public, it is not for you to inquire what miners earn, whether they are well paid or poorly paid, whether their scale of wages and earnings thereunder is too high, and hence not in the public interest, or too low, also not in the public interest. Stand by and let competent students interpret this report on earnings for us!

To a subcommittee, Commissioners Neil and Devine, were assigned the studies of labor, including that on earnings. They are now confessing indifference or incompetence, or lack of desire to tell the American people in words of few syllables that the soft-coal mine worker makes higher daily wages by far than workers in other industries for the same degree of skill, training, and at comparable hazards. The Commission report does not show this or state it, but of almost simultaneous publication is the report of Illinois Miners' Earnings, 1918-1922, prepared and published by the operators of that state, which does show it. Also there is the report in *Monthly and Daily Earnings of Bituminous-Coal Miners*, published by the Brydon Committee. They are able to get some results that the layman can understand. The central Pennsylvania operators managed to come to some pertinent conclusions on the same subject, and from the same data that the Commission had.

It is the unfortunate truth, however, that the public always is likely to discount the operators' figures. The public wants its own Commission's word about whether the miner is simply well paid, overpaid or underpaid. The figures are in the report that Miss Anne Bezanson and her assistants prepared with infinite patience and labor, and the public's representatives warn us, unless we be competent students, to leave it alone, as they have.

And then turn to the recommendation in the “final” report, published last week, and find the place where the Commission says that the industry must be compelled by law to divulge information, through the Interstate Commerce Commission, on earnings of miners.

*Coal Commission Report
On Engineering and Management Shows*

Thickness of Coal, Size of Mine, and Use of Machinery The Three Factors in Efficient Production

Comprehensive Study of the Production Records for
Twenty Years of All Our Soft-Coal Mines Shows Gratifying
Progress in Better Methods and Efficiency of Operation

The thickness of your coal you cannot change; the size of your mine is fixed within certain limits; the other big factor in efficient operation, the use of machinery, is in your control. Here is a short, snappy Commission Report on Coal Engineering that is none the less interesting to coal men because written for the public.

Coal is produced the cheapest in those mines that are large, that have coal just a little thicker than the average man is high and that use the most machinery. This is the combined experience of all the soft-coal mines in this country, as brought out in the Engineering and Management Studies of the Coal Commission. The common measure applied to all was the efficiency in tons of coal produced per man per day. Taking into account all workers, the skilled and unskilled, the mine carpenter, electrician, blacksmith, the shoveler and miner, who work inside and outside at all the soft-coal mines, the average daily output per man was 4.19 tons in 1921. It had risen to this figure from 2.56 tons in 1890, steadily mounting to 2.98 tons in 1900 and to 3.46 tons in 1910.

This gain with time has followed the introduction of machinery and the better engineering practice that puts more machinery into industry. Throughout this period the other factors that influenced the efficiency of operation, the size of the mine and the natural conditions of which thickness of coal is the most important, have remained quite constant. In 1895, companies with outputs of 100,000 tons or more per year produced 71 per cent of the total soft coal; in 1905 the figure was 82 per cent; in 1920, 80 per cent. In 1895, 13 per cent of the total operating companies were in the group of those producing 100,000 tons or more; in 1905, 18 per cent; and in 1920, 17 per cent.

Mining Conditions.—The average thickness of coal mined has not changed materially as the thicker beds have been exhausted in the older fields, for thick beds have been opened in the newer fields. Thus the gains that have been made are the result of more efficient use of man power and the greater utilization of machinery. Some of this machinery is labor-saving, much of it is labor-eating. The use of machinery has brought with it new problems of safety; the electric cap lamp, for instance, gives the miner a better light than the safety lamp, but no warning against excessive gas. Electric motors have accelerated underground haulage but add to the accident hazard.

Coal is mined under an exceedingly wide range of natural conditions. Coal beds from less than 2 ft. to more than 50 ft. in thickness are worked in this country today, with the vast majority of the mines having coal between 4 and 10 ft. thick. Some mines are dry as the Sahara, others literally rain water in the work-

ings. Sometimes water must be pumped into the mines to wet the explosive, coal dust, but in most mines the water must be pumped or ditched out. To reach the coal beds some mines have shafts from a few hundred to a thousand feet or more deep, many enter the hillside on the natural outcrop of the coal. No coal bed is level, though many are approximately so. In the hard-coal region the majority now worked are steeply pitching.

The roof over some coal beds is hard and firm, over others it is friable and will not long stand without support. The floor is often clay that "heaves" and interferes with tracks and haulage. Some beds are clean coal from top to bottom, but the greater number contain layers of dirt or "bone" that must be removed, either by hand in the mine or by hand or machinery outside.

In many if not most mines the coal gives out gas, most often explosive, and immense quantities of air must be forced through the workings to dilute this dangerous gas to a harmless mixture.

Coal mining was a primitive form of endeavor. The coal bed was exposed in the hillside. Men dug into it, holding up the roof with props of wood. Fresh air was drawn in by creating a draft through a stove, wooden rails were laid on the floor, small wooden cars pushed by hand or drawn by mules or ponies brought the coal to the open air. The coal was picked down by hand. Mining in just such primitive ways is going on today. In contrast with these inefficient mines are those where advanced engineering, management and machinery are brought to grapple with the problems of gas, water, heaving floor and falling roof, the immense weight of rock overlying the coal bed, the long underground haul, and the cutting down and loading of the coal.

Management.—Man power is still and doubtless always will be the largest item of cost in producing coal. A mine with an output of 4,000 tons per day has nearly 1,000 mine workers. There are more than 600,000 mine workers in the soft-coal fields and 150,000 in the anthracite region. Labor, its management and efficient use is a major problem in coal mining. Labor cost represents nearly 70 per cent of the cost of production, supplies and general expense, including overhead, making up the remaining 30 per cent.

Thus the questions of engineering and management

How Productivity per Man per Day Varies with Size of Mine

Net Tons Produced per Man Employed per Day Worked, at All Commercial Bituminous Coal Mines. From Reports of Operators to U. S. Geological Survey.

Annual Tons per Mine	1905	1914	1920	1921
0—9,999	1.96	2.29	2.36	2.70
10,000—49,999	2.52	2.91	3.24	3.45
50,000—99,999	2.90	3.35	3.80	3.98
100,000—199,999	3.34	3.78	4.10	4.26
200,000 and over	3.80	4.18	4.50	4.73
Total, all mines	3.23	3.71	3.99	4.19

Read these columns from top down and from left across to right—without exception the larger the mine the more tons of coal per man, and each year better than the one before.

in coal mining have from the earliest time revolved around the two problems imposed by natural conditions and efficient use of labor. Coal mining is a huge engineering problem of material handling under adverse conditions. The material in any one mine must be collected from a large number of scattered working places, a few tons in a small pit car, brought by stages to a main haulageway and rushed out to be dumped through a tippie, cleaned, sized and put into waiting railroad cars. In this the engineering work has naturally divided two ways, into the purely mining engineering problems of laying out the underground haulage, the aircourses and the rooms in which the miners dig the coal, timbering, surveying and drainage, all with reference to the way the coal itself breaks down, its thickness, the nature of the roof, and the attitude of the beds. In all of these the first consideration must always be that of safety for the men and for the mine.

In the other direction are the engineering problems that involve largely the proper application of mechanical and electrical engineering to the work that is to be done—undercutting the coal, loading it into cars, motor haulage, types of cars and kind of track, hoisting, dumping and cleaning equipment. It is only by large-scale use of modern machinery that coal is and can be produced as cheaply as it is by the millions of tons each day in this country.

Handling Labor a Management Problem.—Management is not only complicated by the fact of large labor force but by the conditions under which that labor is employed. The coal miner who cuts down the coal, whether by hand or machine, and the loader who puts it into the pit cars is paid by the ton he gets out. In the soft-coal industry 60 per cent of the workers are thus contract workers, in the anthracite mines 40 per cent. These men are piece workers, laboring alone or in pairs in widely scattered rooms underground. As is shown in the separate studies of the Commission on the engineering aspects of underground management and on labor relations, the problem of supervision of such isolated workers is always of first importance.

Handling labor being the first and foremost everyday problem of coal-mine management, it is natural that the operating officials, the supervisory force, has been recruited from the ranks of the workers themselves. From miner to fireboss, up through assistant foreman to foreman, to mine manager or superintendent, has been the natural course for the abler men. Thus we find the intimate control of the mining operation in the hands of those whose chief qualifications is and has been ability to deal with the individual mine worker, and with the elemental forces of nature, the caving roof, the heaving floor, dangerous gas and wrecked mine cars.

In the better managed mines rule-of-thumb practices have been superseded by sound engineering. The larger companies have engineering departments as advanced in their methods as in any other industry, and often with many more problems to solve, but the average practice is far below the best. The anthracite industry because more uniformly profitable does not offer such a wide range between the best and worst; in the soft-coal field with its multitude of little operations it is a far cry from those holes in the ground at which the occasional visit of a surveyor is their nearest approach to an engineer to the modern plant with a corps of en-

Bituminous Coal Producers Classified by Size of Output in 1920

In making up this table each corporation, partnership or individual reporting production to the Geological Survey in 1920 has been classified by size of his total output. The classification is thus by size of company, not size of mine. Each corporation has been treated as a unit and no account has been taken of interlocking ownership or interest between companies. In the succeeding table, the data are expressed in percentage form.

Size Class	Number of Producers In Each Size Class	Number of Mines Operated By These Producers	Total Output Of These Producers
Country banks reporting	1,440	1,440	420,911
Wagon mines shipping by rail, other than local commercial mines	4,405	4,405	4,513,800
Commercial and local commercial mines producing as follows:			
Less than 2,000 tons	795	798	838,483
2,000 to 4,999 tons	806	814	2,604,260
5,000 to 9,999 tons	740	781	5,337,029
10,000 to 49,999 tons	2,121	2,381	53,348,269
50,000 to 99,999 tons	727	974	51,242,458
100,000 to 199,999 tons	543	988	75,508,562
200,000 to 299,999 tons	202	424	49,019,958
300,000 to 399,999 tons	94	215	32,965,932
400,000 to 499,999 tons	52	152	23,390,433
500,000 to 599,999 tons	33	98	17,914,499
600,000 to 699,999 tons	28	70	18,007,916
700,000 to 799,999 tons	20	122	14,969,468
800,000 to 899,999 tons	12	89	10,112,361
900,000 to 999,999 tons	16	140	14,149,119
1,000,000 to 1,249,999 tons	17	128	18,691,389
1,250,000 to 1,499,999 tons	9	119	12,471,314
1,500,000 to 1,749,999 tons	11	82	17,935,541
1,750,000 to 1,999,999 tons	10	97	18,747,933
2,000,000 to 2,499,999 tons	10	101	20,329,863
2,500,000 to 2,999,999 tons	7	110	21,697,649
3,000,000 to 4,999,999 tons	12	125	43,943,573
5,000,000 and over tons	4	213	40,505,963
Grand Total	12,124	14,766	568,666,683

The following table expresses the data in the preceding table in the form of percentages of the total both absolute and cumulative.

Size Class	Per Cent of Producers	Per Cent of Mines	Per Cent of Total Output	Cumulative Per Cent of Producers	Cumulative Per Cent of Mines	Cumulative Per Cent of Output
Country banks reporting	11.88	9.75	0.07	11.88	9.75	0.07
Wagon mines shipping by rail, other than local commercial mines	36.34	29.83	0.79	48.22	39.58	0.86
Commercial and local commercial mines producing as follows:						
Less than 2,000 tons	6.56	5.40	0.15	54.78	44.98	1.01
2,000 to 4,999 tons	6.65	5.51	0.46	61.43	50.49	1.47
5,000 to 9,999 tons	6.17	5.29	0.94	67.60	55.78	2.41
10,000 to 49,999 tons	17.50	16.12	9.38	85.10	71.90	11.79
50,000 to 99,999 tons	6.00	6.60	9.01	91.10	78.50	20.80
100,000 to 199,999 tons	4.48	6.01	13.28	95.58	84.51	34.08
200,000 to 299,999 tons	1.67	2.87	8.62	97.25	87.38	42.70
300,000 to 399,999 tons	0.78	1.46	5.80	98.03	88.84	48.50
400,000 to 499,999 tons	0.43	1.03	4.11	98.46	89.87	52.61
500,000 to 599,999 tons	0.27	0.66	3.15	98.73	90.53	55.76
600,000 to 699,999 tons	0.23	0.48	3.17	98.96	91.01	58.93
700,000 to 799,999 tons	0.16	0.83	2.63	99.12	91.84	61.56
800,000 to 899,999 tons	0.10	0.60	1.78	99.22	92.44	63.34
900,000 to 999,999 tons	0.13	0.95	2.49	99.35	93.39	65.83
1,000,000 to 1,249,999 tons	0.14	0.87	3.29	99.49	94.26	69.12
1,250,000 to 1,499,999 tons	0.07	0.81	2.19	99.56	95.07	71.31
1,500,000 to 1,749,999 tons	0.09	0.56	3.15	99.65	95.63	74.46
1,750,000 to 1,999,999 tons	0.08	0.66	3.30	99.73	96.29	77.76
2,000,000 to 2,499,999 tons	0.08	0.68	3.58	99.81	96.97	81.34
2,500,000 to 2,999,999 tons	0.06	0.74	3.82	99.87	97.71	85.16
3,000,000 to 4,999,999 tons	0.10	0.85	7.72	99.97	98.56	92.88
5,000,000 and over tons	0.03	1.44	7.12	100.00	100.00	100.00
Grand Total	100.00	100.00	100.00			

Everyone has a general idea about the number of small soft-coal mines in this country, but these tables tell the story in a simple effective way. That 85 per cent of the producers supply but 12 per cent of the output indicates the room for larger mines and for consolidations.

gineers developing and applying up-to-date methods and machinery.

The backwardness of the soft-coal industry in utilizing to a greater and more universal extent the best that modern management and engineering has to offer is plainly to be attributed to the speculative character of many of the mining enterprises. Those operators who have developed steady going businesses have no desire but to operate continuously; they are substantial going concerns. But a host of speculative operators come and go with the rise and fall of the spot price of coal. Since they operate only when a definite if not substantial profit is in sight, these operators give scant attention to good engineering and management practices. In times of high prices they can produce at a profit by slipshod methods, in poor times they shut down or at best are not financially able to invest in modern equipment. This explains why so much of the soft coal is produced inefficiently.

On the other hand the anthracite industry, which by comparison with the bituminous-coal business has been so uniformly profitable and which has had such a steady market for its product, has not had the economic incentive to reach out for always better and cheaper methods. Electrification of the anthracite industry, for instance, is backward compared with the most general advanced practice in soft-coal mining. The conservatism that pervades the anthracite industry has fastened on its engineering and management methods, as well.

Progress, Past and Future.—What better engineering and management mean to the coal industry and the coal consumer through lower cost may be illustrated by pointing out that if there had been no increase in efficiency since 1905 it would have taken the labor of 760,000 men working the average of 220 days to have produced the same tonnage of soft coal as was produced in 1920 with 630,000 men. In 1905 it took 0.31 man-day to produce a ton of coal, in 1921, but 0.24 man-day. Figured on the basis of the present basic day wage of \$7.50 per day this has meant a saving through better mining of 53c. per ton of bituminous coal, or about \$250,000,000 per year on normal soft-coal production. The further saving in housing by reason of the fewer men is an item of importance.

It is the conclusion of the engineering investigation conducted for the Commission under the direction of C. E. Leshner and R. A. Walter and summarized in this report that in the next decade there will be a reduction of 25 per cent in the man power required to produce a ton of bituminous coal through the continued development of better methods of mining, the more extended use of machinery, particularly for replacing hand load-

Trend of Size of Producing Corporation, 1905 and 1920

Data include commercial and local commercial producers only. Grouping is by size of company, not size of mine. Each operating corporation is treated as one producer, regardless of possible affiliations with other corporations.

Size Class	Per Cent of Total Operators		Per Cent of Total Mines Run By These Operators		Per Cent of Total Tons Produced By These Operators	
	1905	1920	1905	1920	1905	1920
Absolute Percent						
Operators producing annually						
Less than 10,000 tons.....	42.8	37.4	29.9	26.8	1.6	1.6
10,000 to 49,999 tons.....	27.6	33.8	21.4	26.7	7.8	9.4
50,000 to 99,999 tons.....	11.6	11.6	11.1	10.9	8.9	9.1
100,000 to 499,999 tons.....	15.2	14.2	20.3	18.8	33.4	32.1
500,000 to 999,999 tons.....	1.4	1.7	4.5	5.8	10.8	13.3
1,000,000 to 4,999,999 tons.....	1.3	1.2	10.4	8.6	29.9	27.3
5,000,000 tons and over.....	1	.1	2.4	2.4	7.6	7.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Cumulative Per Cent						
Operators producing annually						
Less than 10,000 tons.....	42.8	37.4	29.9	26.8	1.6	1.6
10,000 to 49,999 tons.....	70.4	71.2	51.3	53.5	9.4	11.0
50,000 to 99,999 tons.....	82.0	82.8	62.4	64.4	18.3	20.1
100,000 to 499,999 tons.....	97.2	97.0	82.7	83.2	51.7	52.2
500,000 to 999,999 tons.....	98.6	98.7	87.2	89.0	62.5	65.5
1,000,000 to 4,999,999 tons.....	99.9	99.9	97.6	97.6	92.4	92.8
5,000,000 tons and over.....	100.0	100.0	100.0	100.0	100.0	100.0

ing, and by better management. The coal consumer, of course, will reap the larger share of any saving that is thus made, as it has that already accomplished.

The anthracite industry shows a different record. The working of thinner, deeper beds has been largely responsible for a reduction from 2.18 tons per man per day in 1905 to 2.09 tons in 1921. The gains from better engineering have been more than offset by the increasing handicap of natural conditions. The direction in which the anthracite industry can effect the largest economies lies in better utilization of the fine sizes; those below pea coal are marketed in competition with soft coal at prices below their actual cost of production. These economies will be attained by the use of the finest sizes as powdered fuel for steam raising and by some form of briquets or otherwise converting the fine coal to solid smokeless fuel of large size suitable for ordinary household use.

Improved methods of mining have conserved enormous tonnages of coal for future use by reducing waste in mining, and there is even yet opportunity for further saving.

From 25 per cent of the original anthracite in the ground recovered in the mining of 1850, the per cent of recovery has risen to more than 60 today and there is no reason why it should not attain 70 per cent. In the production of bituminous coal whereas 36 per cent of the original deposit was recovered by mining in 1850, 65 per cent is the average now produced, and bringing the poorest practice up to the average will bring the figure to 85 per cent.

The Mechanical Loader Coming Fast.—In management, the application of engineering to operation and handling men, the coal industry has not made the progress it has in the application of engineering to machinery and equipment. The day of the mechanical loader is just dawning. Nearly half the men in the coal mines are employed to shovel the coal by hand from the room floor to pit car. The use of the machine for this work will mean fewer men employed but it will mean higher wages and cheaper coal as well. The investment will add to the overhead cost in interest, depreciation and maintenance, but the increase will be offset many times over by reduction in total labor and other costs of production.

Studies by the industrial and mining engineers of the

Tons Produced by All Bituminous Operators, Including Country Banks and Wagon Mines, Classified by Size of Producer, 1905 and 1920

This table is not to be confused with others of this series, which include only coal from commercial (and local commercial) mines.

Size Class	Tons Produced By These Operators		Per Cent of Total Output	
	1905	1920	1905	1920
Operators producing annually				
Less than 10,000 tons.....	5,359,000	13,715,000	1.7	2.4
10,000 to 49,999 tons.....	24,567,000	53,348,000	7.8	9.4
50,000 to 99,999 tons.....	27,988,000	51,243,000	8.9	9.0
100,000 to 499,999 tons.....	105,319,000	180,885,000	33.4	31.8
500,000 to 999,999 tons.....	34,021,000	75,153,000	10.8	13.2
1,000,000 to 4,999,999 tons.....	93,985,000	153,817,000	29.8	27.1
5,000,000 tons and over.....	23,824,000	40,506,000	7.6	7.1
Total.....	315,063,000	568,667,000	100.0	100.0

Commission, presented in detail in an appendix to this report show the possibilities of economies that can be, and are in some mines, realized by advanced management practice in the very important field of underground haulage. The standardization of equipment, of jobs and the better utilization of the time of the workers are fields of coal-mine management largely untouched as yet, largely because the supervisory force that operates the average coal mine today, is already overburdened with the work of handling the human element under the

adverse condition imposed by scattered working places.

The statement of these conditions carries its own obvious recommendations and suggestions to the coal industry. If anything further is required it is the suggestion that coal operators co-operate with the mining schools and colleges even further than they have in their efforts to train young men in the elements of coal-mine engineering and labor management and that these technically trained men be encouraged and given opportunity to learn the operating side of coal mining.

How Average Daily Output per Mine Worker Varies with Thickness of Coal, Size of Mine and Use of Undercutting Machines, 1921

MINES PRODUCING LESS THAN 10,000 TONS Proportion Mined By Machines

Thickness of Bed Being Mined, in Inches	Less than $\frac{1}{2}$			$\frac{1}{2}$ to $\frac{3}{4}$			$\frac{3}{4}$ And Over			Unspecified			Total		
	Number of Mines	Production in Tons	Production per Man per Day	Number of Mines	Production in Tons	Production per Man per Day	Number of Mines	Production in Tons	Production per Man per Day	Number of Mines	Production in Tons	Production per Man per Day	Number of Mines	Production in Tons	Production per Man per Day
24 or less.....	48	164,000	1.36	4	19,000	1.23	8	31,000	1.53	1	.....	.....	61	214,000	1.146
25 to 36.....	378	1,215,000	2.28	9	57,000	3.05	80	339,000	1.94	7	14,000	1.52	474	1,625,000	2.21
37 to 48.....	514	1,748,000	2.84	23	127,000	2.68	208	829,000	2.97	17	43,000	2.70	762	2,747,000	2.87
49 to 60.....	313	1,053,000	2.93	12	66,000	4.68	150	604,000	3.61	9	30,000	2.38	484	1,753,000	3.17
61 to 72.....	187	678,000	3.24	10	44,000	2.89	100	416,000	3.67	5	14,000	1.63	302	1,152,000	3.33
73 to 84.....	72	253,000	3.91	4	8,000	5.00	26	113,000	3.51	3	13,000	2.77	105	387,000	3.75
85 to 96.....	52	222,000	3.71	.....	.....	.....	10	39,000	4.06	.....	.....	.....	62	261,000	3.76
97 and over.....	49	181,000	3.23	.....	.....	.....	5	18,000	3.46	.....	2,000	1.82	56	201,000	3.23
Unspecified.....	218	629,000	2.51	7	33,000	2.68	43	173,000	2.49	805	1,422,000	2.33	1,073	2,257,000	2.40
Total.....	1,831	6,143,000	2.71	69	354,000	2.84	630	2,562,000	2.94	849	1,538,000	2.33	3,379	10,597,000	2.70

MINES PRODUCING 10,000 TONS, AND LESS THAN 50,000

24 or less.....	23	465,000	2.27	3	65,000	1.88	20	476,000	1.84	.....	.....	.....	46	1,006,000	2.955
25 to 36.....	229	5,076,000	2.84	20	526,000	2.18	107	2,590,000	2.67	2	48,000	1.73	358	8,240,000	2.272
37 to 48.....	287	6,491,000	3.15	50	1,293,000	3.42	338	8,678,000	3.52	2	32,000	2.03	677	16,494,000	3.35
49 to 60.....	237	5,556,000	3.60	53	1,240,000	4.01	264	6,780,000	4.15	5	72,000	3.48	559	13,648,000	3.90
61 to 72.....	144	3,061,000	3.67	30	736,000	3.53	162	4,512,000	4.31	1	12,000	2.00	337	8,321,000	3.97
73 to 84.....	62	1,509,000	4.20	16	434,000	4.72	49	1,172,000	4.32	.....	.....	.....	127	3,115,000	4.31
85 to 96.....	36	846,000	3.56	6	214,000	3.92	21	524,000	4.39	.....	.....	.....	63	1,584,000	3.85
97 and over.....	36	943,000	3.77	5	75,000	6.25	15	353,000	4.34	.....	.....	.....	56	1,371,000	3.99
Unspecified.....	38	704,000	3.34	2	56,000	5.96	32	754,000	3.09	41	758,000	3.13	113	2,272,000	3.22
Total.....	1,092	24,651,000	3.29	185	4,639,000	3.46	1,008	25,839,000	3.64	51	922,000	2.95	2,336	56,051,000	3.45

MINES PRODUCING 50,000 TONS, AND LESS THAN 100,000 TONS

24 or less.....	3	176,000	1.61	1	57,000	1.48	3	236,000	2.40	.....	.....	.....	7	469,000	1.197
25 to 36.....	37	2,610,000	3.45	7	516,000	2.80	33	2,184,000	3.05	.....	.....	.....	77	5,310,000	3.20
37 to 48.....	83	5,846,000	3.14	24	1,706,000	3.23	205	14,264,000	3.92	.....	.....	.....	312	21,816,000	3.62
49 to 60.....	72	5,135,000	3.84	23	1,697,000	4.05	156	11,235,000	4.35	.....	.....	.....	251	18,067,000	4.16
61 to 72.....	39	2,779,000	3.64	21	1,442,000	3.83	100	7,335,000	4.52	.....	.....	.....	160	11,556,000	4.19
73 to 84.....	32	2,386,000	5.72	9	598,000	5.51	38	2,762,000	5.40	1	62,000	19.38	80	5,808,000	5.58
85 to 96.....	41	2,897,000	4.88	17	1,150,000	3.94	18	1,277,000	6.09	.....	.....	.....	76	5,324,000	4.86
97 and over.....	12	899,000	5.94	2	160,000	3.27	9	621,000	5.04	.....	.....	.....	23	1,680,000	5.19
Unspecified.....	5	363,000	3.63	.....	.....	.....	11	782,000	3.92	.....	.....	.....	16	1,145,000	3.92
Total.....	324	23,091,000	3.79	104	7,326,000	3.67	573	40,696,000	4.19	1	62,000	19.38	1,002	71,175,000	4.00

MINES PRODUCING 100,000 AND LESS THAN 200,000 TONS

24 or less.....	8	1,038,000	2.55	4	555,000	2.68	16	1,080,000	2.63	.....	.....	.....	1	108,000	166
25 to 36.....	32	4,074,000	2.96	18	2,559,000	3.60	97	13,632,000	3.88	.....	.....	.....	28	3,707,000	6,607
37 to 48.....	46	6,509,000	3.89	15	2,098,000	4.13	162	22,605,000	4.55	.....	.....	.....	147	20,265,000	28,551
49 to 60.....	41	5,566,000	3.95	20	2,898,000	4.68	123	17,906,000	4.61	.....	.....	.....	223	31,212,000	42,209
61 to 72.....	25	3,266,000	4.91	18	2,648,000	4.40	57	8,379,000	5.16	.....	.....	.....	184	26,370,000	38,678
73 to 84.....	45	2,483,000	4.46	4	579,000	4.32	63	11,087,000	6.28	.....	.....	.....	100	14,293,000	18,989
85 to 96.....	17	1,844,000	4.59	2	287,000	6.04	19	2,916,000	6.05	.....	.....	.....	84	14,149,000	17,972
97 and over.....	2	226,000	4.60	.....	.....	.....	2	252,000	4.60	.....	.....	.....	35	5,047,000	5,894
Unspecified.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	478,000	589
Total.....	185	25,006,000	3.82	81	11,624,000	4.11	540	78,999,000	4.62	.....	.....	.....	806	115,629,000	159,655

MINES PRODUCING 200,000 TONS AND OVER

24 or less.....	.....	.....	.....	2	758,000	3.65	4	938,000	2.53	.....	.....	.....	6	1,696,000	2,618
25 to 36.....	11	3,306,000	3.85	10	2,957,000	3.67	24	7,432,000	4.05	.....	.....	.....	45	13,695,000	16,612
37 to 48.....	17	5,314,000	4.13	7	2,226,000	4.43	66	21,073,000	4.27	.....	.....	.....	90	28,613,000	33,443
49 to 60.....	21	6,301,000	4.39	15	5,038,000	4.18	107	37,041,000	4.58	.....	.....	.....	143	48,380,000	53,948
61 to 72.....	10	2,776,000	5.42	12	4,345,000	4.46	83	28,648,000	5.34	.....	.....	.....	105	35,769,000	37,788
73 to 84.....	8	2,010,000	4.66	11	3,821,000	4.55	33	14,502,000	5.61	.....	.....	.....	52	20,333,000	21,370
85 to 96.....	12	3,973,000	5.16	3	1,403,000	5.60	23	8,142,000	5.50	.....	.....	.....	38	13,518,000	14,176
97 and over.....	.....	.....	.....	.....	.....	.....	1	467,000	3.54	.....	.....	.....	1	467,000	550
Unspecified.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	79	23,680,000	4.47	60	20,548,000	4.29	341	118,243,000	4.77	.....	.....	.....	480	162,471,000	180,505

TOTAL OF ALL MINES

24 or less.....	74	805,000	1.85	8	141,000	1.59	32	851,000	2.03	1	.....	.....	115	1,797,000	5,464
25 to 36.....	652	9,939,000	2.85	42	2,412,000	2.81	240	8,165,000	2.74	9	62,000	1.68	943	20,578,000	50,709
37 to 48.....	927	21,465,000	3.17	125	8,642,000	3.50	872	44,835,000	3.82	19	75,000	2.37	1,943	75,017,000	140,320
49 to 60.....	685	23,567,000	3.80	110	7,327,000	4.18	798	62,297,000	4.36	14	102,000	3.06	1,607	93,293,000	152,208
61 to 72.....	432	18,385,000	3.95	96	10,158,000	4.19	592	67,210,000	4.55	6	26,000	1.78	1,126	95,779,000	141,344
73 to 84.....	201	10,190,000	5.05	59	8,033,000	4.52	253	41,074,000	5.27	4	75,000	9.49	517	59,372,000	74,710
85 to 96.....	154	8,458,000	4.50	38	5,764,000	4.36	145	27,429,000	5.85	.....	.....	.....	337	41,651,000	56,013
97 and over.....	123	7,840,000	4.81	12	1,925,000	5.36	71	12,050,000	5.55	2	2,000	1.82	208	21,817,000	25,839
Unspecified.....	263	1,922,000	3.15	9	89,000	4.10	89	2,428,000	3.47	846	2,180,000	2.56	1,207	6,619,000	16,846
Total.....	3,511	102,571,000	3.71	499	44,491,000	4.02	3,092	266,339,000	4.47	901	2,522,000	2.58	8,003	415,923,000	663,453



Coal of Soochan and Its Importance in Pacific Trade

Output Rose with Russia's Progress and Fell with Its Decline—Six Coal Seams Three to Nine Feet Thick—Anthracite and High-Grade Bituminous Coal—Coke and Briquets Manufactured—Railroad Location Ill-Chosen

BY I. TOLMACHOFF*
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OF ONLY recent date is the development of the coal industry in Far East Russia. It found its first justification in the construction of the great Siberian R.R., which was and still is one of the most important consumers of coal, for the consumption of that fuel is still small in the Russian Far East. The industries which require so much coal in other countries thus far are lacking in these regions, and the domestic use of coal is spreading slowly. By and by, however, coal will drive out firewood, heretofore the traditional Russian fuel throughout the country.

It has been estimated that the possible annual demand for coal in the Russian Far East does not exceed 900,000 tons, but the local coal production has never reached so large a figure. Such an amount could well be produced from a single mine. It seems ill-fitting that it should be the output of a spacious country like the Russian Far East with its extensive and rich coal fields. The figures show that the consumption of coal and the development of the industry are only just starting in that region.

Soochan has a prominent position among the different localities in which coal is mined in the Russian Far East. The Soochan coal fields are situated in the Maritime Province of Eastern Siberia, 93 miles east of Vladivostok. The mineral was discovered in 1888 and successfully examined and prospected in the years

that followed. The good quality of the coal, as proved by laboratory tests and trials on steamers, and the possibility of its adoption for use by the Russian Navy decided the fate of the mines, and beginning 1900 they were operated by the government, the expenses being paid out of the state treasury. The government institutions—the Army and Navy departments, the railroads, etc.—acquired the greater part of the output of the mines. It is possible to say that for the greater part of the time the Soochan mines were working almost entirely for government supply. The importance of the government's orders for coal is shown distinctly



OFFICE BUILDING AT SOOCHAN MINES

The church can be faintly discerned on the left. A substantial building with the ground floor of stone. The upper story is of wood.

*Former managing director of Far Eastern Geological Committee and professor of geology in Polytechnic Institute, Vladivostok, Siberia; now curator of invertebrate paleontology, Carnegie Museum. The author desires to credit V. Paak, former manager and mining engineer, for information and illustrations furnished.



ROAD FROM MINES OVER SIKHOTA XALIN MOUNTAINS

These mountains separate the mines from the coastline. About 200 square miles are covered with forest which will supply the mines with timber for many years. Note the typical Russian conveyance. Though Soochan is a Chinese name the mines are on Russian territory.

in Table I, in which the quantity consumed is tabulated by kinds of consumers for the years between 1908 and 1919.

TABLE I—CONSUMPTION DISTRIBUTION BY USES, SOOCHAN MINES

Year	Government Consumption—			Total	Other Consumers	Percentage of Consumption	
	Navy	Army	Railroads			Government	Other
1908....	25,133	39,483	64,033	137,982	9,333	94	6
1909....	70,250	43,550	30,900	151,338	6,683	96	4
1910....	94,417	43,833	21,883	164,416	4,283	97	3
1911....	69,518	30,350	70,650	173,816	3,318	98	2
1912....	49,983	28,900	71,517	157,583	7,183	95	5
1913....	25,183	38,250	52,533	129,299	11,333	91	9
1914....	56,667	40,050	48,667	149,317	3,933	97	3
1915....	45,083	35,883	66,667	166,933	19,300	89	11
1916....	44,417	41,550	78,317	207,334	43,050	80	20
1917....	54,050	31,933	69,750	217,516	61,783	75	25
1918....	11,917	11,517	75,567	155,534	56,533	67	33
1919....	9,800	8,400	22,467	59,100	18,433	67	33

These conditions were very profitable for the enterprise, as the government alone could build a special railroad 73 miles long between the mines and the main road and install adequate mechanical equipment. For this reason the Soochan mines were the best mining operations in the Russian Far East, experienced workmen and employees being brought from the Donetsk coal fields of European Russia.

On the other hand, the government's enterprises in Russia were always defective from a commercial point of view, and the Soochan mines are no exception to that rule. It is possible now to say frankly that the mines could have been operated as they were only by the continued support of the government, which was given partly in an indirect way, namely by fixing a high price for the coal purchased.

In the last years of their operation, years when Russia was the victim of many political troubles, the

Soochan mines lost the support of the government. They delivered much less coal to government institutions and were forced to exist much as any other commercial enterprise; that is, they were compelled to pay all the expenses of operation out of their own income. The enterprise is in an extremely difficult position now and only with great difficulty can meet the unavoidable costs of everyday operation.

The Soochan coal fields extend over 850 square miles, ninety of which are more or less prospected and found coal-bearing; only 13 square miles, one-sixty-fifth of the whole region, forming the area of exploitation. This area has been examined in detail.

The coal-bearing measures occupy a strip of land one to two miles wide. They consist of Jurassic strata, severely folded in many places. Six coal seams are suited for operation. They have a steep dip which runs from 65 to 80 deg. and are of uneven thickness, varying between 3 and 9 ft.

According to recent geological investigations the whole coal reserve in the Soochan coal fields above a depth of 1,400 ft. can be estimated at about 40,000,000 tons, a quarter of which is in the well-prospected area of exploitation. However, there are good geological reasons to infer that coal-bearing strata exist outside of the prospected region, and the possibility of finding new coal bodies is promising.

Systematic mining started in 1903 with the completion of shaft sinking. The output increased gradually every year, reaching a maximum in 1917. From that year the output declined, the cause being political unrest in Russia and the decreased demand of the government institutions. The following table gives the production of the mines and the cost per ton loaded on railroad cars at the tippie:

TABLE II—OUTPUT OF SOOCHAN COLLIERIES BY YEARS AND COST PER TON

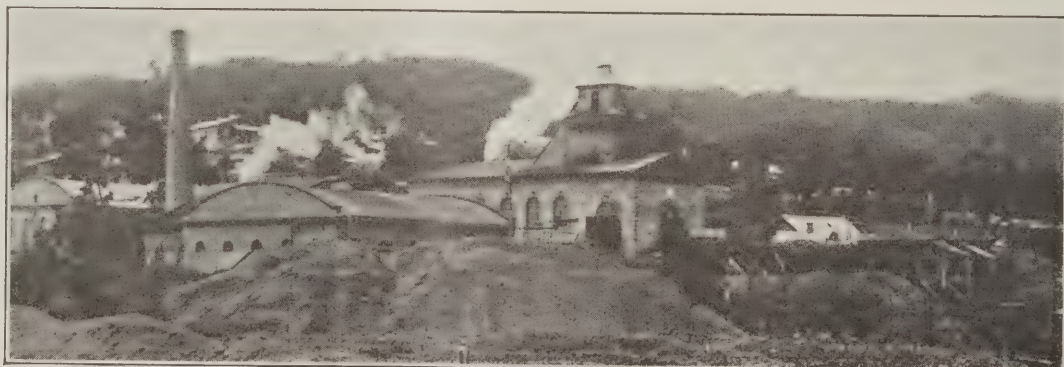
Year	Output Tons	Cost of Production—	
		Rubles	Dollars
1903.....	19,567		
1904.....	27,383		
1905.....	50,567		
1906.....	20,063		
1907.....	8,967		
1908.....	115,733	3.75	\$1.87
1909.....	177,917	3.94	1.97
1910.....	200,150	3.92	1.96
1911.....	218,900	4.06	2.03
1912.....	212,083	4.30	2.15
1913.....	166,733	4.64	2.32
1914.....	209,533	4.65	2.32
1915.....	208,450	4.81	2.40
1916.....	275,033	5.75*	
1917.....	299,283	9.10*	
1918.....	209,550	36.88*	
1919.....	120,317	98.95*	
1920.....	121,233	15.00	7.50
1921.....	140,000†	12.00	6.00

* As the ruble in these years was the paper ruble, no precise equivalent in dollars can be attempted. † Estimated output based on output of certain months.

The proximate analysis of the Soochan coals greatly varies with locality and depth. They contain 5 to 28

Surface Works, No. 1 Mine

Note the curved roofs sustained by segmental steel trusses. The hills in the rear are well wooded. Glimpses of the village can be seen back of the mine buildings.





per cent of volatile matter, 8 to 24 per cent of ash and not over 0.7 per cent of sulphur. The high percentage of ash forced the administration of the mines to erect picking tables and washeries.

From a marketing point of view Soochan coal can be divided into two classes: (1) Coking coal, containing 15 to 28 per cent of volatile matter and 8 to 12 per cent of ash. This coal compares well with the best coals used on the Pacific Ocean. It is well fitted for export. (2) Coal for which it is difficult to find consumers abroad but which can be used in the country domestically, for railroads and other purposes. This includes bituminous coal with 15 to 28 per cent of volatile matter but with more ash than coals of the first category, namely 15 to 24 per cent, and anthracite coals with 8 to 12 per cent of volatile matter and much ash.

In Table III two analyses of the better class of Soochan coal are given, which can be compared with coals Nos. 3, 4, 5 and 6, which are Japanese, and Australian coals used on the Pacific Ocean.

TABLE III—COMPARISON OF TWO SOOCHAN COALS WITH COMPETING FOREIGN FUELS						
	1	2	3	4	5	6
Moisture.....	0.83	1.12	2.28	2.57	2.36	2.00
Volatile matter.....	22.83	22.83	40.54	44.45	41.44	42.45
Fixed carbon.....	63.36	64.51	52.75	57.01	51.52	52.55
Ash.....	13.13	12.16	5.75	6.17	7.04	5.00
Sulphur.....	0.68	0.50	0.96	0.37	0.90	0.75
British thermal units.....	13,572	13,410	13,464	13,392	13,685	14,150
Calories.....	7,540	7,450	7,480	7,440	7,603	7,861
Heating efficiency.....	8.0	7.8	7.65	7.5		
Equivalent.....	1.0	1.025	1.045	1.066		

1 and 2—Coking coal of Soochan coal fields. 3—Japanese coal of Ochy coal field. 4—Japanese coal of Beebay coal field. 5—Australian coal from Hebburn colliery delivered to Schonfield barracks, Hawaii. 6—Coal from same source delivered to Fort Ruger, Hawaii.

The calorific values of all three kinds of coal are somewhat similar. It will be noted that the lowest figure is 13,392 B.t.u. for a Japanese coal to 14,150 for one derived from Australia. The last two coals, which are quite similar to each other in their proximate analyses, differ greatly from the coal of the Soochan mines in the larger percentage of volatile matter and the smaller proportion of carbon and ash.

The only defect in the Soochan coal is the big percentage of ash, and this fault can be partly removed by washing. This is now being done. The other differences are in its favor as a steaming coal, which is demon-

strated in Table IV by comparing the quantities of Soochan coal and of other coals used on the Pacific Ocean that will produce a given result. The various coals are compared with the best Cardiff, its heating power being taken as unity.

Australian coal has a better reputation than that from Japan, but it is more expensive. In spite of this it is often preferred to the Japanese coal, if the consumer is looking for quality.

TABLE IV—WEIGHTS OF COAL GIVING EQUAL NUMBER OF HEAT UNITS		
Source		Equivalent
Best Cardiff, Wales*	.....	1.000
Duisky, Sakhalin.....	.....	1.125
Tokasima†, Japan.....	.....	1.173
Soochan, coking.....	.....	1.257
Nakusima, Japan.....	.....	1.371
Kitegawa, Japan.....	.....	1.400
Ichic, Japan.....	.....	1.500
Turukawa, Japan.....	.....	1.500
Ioubary, Japan.....	.....	1.514
Otaru, Japan.....	.....	1.650
Akanki, Japan.....	.....	1.635
Meeke, Japan.....	.....	1.430
Kanaimo, Japan.....	.....	1.370
Australian.....	.....	1.580

*With every reloading coal loses 10 per cent in coarseness. †Not on market since 1896. Run-of-mine coal, not cleaned.

Soochan bituminous coal is well suited to the production of coke. The coal is coked in beehive ovens,



INTERNAL-COMBUSTION BOILERS, MINE NO. 2
Evidently the fine coal is used to raise steam. A close inspection will reveal how the roof is sustained and how the coal is brought into the boiler room.



POWER HOUSE AT MINE NO. 2

Vertical engines drive the generators by belting. Note the massive walls and the white surfaces, which make the most of what light is admitted.

the total output not exceeding 500 tons a month, no byproducts being obtained or utilized.

Coke production started in the year 1908; it gradually increased in accordance with the demand of the market and reached its highest point in the year 1917, during the war, when Soochan coke was used largely in the military works and shops on the Siberian R.R. and was delivered as far as Omsk, over three thousand miles from the point of coking.

The output of coke is about 55 per cent of the weight of coal used. The average analysis of Soochan coke, prepared from washed coal, is: Fixed carbon, 82.49 per cent; volatile matter, 3; ash, 12.50; sulphur, 0.50; phosphorus, 0.01; moisture, 1.50; calories, 8,000; British thermal units, 14,400.

The data of the coke industry in tons and the costs of production in rubles and dollars are given in Table V.

TABLE V—PRODUCTION COST OF COKE BY YEARS

Year	Production, Tons	Cost of Production— Rubles	Cost of Production— Dollars
1908.....	817	13.44	6.72
1909.....	817	13.39	6.69
1910.....	1,183	13.07	6.53
1911.....	1,250	12.75	6.87
1912.....	1,183	13.28	6.64
1913.....	1,467	16.05	8.02
1914.....	1,300	15.60	7.80
1915.....	2,817	14.43	7.21
1916.....	4,480	13.94	6.97
1917.....	5,412	19.29*	.....
1918.....	2,880	82.23*	.....
1919.....	1,660	201.64*	.....
1920.....	400	54.00*	.....

* No precise comparison with American currency is possible.

In order to supply the Russian Navy with a compact fuel and to prevent wasting the fine coal and dust collected in the coal yard of the Navy Department in Vladivostok, a factory was built in that city for the manufacture of briquets. It is capable of producing

10 tons of prismatic briquets per hour. The output of this factory and the costs of production are shown in Table VI.

TABLE VI—OUTPUT AND PRODUCTION COSTS OF BRIQUET FACTORY

Years.....	1913	1914	1915	1916	1917	1918	1919	1920
Production (tons).....	33,083	12,283	4,133	.....	10,750	6,233	3,767	7,567
Costs { rubles.....	16.23	17.40	21.60	.....	21.30	75.50	480.00	29.40
Costs { dollars.....	8.10	8.70	10.80	.....	10.65	.....	.....	14.70

The Soochan plants are well supplied with timber for mining and building purposes. About a quarter of the acreage—200 square miles—is covered with forest, thus making certain that there will be no lack of timber for the operation of the mines for many years.

Labor, strange to say, is not so scarce in Soochan as in the rest of Russia, though in a country having as scanty a population as the Russian Far East it well might be expected that labor would be more difficult to obtain than elsewhere. The Russian workmen who were brought to Soochan from European Russia at the commencement of mining, and their descendants are



HEADFRAME AND WASHERY AT NO. 2 MINE

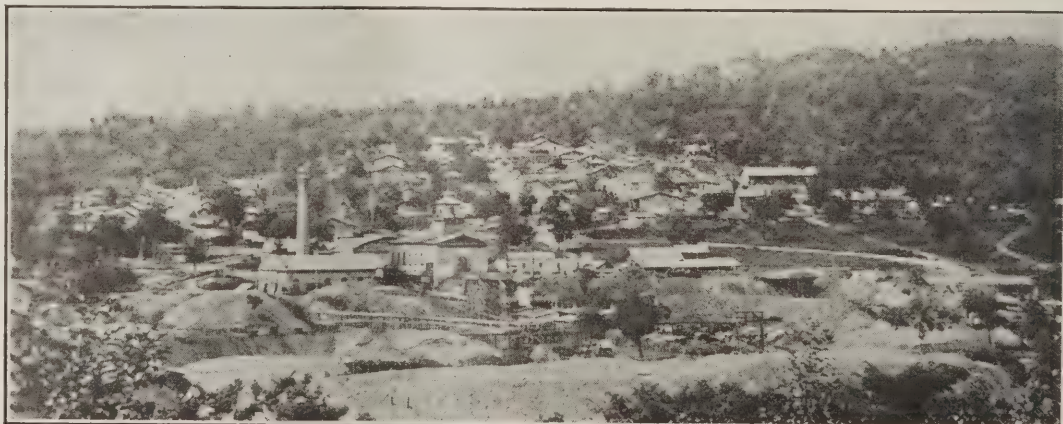
The coal in the Soochan mining region contains from 8 to 24 per cent of ash. Consequently the need for a washery is evident. The washing is performed in the building on the right.

still living at the mines, being intimately connected with the enterprise. They undoubtedly were infected by the revolutionary propaganda of recent years and strikes were not infrequent, but after all there were good economic reasons for unrest and the troubles were not all due to political excitation.

The men were paid irregularly for their labor and not at the full rate; food and other necessities were of poor quality and in uncertain supply. In spite of these conditions—quite enough to cause laboring men to revolt in any country—it was the workmen's opposition which saved the mines, when their destruction was devised by Bolshevik agitators, who came to Soochan with their propaganda and urged the workmen to destroy there, as elsewhere, the instruments of capitalism. The Far East has, besides Russian workmen, a practically unlimited supply of yellow labor from

Mining Town, No. 1 Mine

The plant in the foreground readily will be recognized as the same as is shown in a previous illustration. Despite the large area of land available the village is placed close to the mine.



Bunkers of Aerial Tramroad

These are at No. 2 Mine. The tramroad brings coal from Mine No. 1. Observe the interesting bents to the right which economize space and timber. Probably there is little cause to be frugal in the use of the latter in Russia, but a saving of space everywhere has its advantages, especially around a yard. Rotary dumps can be seen above the loading pockets in the middle of the illustration.



China and Korea. Today 70 per cent of the workmen in the mines of Soochan are Russians and the other 30 per cent Chinese.

Though the production which the mines achieve is small, it is obtained only by the operation of several shafts and slopes, none of which, however, is more than 700 ft. deep. Every mine is supplied with its own boiler plant, its own power house and a separate staff of officials and workmen which are specially assigned to its service. Despite its low tonnage, each mine is practically a separate operation. Such extreme decentralization can be explained in part by the history of the development of the mines and in part by the defective industrial organization, but it readily can be seen



BRIQUET FACTORY AT VLADIVOSTOK

The coal yard of the Navy in Vladivostok contained large quantities of slack. In order to make of it a fuel better suited to the needs of the Navy a factory making prismatic briquets was erected. It has a capacity of 10 tons per hour.

to be a source of unjustifiable overhead expense. For example, owing to the many small plants it is necessary to operate twenty-five small boilers and these use 10 per cent of the coal mined.

But the way in which coal is delivered from the mines to the market is subject to even more serious criticism. Of the trackage of the Soochan R.R. 48 miles are of the usual Russian type with a wide gage, but 25 miles are of narrow gage (750 mm., or a little less than 30 in.). Where the narrow track crosses the crest of the Sikhoto-Alin Mountain a system of rope haulage with four hoists and three skid shoes is applied. The operation of this part of the road is complicated and expensive. There are ten stations and crossings in a distance of 18 miles and a large staff of

workmen has to be employed. The expense is increased by the frequency with which the machinery gets out of repair and by accidents along the road, especially that part of it which is served by rope haulage. The cost of transport on the wide-gage track, on account of some technical defects, is high also. These defects together make transportation on the Soochan R.R. so expensive that the price of coal is about doubled by the time it reaches the market.

Table VII gives the cost of transportation on the narrow track in recent years:

TABLE VII—COST OF TRANSPORTING COAL OVER NARROW TRACK										
Years.....	1912	1913	1914	1915	1916	1917	1918	1919	1920	
Cost of transport,										
per ton {	Rubles. 2.23	2.24	1.97	2.21	2.19	3.62	14.50	29.57	6.00	
	Dollars. 1.11	1.12	0.98	1.10	1.09				3.00	

The cost of transport on the wide-gage road before the war was 1.5 rubles, or 75c., per ton and at present time is 2.84 rubles, or \$1.42, which figured per mile is 0.03 ruble, or 1.5c., per ton and 0.06 ruble, or 3c., per ton, respectively. The cost of freight on the Oossoory (Ussuri) R.R., which is the part of the great Siberian R.R. between Vladivostok and the Soochan R.R. junction, a distance of 20 miles, was before the war 0.15 ruble, or 7.5c., and is now 0.25 ruble, or 12.5c., per ton, which figured per mile is 0.0075 ruble, or 0.37c., and 0.0123 ruble, or 0.6c., per ton respectively. This comparison shows that the cost of transportation on the Soochan wide-gage railroad was before the war four and is now five times more expensive than on the ordinary Russian railroad.

The total cost of coal transport between the mines and Vladivostok, before the war was therefore 3.88 rubles, or \$1.94, and is now 9.09 rubles, or \$4.54. With ordinary railroad connections these figures should be 0.70 ruble, or 35c., and 1.14 rubles, or 57c. The difference between the normal freight rate (the latter one) and that existing on the Soochan R.R. is due solely to the poor accommodations on the latter railroad. It has been estimated that during the existence of the Soochan enterprise the Russian government has paid for its delivered coal about 20,000,000 rubles, or \$10,000,000, more than would have been necessary had the track of the railroad been properly located. These figures are especially surprising when it is remembered that the total value of the entire coal field can be expressed at 12,000,000 rubles, or \$6,000,000.

The Soochan R.R. is not only expensive to operate



HOSPITAL BUILDING AT SOOCHAN MINES

A wood structure but quite extensive and set on an eminence.

in its present condition, but it is of small capacity as it cannot, even without any interruption of traffic, carry more than 300,000 tons yearly, but even that tonnage probably never will be reached. Increased development of the mines therefore would serve no useful purpose if the Sookhan R.R. is not so rebuilt as to be a continuous railroad having a gage equal to that commonly used in Russia. The technical possibility of this enterprise is proved by prospecting work performed in the years 1920-1921 by the Administration of Mines.

It may be of interest to mention that at the time when the Sookhan enterprise was being started, decision was made to construct a railroad about 27 miles long in a southerly direction to Nakhodka Bay. The cost of this short railroad, which would have had a capacity of 200,000 tons a year, would have been 3,000,000 rubles, or \$1,500,000. This estimate included the construction of a harbor with all equipment for coaling ships mechanically. The railroad thus projected was never constructed, for military reasons.

The lines at present are in bad condition. The political events of Russia were reflected in the Far East and at the Sookhan mines. All the equipment has worn out rapidly, not having been repaired promptly when repairs were needed. Much expenditure will be required to restore the capacity of the mines. It is estimated that the work started some years ago but not finished could be completed in two years at an expenditure of 1,800,000 rubles, or \$900,000. With it the output should rise to 400,000 tons annually, a part of which will be used in the running of the mines themselves and a part will have to be coked because the railroad can haul only 300,000 tons.

In spite of all difficulties, and they are many, Sookhan mines even now can deliver to the foreign markets a few thousand tons every month. It is regrettable that Sookhan coal is not known outside of Russia, as it is difficult for mines to look for the new consumers on the foreign market under present conditions and it is risky to send coal abroad without a definite order. However, once established in the market Sookhan coal will hold its own, for with an assured market will come improved methods of operation and a low production cost that will enable the management to lower the selling price. Labor is cheap in the Far East in comparison with what it is in America and Australia. The markets now receiving Australian coal are no further from Vladivostok than from Australia, and some, like Alaska, are actually nearer. Furthermore, with an improved railroad the figure for freight can be brought below the \$4.95 paid before the war. A railroad more judiciously constructed should haul a million tons annually, and the field could supply it for at least forty years out of the prospected area alone.

South Dakota Operates Its Own Coal Mine in North Dakota*

Finds Mine Prices of Private Concerns Reasonable but That Owing to Multiplicity of Retailers Delivered Prices Are Too High

GOVERNOR McMASTER of South Dakota having staged an attack on the distributors of gasoline, by offering the public state-owned fuel from its own warehouses at 16c. per gallon, or more than 10c. under the prevailing price for gasoline at filling stations, is now getting ready to show the mining world and writers on political economy in particular the part that a government can take in the production and sale of coal during emergency conditions, when capital, labor and dealers cease to function harmoniously and without proper consideration for the reduced purchasing power of the farmer's dollar. This state is actually one of the largest owners of coal lands, surveys indicating more than a billion tons of lignite in the two north-western counties.

Having left it to others to spend millions on experimental work trying to improve the quality and radically change the physical conditions of lignite coal, these hard-headed farmers decided in 1919 that an inferior quality of coal delivered at a low price to them was better than no coal at all. If public funds had to be spent, the most practical way would be to open a mine, operate it at the lowest possible cost and sell directly to the public. It seemed inconsistent that the very state institutions that were owners of these coal lands by direct grant from the federal government were paying excessive prices for Eastern coal hauled an average distance of 1,000 miles. The result was a state mine, located for convenient railway connections just outside the state at Haynes, Adams County, North Dakota, and today the largest producer of lignite in the Northwest. The theory then adopted was that if this grade of coal be delivered to the consumer he will find some way to burn it by appropriate changes in the type of stoves and grates or by improvements in the draft conditions.

VENTURE ON SOUND BUSINESS BASIS

Growth of the undertaking has been slow and hindered by setbacks that on several occasions brought operations to a standstill, but the scheme as a business venture was fundamentally sound and in the absence of political interference and with the energetic and efficient management of E. O. Roush the mine is today in a position where it can and will play an important part in the welfare of its owners, the citizens of South Dakota.

In spite of the immense area of the state and the long haul to the centers of population there are few points where the state mine cannot deliver fuel in car-load lots at a price beyond competition when figured on the basis of calorific value per dollar expended by the consumer.

Started primarily to supply only state institutions, the demand has grown to a point where orders from individuals, public-utility plants, municipal schools and public buildings, central heating stations and laundries exceeds the daily capacity of the mine equipment. The

*Article entitled "South Dakota Prepares for the Coal Shortage," received on the stationery of the South Dakota Coal Mining Commission, Pierre, S. D.

mine receives no public funds for improvements or extensions, these being met by surplus earnings, the original grant by the Legislature being amortized with interest by a charge of 15c. per ton of coal mined. Owing to its location outside the state of South Dakota it is duly and heavily assessed for local, county and state taxes. As a publicly operated enterprise it is therefore unique. Political opponents and misinformed taxpayers have motored up to see for themselves a waste of public funds and remained to place orders for their winter fuel.

Located on the Yellowstone Trail, which follows for a mile the southern boundary of the property, the mine has become one of the show places of the route for tourists coming and going.

The coal, as mined, is a firm black lignite with a brilliant luster and distinct cubical cleavage. Its moisture content is 32 per cent and its heat content 7,500 B.t.u. It holds together well during shipment and also in storage if not exposed in thin piles to sunlight or currents of warm air. Working conditions underground are excellent, the mine is dry, the ventilation good, the roof firm and the 16-ft. horizontal strata of coal free from layers of non-combustible matter. The seam is found 30 ft. from the surface.

A spur track $2\frac{1}{2}$ miles long operated by the mine con-

nects with the main line of the Chicago, Milwaukee & St. Paul Ry. Shipments are made to every county in South Dakota having railroad facilities and to adjacent points in North Dakota and as far east in Minnesota as Minneapolis.

The mine has a service department under the direction of Dr. Bancroft Gore, of the State School of Mines at Rapid City, where the utilization of lignite is studied intensively and the merits of base-burner heating stoves, magazine-type steam and hot-water heating furnaces are investigated and reported to the public, different types of automatic stokers and hand-operated grates for boiler operation also being tested. Dr. Gore has investigated the burning of state lignite in pulverized form without previous drying, results having been published in June of last year in the *Black Hills Engineer*.

One purpose of the state mine is to build up a steady demand for lignite by those heretofore accustomed to anthracite and in this way not only save residents large sums but stimulate the development of the lignite area by private capital. This mine can never fill all the requirements of the state but it is in a strategic economic position to prevent absolutely at any time unfair prices either by the mine owner or dealer by its advertised price schedule for run-of-mine, screened or slack coal delivered promptly at all points of the state.

In general it has been found that the wholesale prices of privately owned mines, after discounting the high freight rate from the long haul are reasonable, but the high cost and the excessive profits of local dealers have to be reckoned with, and the state mine with no initial intention of interfering in any way with the small dealer now advises the small consumer to form clubs of four or five members and buy directly in carload lots from the mine and have a local drayman weigh each truckload from the car, charging each subscriber his proportionate cost for coal at mine plus freight and truckage.

Again and again it was found that all advantages of low-cost fuel were discounted and entirely lost by the excessive cost of doing business by the small dealer. Usually there were too many of him in each community.

Big Three of the Cabinet

What Washington occasionally calls the important big three of the Cabinet are Hughes, Hoover and Mellon. Hughes and Mellon are in this group apart because of the importance of their particular offices, as well as because of their ability. Hoover is in it in spite of the relatively less importance of his Commerce Department, because of his extraordinary personal ability and because, as a matter of fact, he is so well grounded and so indispensable in many big matters that come up outside the limits of his particular official field.

As to Secretary Hoover, in addition to his own department, he is everything that is embraced in the dignity and efficiency of the phrase, "a competent workman." He contributes able and faithful trustworthiness for such frequently arising emergencies as coal strikes, unemployment, conservation and a dozen other matters calling for hard work, concentration of mind and immensely varied knowledge. It was one of the comparatively few easing comforts that Mr. Harding had in his difficult Presidency to know that at any hour, day or night, Mr. Hoover was at the end of the telephone wire, subject to call for any emergency. It was a reliance of which Mr. Harding made frequent use. Mark Sullivan, in *N. Y. Tribune*, Aug. 6, 1923.



SCENE IN THE LIGNITE MINES AT HAYNES, S. D.

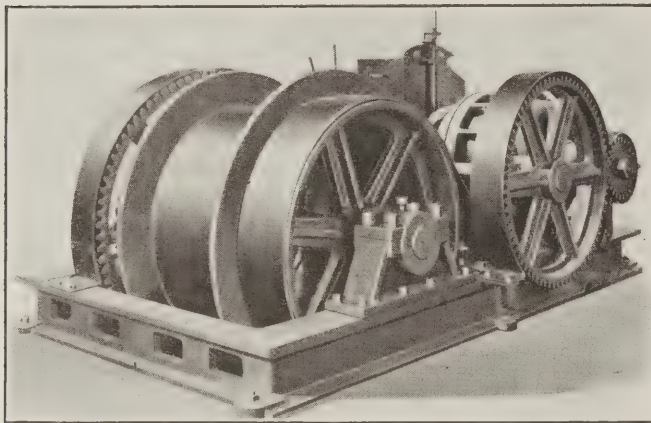
Coal when mined is firm, black and cubical but it has 32 per cent of moisture and only half the heat of the best grades of coal. However, many believe that lignite found almost on the doorstep is preferable to coal hauled thousands of miles, even though it may contain only half the heating power of the more remote fuel.

New Equipment

Electric Hoist for Heavy Work

A NEW electric mine hoist development recently made by the Thomas Elevator Co., of Chicago, embodies oversize drums, low pedestals, semi-automatic control, through-bolt bearing construction, and extra large brakes. It is designed especially for pulling cars up inclines, sinking shafts, or any similar class of work which requires unusual strength and a large cable capacity. This particular hoist is similar in many respects to the standard Thomas single friction drum mine hoist but is designed for much heavier duty.

The new hoist is fitted with Thomas band frictions, which eliminate thrust bearings and their heating and welding tendencies. These band frictions are located in the opposite end of the drum from the brake. Both the friction and the brake are composition lined and of sufficient area for heavy service on long hauls. Machine cut gears are used exclusively throughout. Drum shafts are turned from forgings, pedestal bearings are of through-bolt design, and semi-automatic variable speed control is included as standard equipment.



NEW BAND FRICTION ELECTRIC MINE HOIST
A heavily constructed hoist for slope and shaft duty.

All motors are regularly furnished with a Thomas automatic irreversible safety brake. Control levers are banked in quadrant.

Steam-Jet Ash Conveyor

RECENT developments in the labor situation have brought home more forcefully the advantages of labor-saving equipment around the power house. Unskilled labor is becoming more pressing in its demands and more choice in the type of work it performs. Handling ashes is dirty, dusty, back-breaking work. Men stay at it only until they can get something less disagreeable. As a result the power plant crew is constantly shifting and changing.

The installation of labor-saving ash-handling equipment not only relieves the plant of the turmoil of changing labor but makes possible the transfer of men working in the boiler plant to other work.

In an effort to cut the power-plant payroll, the American Steam-Jet Ash Conveyor was manufactured by the Conveyors Corporation of America, 326 West Madison

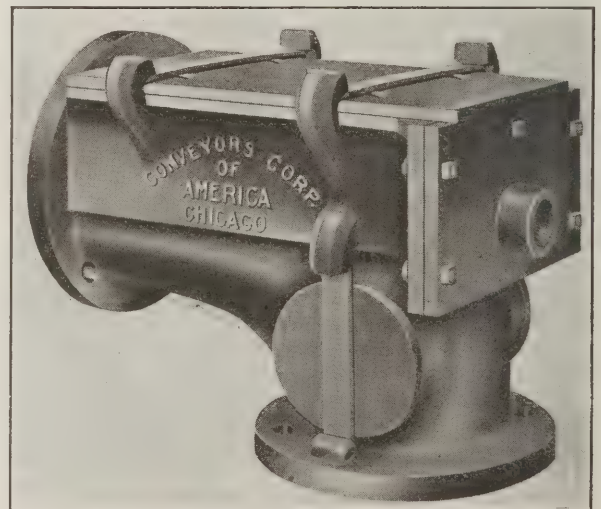


USING ASH CONVEYOR

Here the fireman is shown feeding the ashes into the conveyor system as he cleans the fire.

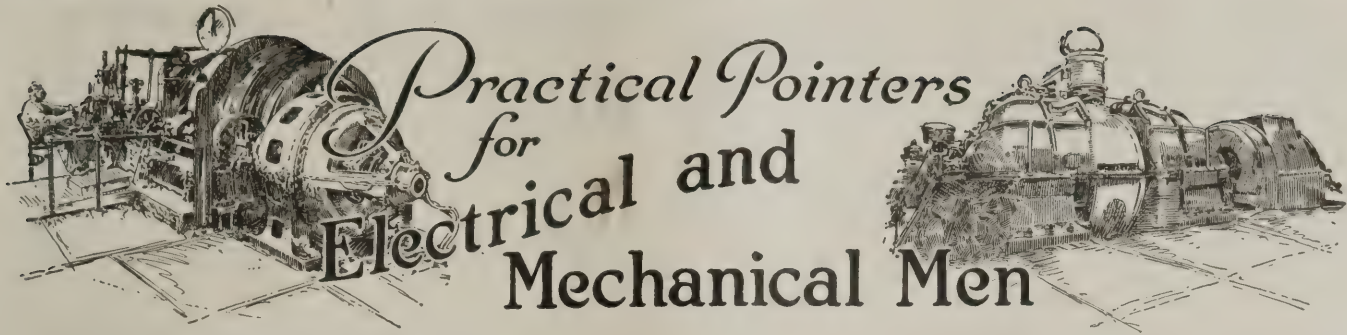
St., Chicago, for handling ash in power plants. At one mine this conveyor was installed several years ago with a saving of two men and a team. The daily savings amounted to \$12.38.

One of the advantages of the steam-jet conveyor is the effect on the morale of the other plant employees. The wheel-barrow gang no longer hampers the boiler-room workmen as they stoke their fires. The floors are kept clean; there is no dust-laden atmosphere.



STEAM UNIT OF ASH CONVEYOR

A jet of high pressure steam is introduced through this fitting into the conveyor line.



Reasons for Interchanging the Fields of Locomotive Motors While Braking

REFERRING to some interesting discussions which have recently appeared in *Coal Age* on the subject of electric braking for mine locomotives, I believe the following ideas will show some of the points brought out in investigations which have been made along this line.

The equalizer is the first thing which suggests itself to anyone studying electric braking for locomotives, because of its simplicity. However, there are several serious objections to its use. The series direct-current motor has inherent characteristics which tend toward keeping the load on two or more motors running in parallel and driving the same load balanced, even though the speed of the two motors is not exactly the same. This is particularly essential in the case of locomotives and street cars as the diameters of the driving wheels change due to wear and one wheel may be considerably greater in diameter than another on the same locomotive or car.

A locomotive could very readily be selected and the fields of the two motors connected by means of an equalizer and a small amount of resistance so that the current in their armatures balance. If conditions on the locomotive remain exactly the same it might run indefinitely without any serious unbalancing, but the wheels of the locomotive wear and in a short time one set of wheels might easily become greater in diameter than the other, with the result that the motor connected to the wheels with the greater diameter would run a little slower than the other set of wheels, and since the fields of the two motors are balanced by the equalizers between them, the motor running slower would generate a lower counter electro-motive force and take more current than the faster motor, the amount of unbalancing depending upon the difference between the diameters of the two pairs of wheels. This unbalancing will occur whether the machines are running as motors or generators.

One of the reasons for selecting a series motor for traction work is its ability to take its share of the load when two or more motors are operated in parallel and connected mechanically to the same load. Shunt motors, which maintain a practically constant speed over a wide range of load, will not divide their loads equally when operated under these conditions and a very slight change in the speed of one motor will change to a large extent the amount of current it draws from the line. Using an equalizer between the fields of series motors gives them characteristics similar to the shunt motor.

Reference has been made to the use of equalizers to maintain a balance between generators in power plants. Generators operating under these conditions are pro-

vided with strong shunt fields. The series fields are only a small proportion of the total field. The balance between the machines is first obtained by adjusting the shunt-field rheostats. The function of the equalizer between the series fields is to keep the current equalized between the generators under varying loads after they have been balanced by adjusting the shunt fields.

Numerous tests have been made of electric braking using several different connections. Interchanging of the fields has been found to be the most reliable connection for insuring an equal division of the load.

R. D. KRAPE,

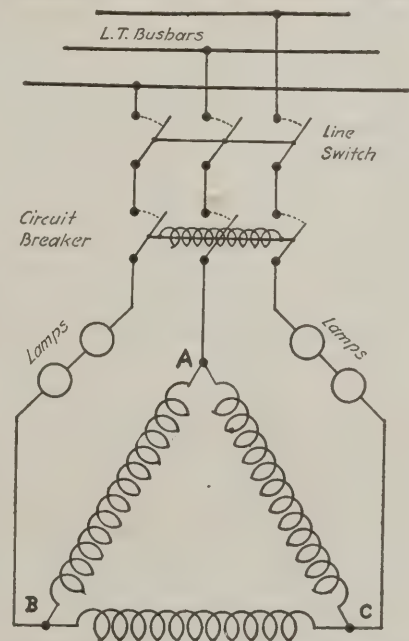
Railway Equipment Engineering Department,
General Electric Co.

Paralleling a New Transformer

A NEW transformer often has to run in parallel with existing units, and in order to make the right connections considerable care is necessary. A short-circuit may accidentally result from getting some of the windings of the transformers to be paralleled on the line in series instead of in opposition.

There are two simple methods by which the connections can be checked, always assuming, of course, that the transformers to be paralleled are similarly connected internally. The first is to note the direction of rotation of an induction motor fed from the low-pressure bus bars of one transformer; then substitute the new transformer for the first one, and the motor should run in the same direction, the transformers may then be connected together.

The second method and the one which is perhaps preferable is to connect up the high-tension side of the new transformer ready for running from the high-tension bus bars. On the secondary side one line wire should be permanently connected to the low-tension circuit breaker which will be employed for



PARALLELING A TRANSFORMER WITH ANOTHER

The test lamps give an indication which tells when the secondary terminals are properly connected to the lines.

controlling the low-tension side of the new transformer. This switch should be in the "off" position until everything is in readiness. Having connected, say, line *A* to one terminal of the low-tension switch as shown in the figure, the two remaining line wires should be connected temporarily to the other two transformer terminals through a number of 200- or 220-volt lamps in series. On a 500-volt circuit two 250-volt lamps in series would be suitable, as indicated on the illustration. Any number of lamps will suffice so long as the full-line voltage of the transformers is high enough to make them glow. It is unnecessary that the lamps fully light, as a decided glow will be sufficient for conducting the test.

When everything is in readiness, as indicated in the figure, the high-tension line and oil switches of the new transformer are closed; these are not shown in the figure. Then the low-tension line switch is closed and afterward the circuit breaker, which should be set to open on a very low current. This connects the secondary of the new transformer through the lamps to the busbars which are assumed to be fed from an existing transformer with which it is desired to parallel the new transformer. If the lamps light up, the lines *B* and *C* are crossed and should be interchanged. If the transformers are of normal design the lamps will then be dark, in which case the new transformer may be isolated and the connections between the lines and transformer made in the usual method direct from the circuit breaker to the transformer. In the event of the connection appearing to be right the first time, it is advisable to change the leads temporarily in order to get the lamps to light as a check on the condition of the test lamps and lamp-holders. A possible broken connection in each series of lamps—an unlikely but possible coincidence—might lead to a serious result if not checked in this manner.

R. FOKES.

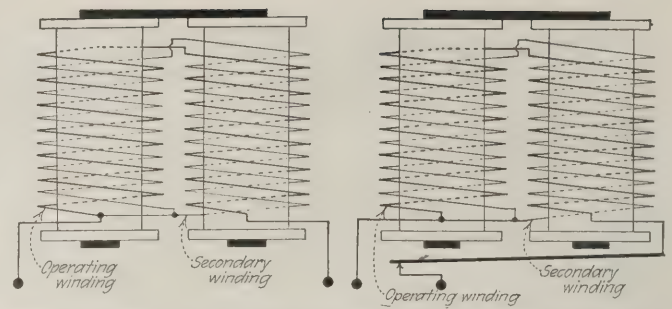
Making Signaling Bells Safe Against Ignition of Gas

IT IS a well-known fact that when the circuit of an ordinary electric bell is interrupted the self-induction of the magnet coils gives rise at the contacts to a spark which is sufficiently hot to ignite a gaseous mixture, and from time to time this source of ignition has been suspected of being the cause of mine explosions.

In the case of trembler bells the ignition of gas is more likely to take place at the make-and-break contact of the bell itself than on the signal wires or at the switch. With single-stroke bells, however, the break flash may occur on the signal wires or at the switch only. A single-stroke bell usually needs a larger current, and of the two it is less safe in its operation from the viewpoint of gas ignition.

There are two methods available for overcoming the undesirable effects of self-induction in the bell coils. One employs a copper sleeve which surrounds each of the coils but to obtain most efficient results the sleeves must be properly proportioned, and this involves the use of certain mathematic calculations. The other method of attaining the same end, but with more certainty, is by employing what is known as a short-circuited winding.

The object of these notes is to indicate briefly how the break-flash of existing electric bells may be rendered harmless by rewinding and at the same time



FIGS. 1 AND 2—SINGLE-STROKE AND TREMBLER BELLS WITH SECONDARY AUXILIARY WINDING

Both types of bells may be wound with auxiliary windings, which have a dampening effect upon the arc, occurring wherever the circuit is broken during operation.

applying a short-circuited winding, which needs no calculations and therefore requires little or no technical skill in its application. To rewind an electric bell to apply this secondary winding requires more space on the magnets themselves. Many bells have magnets which are not fully wound and the additional space can be utilized without increasing the diameter of the bobbin ends in order to take the extra amount of wire.

In many instances old bells will be found to have windings of comparatively low resistance. In winding such bells a wire of smaller section may often be employed. This provides the necessary space for the additional winding, and by filling the bobbins entirely the resistance of the working winding can be made higher than the original one. If the bobbins on a bell to be converted are already full of wire and the construction does not lend itself to increasing the depth of winding by enlarging the diameter of the bobbin ends, then new bobbins must be made. These can easily be cast or they may be turned from the solid.

The wires for winding should be double-silk covered, so that the insulation between the operating and the short-circuited winding will be reliable. In winding, reels of wire are employed. These should be suitably mounted so as to turn freely as the winding proceeds. The bobbin to be wound also should be mounted free to turn and provided with a temporary handle. Winding proceeds in the usual way, except that the wire is fed double, so that for every turn of working winding there is one short-circuited turn.

When the bobbins are filled an insulation test should be made on each coil between the two windings. If the test is satisfactory, one winding on each bobbin—it does not matter which—will be short-circuited—that is, its two ends joined together and soldered, afterward being joined to one terminal of the working winding. This prevents any strain being placed inadvertently on the insulation between the windings and in no way affects the functioning of the short-circuited element. The illustration shows how the windings are arranged and connected on a single-stroke and a trembler bell. The advantages of this method of neutralizing the break-flash of signal bells are:

(1) The short-circuited winding always bears a fixed relation to the working winding and is independent of the number of turns, seeing that a short-circuited turn is introduced with every working turn of wire.

(2) The application is simple and can be carried out by an unskilled person, no calculations being required.

(3) Bells with these short-circuited windings can be worked with almost absolute safety.

ENGINEER.



Problems of Operating Men

Edited by
James T. Beard



Normal vs. Reverse Faults in the Mining of Coal

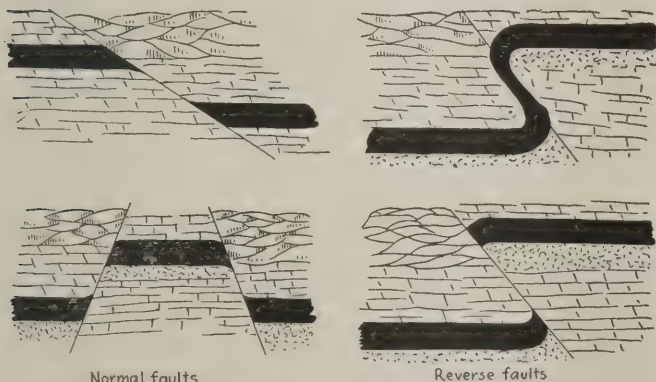
Illustrating Two Types of Faults—Conditions Affecting Their Formation—Simple Rules for Finding the Coal Beyond a Fault

IF NOT too late, kindly allow me to refer to a matter that was discussed some time ago, in *Coal Age*, in reference to finding the coal beyond a fault. Following that discussion, I remember that an inquiry appeared, in these columns, where a correspondent presented a faulted proposition, encountered in the working of a coal seam, and stated that he was puzzled to locate the continuation of the seam.

A little later (*Coal Age*, July 5, p. 18) a correspondent drew attention to the fact that the fault plane may have any direction with relation to the plane of the seam, the strike lines of the two planes not necessarily being parallel, as has generally been assumed in treating the subject.

To my mind, this last contribution has not simplified the matter for the practical miner who suddenly runs up against a fault that has cut out the coal. The solving of the problem, as it occurs in coal measures, does not require a technical education. As far as the practical miner is concerned, it is simply a matter of observation and the following of a simple rule.

Referring to the accompanying figure, there are two general types of faults of dislocation. The two faults



Normal faults
Reverse faults
CHARACTERISTIC FAULTING OF COAL SEAMS

shown on the left of the figure are those commonly met and known as normal faults. On the right of the figure, are shown two reverse faults, one in which the seam is continuous having been doubled on itself, while in the other the continuity of the seam has been broken by the slip in the strata.

In the case of a normal fault, the slip has taken place in such a way that the two portions of the seam have been pulled apart horizontally and there is no overlapping as in the case of a reverse fault, where the

pressure has been exerted in a manner to produce buckling in the strata.

In the latter case, the strata, including the seam of coal, may simply be folded on itself, in the form of a letter S. At other times, the action is so sharp as to rupture the strata and destroy the continuity of the seam. In any case where rupture has occurred and the seam is not continuous, there is always left, however, a telltale drag or bending of the strata in the line of fracture, which shows the direction in which the movement has taken place.

While there is no way of telling how great the displacement has been, without drilling through the strata or prospecting the place, there are two simple rules that if followed will always lead to the continuation of the seam. A study of the figure will show that when the fault is normal one must follow the wide angle; but, in the case of a reverse fault, the rule is to follow the smaller angle that the seam makes with the plane of the fault.

M. C. BUTLER.

Carbonado, Wash.

Entering Abandoned Mines

Fatal explosion of gas when men entered an abandoned shaft—Need of law forbidding persons entering such places without the written consent of the mine inspector.

WHEN reading the account in *Coal Age*, Aug. 23, p. 285, where six men entered a 200-ft. shaft known as the Marcoll mine, near Clarington, Ohio, Aug. 2, 1923, I was deeply impressed with what seemed to be the careless statement reported as having been made by an engineer who visited the mine two days later.

In the last paragraph of the article, it is stated that the engineer regarded the explosion as a "deplorably unfortunate occurrence, with no blame to be attached to any one." It quoted the engineer as saying further, "It is easy now to say that the shaft should have been ventilated and safety lamps used; but who would ever have perceived that necessity before the explosion happened?" I want to ask: "Why Not? Are not mining men supposed to be on the alert when undertaking to enter abandoned places where dangers lurk?"

DISREGARD OF KNOWN DANGERS

In this instance the party that entered the fatal shaft consisted of the general manager of the mine, his brother who had charge of the Rosemary mine nearby, an engineer of the Allen & Garcia Co., of Chicago, Ill., and three other men of Wheeling, W. Va. All of these men were intelligent men who might be supposed to understand the dangers they were about to face.

From the meager report given in the article to which I have referred, nothing is said in regard to whether the mine had generated gas previous to its

abandonment or whether the airshaft nearby was generating gas. Prior to connection being made between the two shafts, the mine was being developed and coal hoisted at the airshaft.

It was with the intention of making the abandoned shaft the main hoistway that the party entered that shaft to investigate its condition. The result was that the general manager and a salesman for the Gee Electric Co., Wheeling, W. Va., have since died from their burns and two others of the party are in a serious condition.

The flame of the explosion is said to have shot to a height of ten or fifteen feet above the top of the shaft. One can only conjecture as to where the gas came from. The shaft had only just been drained of the water that had accumulated and risen to a considerable height during the two years since work was abandoned therein.

WHAT HAPPENED WHEN THE MEN DESCENDED

The day of the explosion, the water had been lowered to within 2 ft. of the bottom, and it is probable that the entrance of the six men who descended the shaft started a circulation that brought the gas from its lodgment to where it was ignited on their open lights.

Aside from the danger of meeting explosive gas, there was the possibility of encountering blackdamp. To climb down the stairs of this 200-ft. shaft, with open lights and without having previously made any attempt to ventilate the shaft and its 60 ft. of entry which had been driven, was an exceedingly reckless act on the part of mining men.

What little natural ventilation was produced by the movement of the men and the heat of their lamps and bodies, in descending the shaft, could not have supplied fresh air sufficient to dilute even a few cubic feet of the gas accumulated below, and it is possible that the mixture reached a highly explosive point.

Does not this incident, however, teach the lesson of the need of a law forbidding any one to enter an abandoned mine or shaft without notifying the district mine inspector and obtaining his written consent, which would involve the inspector's making an examination of the place before giving such permission.

Detroit, Mich.

GASTON F. LIBIEZ.

[This correspondent has drawn attention to an important consideration that should be incorporated in the mining laws of every coal-producing state. The law should make it a crime for any one to enter an abandoned mine or shaft, until the mine inspector of the district has been notified and has examined the place and given his written consent for those in charge to enter. Too often it has happened that lives have been lost through a reckless disregard of well known principles and regulations regarding safety.

In this connection, it may be stated that the Mining Laws of Ohio (Sec. 939) require that "the owner, lessee or agent of a mine shall give notice to the chief inspector of mines . . . when the working of a mine is commenced after an abandonment or discontinuance thereof for a period of more than three months."

If this was not done in the present instance it was a violation of the law. On the other hand, if notice had been given to the chief inspector of mines, advising him of the dewatering of this abandoned shaft with a view to its development, it would seem that the responsibility rested with the inspector. In any case, however, the shaft should not have been entered without first being ventilated and examined with safety lamps to ascertain if gas was present.—EDITOR.]

Careless Act of Fireboss Causes Disaster

Fatal explosion the result of one careless act—Responsibility does not rest on fireboss alone—Mine officials blamed for lack of supervision.

IT IS with deepest regret that we read, in *Coal Age*, Aug. 23, p. 296, of the terrible disaster which, judging from the evidence given before the coroner's jury at the inquest held a few days after the explosion, resulted from the seeming attempt of a fireboss to relight his safety lamp.

The sad occurrence happened at 8 o'clock, Tuesday morning, Aug. 14, in No. 1 mine of the Kemmerer Coal Co., Kemmerer, Wyo. At the time of the explosion there appears to have been 134 men in the mine, only 35 of whom escaped; and 99 lives were sacrificed to the heedless act of one whose duty it was to safeguard both the mine and the workers therein.

FIXING RESPONSIBILITY FOR THE ACCIDENT

Without more definite information than we have at present, it is impossible to pass accurate judgment on the unfortunate fireboss, who forfeited his life, and the higher mine officials, charged with the responsibilities of operating the mine in the safest manner possible.

On the fireboss rested the duty of performing his work intelligently and conscientiously, while on the shoulders of the management rested the responsibility of providing proper equipment and carefully supervising every operation.

The last report of the state mine inspector, made three months prior to the explosion, described the mine as being in good condition and the ventilation adequate. It was testified at the inquest that the lamp the fireboss had carried was found 12 ft. from the face of No. 7 room, on the thirtieth entry, and close to the body of the man himself. It is stated that the top and bottom of the lamp were found 2 ft. apart, while a match with the head burned off was lying but a few inches away from the bottom of the lamp.

The natural conclusion of these evidences is that the fireboss had taken his lamp apart, struck a match to relight the wick, and the flickering blaze had set off the gas, filling the place with flame from which there was no escape. There was no opportunity to warn the workers in other portions of the mine who, with few exceptions, were either killed by the force of the blast or suffocated by the deadly afterdamp.

WHERE THE FIREBOSS FAILED

We never read of an accident without, in our own minds, fixing the blame on some one who it appears was in fault. In this case, it would seem that the unfortunate fireboss should have known better than to attempt to light his lamp within 12 ft. from the face of the room where he was found, assuming that to be the case from the evidence produced. Such an attempt can only be characterized as heedless and reckless in the extreme.

On the other hand, we are left to wonder if the lamp of the fireboss was equipped with an igniter. The fact that the lamp had been taken apart would indicate that it was not; or that the igniter had failed to work. Again, it would appear that this fireboss was in the habit of carrying matches with him to relight his lamp when extinguished.

These conditions, at the best, reflect on the management in charge of the mine, for their failure to properly

supervise the work in every detail. The question arises, in this connection: Was the fireboss a competent and conscientious person, one worthy to be trusted with the important work of safeguarding the mine and its workers?

Here is food for thought that impresses us with a realization of the grave responsibility that rests heavily on the management of a mine when we think of a hundred lives being suddenly snuffed out by a seemingly unwarranted act of a responsible mine official.

Inquiries Of General Interest

Practical Limitations in the Action of Siphons

Two Cases to Be Considered—Effective Head
Less than Atmospheric Head — Effective
Head Greater Than Atmospheric Head

More than once the question has been put to me, by coal operators and mine officials, asking, "Can a siphon have too much fall?" I have always argued that, the greater the fall in the discharge pipe, the greater would be the flow. In other words, my thought was that for the same size of pipe, the capacity of a siphon for handling the water increased with the depth of its fall. Some recent experiences, however, have shown me that this is a mistaken idea and there are limits beyond which the siphon will not do its most effective work. I shall very much appreciate seeing the matter explained in *Coal Age* and the conditions set forth that are needful to the successful operation of siphons under varying conditions.

MINE ENGINEER.

Lexington, Ky.

In the operation of every siphon there are two chief factors: 1. The lift or suction head, which is the vertical height of the summit or crown of the pipe line above the level of the water in the supply basin. 2. The fall of the discharge pipe measured vertically, which is the discharge head and is always the greater. The difference between the discharge head and the suction head is the effective head, which produces the flow of water from the upper, or supply basin, to the lower basin where it is discharged from the pipe.

In practice, there are two cases to be considered; but, first, it is necessary to remember that the atmospheric pressure, acting equally on the surface of the water in each basin is balanced; and the effective head, or the excess of the fall over the rise in the pipe line, is the force producing the flow when the two branches of the siphon are acting as one.

As previously stated, there are two cases to consider. In the first case, the fall of the discharge pipe or the discharge head, minus the friction head in that branch of the pipe, is less than the water column supported by the pressure of the atmosphere. When that is the case both the suction and the discharge pipes are kept full of water by the atmospheric pressure, and there is no

In my own experience of firebossing for a period of ten years, I cannot recall a single instance when the mine foreman or the superintendent ever examined my lamp to satisfy himself that it was safe and properly used. I have known of firebosses who would clean the gauzes of their lamps with a corncob and do other things equally bad and dangerous. Let our mine officials give closer supervision to every detail of the work and know that their firebosses are competent and men to be trusted.

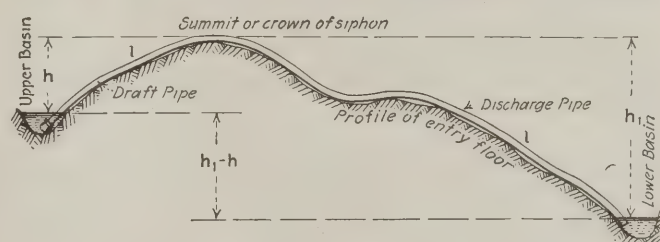
Ashland, Ky.

MINE OFFICIAL.

tendency of the siphon to empty itself or run dry, as it would if the discharge head less the friction head exceeded the atmospheric pressure. Therefore, in this first case, the pipe will always run full.

In the second case, the fall of the pipe line is so great that the discharge head, less the friction head in that branch of the pipe, exceeds the atmospheric head expressed in water column. At sea level under normal conditions, the atmospheric pressure being 14.7 lb. per sq. in. will support a water column of $14.7 \div 0.434 =$ say 34 ft. In order that the siphon shall run full in this case, the flow from the supply basin to the summit, under atmospheric pressure, must be equal to the flow from the summit to the discharge basin, under the gravity head or fall in that branch of the pipe.

Now, indicating the flow of water in the pipe by G (gal. per min.), the diameter and length of the short



ELEVATION SHOWING PROFILE OF SIPHON LINE

arm of the siphon by d and l , respectively, and the diameter and length of the long arm by d_1 and l_1 ; the effective head in the short arm is the atmospheric head (34 ft., water column, sea level), resisted by the gravity head or rise (h) and the friction head ($l G^2/800 d^5$). In the long arm, the effective head is the gravity head or fall (h_1), resisted by the atmospheric head (34 ft.) and the friction head ($l_1 G^2/800 d$), assuming a uniform diameter in both branches of the siphon.

But the velocity and quantity of flow (G), in each branch of the pipe (uniform diameter), is proportional to the head and inversely proportional to the mass moved or length of the respective pipe. Therefore, for an equal flow in each branch of the siphon, each effective head must be divided by the corresponding length of pipe l, l_1 ; which gives

$$\frac{34 - h}{l} = \frac{h_1 - 34}{l_1}$$

From this equation we have for the limit of fall of the siphon when the diameter of the pipe is the same throughout,

$$h_1 = \frac{l_1 (34 - h)}{l} - 34$$

In this last equation, it appears that the lift or suction head (h) of a siphon cannot exceed the theoretical water column supported by the atmosphere and the fall in the discharge pipe is dependent on the relative length of the two branches of the siphon.

To illustrate, assume a siphon pipe line at sea level, having a rise of 24 ft. in 100 ft. measured on the pitch, and the point of discharge, say 500 ft. beyond the summit. In this case, if the diameter of the pipe is uniform throughout, the fall from the summit to the discharge basin should not exceed $500/100 (34 - 24) = 34 = 16$ ft. If the fall is greater than this, the pipe will have a tendency to empty itself, the flow in the discharge end, under gravity, being greater than that in the suction end, under the pressure of the atmosphere.

In all siphon work, it is of the greatest importance to make all joints airtight and submerge both ends of the pipe, in order to prevent the entrance of air, which would find its way to the crown or summit and obstruct the flow. A good siphon line should always have means for tapping the air that escapes from the water and collects at the summit. This air is more troublesome as the limits of siphoning are approached.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—An airway is 5×10 ft., in section, and 2,000 ft. long; the velocity is 400 ft. per min. Find the pressure in two ways.

ANSWER—The rubbing surface in this airway is $2(5 + 10)2,000 = 60,000$ sq.ft.; and the sectional area $5 \times 10 = 50$ sq.ft. Then, assuming a coefficient of friction, $k = 0.00000002$, we have

$$p = \frac{k s v^2}{a} = \frac{0.00000002 \times 60,000 \times 400^2}{50} = 3.84 \text{ lb. per sq.ft.}$$

The pressure can also be calculated from the quantity of air in circulation, which is $5 \times 10 \times 400 = 20,000$ cu.ft. per min. This gives for the pressure producing the circulation,

$$p = \frac{k s q^2}{a^3} = \frac{0.00000002 \times 60,000 \times 20,000^2}{50^3} = 3.84 \text{ lb. per sq.ft.}$$

QUESTION—Name the supplies required by law to be kept at all mines for the care of injured persons.

ANSWER—Besides the ambulance and stretchers required in Art. 7 of the anthracite law, there must be kept at every mine both woolen and waterproof blankets, oil for the treatment of burns, bandages, splints and linens.

QUESTION—Name and define the four electrical units that are in common use.

ANSWER—The four most common electrical units are: The ampere, expressing the strength of the current or the volume of the flow of electricity; the volt, expressing the pressure or difference in potential of the current; the ohm expressing the resistance offered by the conductor, as measured in terms of the ampere and the volt. A current of one ampere flowing under a pressure of one volt represents a resistance of one ohm. The watt is the unit of electrical power, or the power consumed in transmitting a given current against a given resistance, or under a given pressure or voltage.

QUESTION—A fan driven by a steam engine supplies air in a mine through several miles of air-course. A door is suddenly opened allowing the air to go directly from the air shaft to the return. Will the opening of this door cause any change in the operation of the fan? Give the reason for your answer.

ANSWER—The opening of the door at the shaft bottom short-circuits the air current and cuts out the mine resistance against which the fan was previously operating. This decrease of resistance is followed at once by a fall of pressure and a large increase in the quantity of air flowing through the fan, increasing the resistance to its passage between the blades, which means an increase in the power absorbed within the fan itself. As a consequence, there is a less power available for starting the fan which will run slower under these conditions. In other words, when the air is short-circuited, by opening the door at the shaft bottom, and the mine resistance cut out the speed of the fan will be reduced, for the same power applied to the fan shaft.

QUESTION—(a) Give a full description of a safety lamp. (b) What are its essential characteristics? (c) In what condition and under what circumstances may a safety lamp be unsafe?

ANSWER—(a) The safety lamp, as used in coal mining, consists of a brass or steel oil vessel surmounted by a chimney, which may be composed of a glass cylinder surrounding the flame and carefully fitted to its seat on top of the oil vessel. Above the glass cylinder and resting on it are one or more gauzes having more or less a conical shape. Asbestos washers are placed above and below the glass cylinder to form an airtight joint and exclude the outside air at those points. The chimney is held in place by means of upright standards firmly attached to the oil vessel and surmounted by a metal disk or plate to which the handle of the lamp is attached. This in brief is the description of a common safety lamp for general use.

(b) The essential characteristics of a safety lamp are the isolation of the flame of the lamp from the outside atmosphere. The gauze-protected openings below the flame, in most lamps, and the wire-gauze chimney above the glass cylinder provide for the necessary ascensional circulation within the lamp, which is important in order to prevent the smoking of the flame and essential to a maximum illumination. In practice the gas-charged air enters the lamp and the gas burns within the combustion chamber while the flame is prevented from passing out through the chimney by reason of the cooling effect of the wire gauze. The flame of the burning gas is extinguished in proximity to the gauze as long as the latter remains cool. The cooling effect is assisted by the wire mesh only permitting small streamlets of the gaseous products to pass, which are thus more readily cooled below the point of ignition of the gas and the flame extinguished before it can reach the outside of the lamp.

(c) A so-called safety lamp is unsafe when improperly handled by an incompetent person. It is unsafe when improperly assembled or any of its parts omitted, or when the gauze is dirty or injured in any manner, or has become heated so that its cooling effect is destroyed. This happens when the lamp is exposed to a gas-charged atmosphere for too long a period. The lamp is unsafe when exposed to a strong air current or any sudden compression of the air that might blow the flame of the lamp through the gauze.



Milwaukee Auditorium, Where American Mining Congress Sessions Were Held

American Mining Congress in Slim Session at Milwaukee

Devotes Much Time to Coal Industry and Its Problems in Small Convention—Taxation and Labor Relations in Foreground—National Mine-Equipment Exposition Makes Good Appearance

Coal was one of the principal interests at the 26th annual convention of the American Mining Congress at Milwaukee, Wis., Sept. 24 to 29. The sessions gave opportunity for J. C. Brydon, president of the National Coal Association, and other nationally known operator spokesmen to set forth facts about bituminous and anthracite, freely prophesying serious trouble for the bituminous industry next April, when the wage contract expires. Mechanical problems of coal operation, especially with reference to underground loading machines, absorbed a good deal of attention and the machinery show, around which the convention centered, was largely an exposition of coal-mining equipment.

So a good deal of information about coal, from taxation to labor relations, was disseminated, even though the Congress, in its resolutions, mentioned coal but once—favoring a 75c. reduction in ocean freight on coal or any other transportation improvement that will give American coal a better break in export trade. The coal industry asked nothing more in the way of convention action than that.

The convention had a comparatively small attendance—about 1,000 delegates and exhibitors registering, as compared with 2,400 last year—many of the sessions had few participants, and two or three minor ones were cancelled altogether. This and other considerations led the Manufacturers' division of the Congress to recommend that hereafter metal and coal conventions be held separately so that each group could concentrate and so that the convention cities could be in the heart of the particular field involved. This plan no doubt will be adopted. The details have not been worked out yet. It may be that the coal and metal conventions will be on alternate years or both in the same year. It is likely the 1924 convention and machinery show will be in San Francisco for the metal interests.

H. W. Seaman, of Clinton, Iowa, head of the Trojan Mining Co., a gold operation of Deadwood, S. D., was elected to the presidency of the Congress. His forceful personality is expected to be effective for the upbuilding of the Congress. The other officers for the coming year are D. B. Wentz, head of the Wentz Co., of Philadelphia, bituminous and anthracite miners and shippers, first vice-president; E. L. Doheny, of New York, second vice-president; L. S. Cates, of Salt Lake City, Utah, third vice-president. The executive committee is composed of President Seaman, Albert J. Nason, of Chicago, head of an important coal-operating company, and Sidney J. Jennings, of New York, retiring president of the Congress.

It goes without saying that J. F. Callbreath, of Washington, D. C., the energetic and effective secretary for twenty years, was retained. New directors are W. J. Loring of California; Hugh Shirkie, of Indiana; Stanley A. Easton, of Idaho; J. G. Bradley of West Virginia; L. S. Cates, of Utah, and F. S. Morse, of New York.

The main results of the convention, as measured by the official action alone, were several. In the hope of furthering the movement for better labor relations in mining the convention authorized a special committee to work out and put into effect a plan for offering to mining companies a course of training for foremen and bosses aimed to make better informed men of that important class of connecting links between employer and employee. If the mine operator is honest in his effort to cultivate the good will of his men and to give them a square deal all the time, it is thought that the foremen are the best agencies through which to work. If they understand the fair-minded operator's position they are one important defence against insidious attack by labor propagandists.

The Congress also favors some form of immigration restriction that will let in all the desirable aliens and keep out of this country the undesirables, as an aid to meeting man shortage in mining. This resolution was passed in spite of a declaration in an address by E. J. Henning, Assistant Secretary of Labor, that selective immigration cannot be made operative.

The Congress resolved in favor of a general investigation of the gold situation in this country to determine whether the gold reserve is too small and whether the Treasury Department's policy of selling gold into commerce at what is said to be less than the cost of production, should be discontinued. A committee is to be appointed to study the matter.

Other resolutions protested against government interference in business, called for better efficiency and less needless waste in state and local government to reduce taxation, reaffirmed the Congress' position against selling the Muscle Shoals government power plant to Henry Ford, a sale which the Congress would construe as an indication of unsound government policy on Southern water-power development, taxation resolutions mentioned later in this report, and various lesser ones.

The convention centered its attention upon industrial operation, standardization of mining methods and equipment, taxation, oil shale, and mechanical problems of min-

ing. The latter were considered mainly in "open forums" held every afternoon where discussions could be full and free. Some of them were entirely satisfactory in spite of battalions of empty chairs. An industrial co-operation dinner was held Tuesday evening the 25th, a vaudeville entertainment by the exhibitors was given Wednesday evening where graceful legs twinkled, and where jazz band music, song and funny story strove more or less futilely for attention amid a happy but entirely respectable hubbub, and a banquet Friday evening closed the convention.

Although delegates and attendants of the Congress' convention began reaching Milwaukee as early as Friday, the 21st, the convention did not formally open until Monday night, the 24th, as reported in last week's issue of this paper. On a band stand in the side balcony at the Auditorium, overlooking the comparatively quiet machinery and equipment exhibits, Max W. Babb, vice-president of the Allis-Chalmers Manufacturing Co., introduced Mayor Daniel W. Hoan, who welcomed the Congress on behalf of the city, and E. L. Phillips, a former Wisconsin Governor, on behalf of the Milwaukee Association of Commerce. The good feeling of the mining interests and government of Mexico toward the Congress was expressed by Señor Moises Perogordo y Lasso, representing the Mexican Department of Commerce, Industry and Labor, and by Señor F. Roel, Mexican Consul General.

CO-OPERATION MESSAGE FROM PRESIDENT COOLIDGE

Sidney Jennings, president of the Congress, who is head of the United States Smelting & Refining Co., of New York, responded gracefully to the various welcomes and then read a short message from President Coolidge in which the nation's chief remarked upon the importance of mining in this country, urged everybody concerned in mining to co-operate fully to reduce both economic waste and loss of life in the industry and closed by extending his good wishes to the Congress and "my congratulations on the prospect for a long session of improving business conditions." Then Mr. Jennings formally declared the convention and its attendant machinery show open.

Beginning Tuesday each morning of the week was given over to a general session of the convention while the afternoons were devoted to two or more separate divisional meetings, and open forums on practical equipment problems.

At the Tuesday morning general session President Jennings read his annual report, summarized in these columns last week. It was an appeal for less waste in mining, for better labor relations, and a short review of the work that had been done by the several divisions of the Congress during the year. He said that although the Congress had entered the year with a deficit, the receipts totaled \$179,000 and the deficit had been practically wiped out.

A dark picture of the anthracite situation and its future was painted by E. W. Parker, director of the Anthracite Bureau of Information, of Philadelphia. That accomplished publicist said his industry has just suffered a violent attack of "governmentitis," has a hangover of indigestion and will no doubt continue to suffer from it for years. The misrepresentations about anthracite, he deplored. This keeps up even though the average investment in anthracite plants per ton of coal produced is \$8.50, according to R. V. Norris, an independent engineer, and the average profit is but 25c., or only about 3 per cent. Yet anthracite operators are condemned as robbers fattening gluttonously off of a helpless public, and a few special cases, unfortunate for but not representative of the industry, have given basis for the charge.

Mr. Parker had much gentle sarcasm—and some not so gentle—for the U. S. Coal Commission. He cited an instance of the publication of the fact that the average realization on anthracite during the last quarter of 1922—naturally the best quarter of the year for the industry, and the one which levels up earlier low spots—was \$1.05. The public got the impression that this is a constant average. An investigator for the Commission told Mr. Parker he had prepared a long-term average which should have been used for the purpose, but which wasn't.

He spoke with feeling about the Pinchot settlement of the recent strike. Governor Pinchot found after four days'

study that the miners ought to have 10 per cent more pay, though the Coal Commission, after six months of it, had said wages were high enough. Mr. Parker observed that, while the Governor proposed ways of absorbing the increased cost of anthracite, there was no suggestion that the state's anthracite tax be reduced.

The anthracite industry must soon go into a period of decline, he said, because the available supply is decreasing and there are no more deposits to exploit.

Reverting to the Commission's report, Mr. Parker could not refrain from saying he noticed that the Commission didn't appear to have much confidence in the Federal Trade Commission, or it would not have proposed that coal be put into the hands of the Interstate Commerce Commission. He said it was gratifying, however, that no new bureau was suggested, for what this country needs now is fewer bureaus and more sideboards.

The smokeless coal region operators are disappointed in the work of the Commission, George A. Wulff, secretary of the Winding Gulf Operators Association, said. His members last year voted by only a narrow margin to furnish statistics to the Commission, but those statistics and a good many recommendations were supplied fully and freely.

"We had a notion this week," said he, "to request that the information be sent back to us. I believe it surely would have come back in the original packages. The Commission must never have even opened them or it wouldn't have drawn some of the conclusions it did." The smokeless operators do not feel like submitting without a court trial to some of the Commission's proposals for control of coal, he said.

About forty men attended the Tuesday afternoon meeting of the industrial co-operation division, where the important question of labor relations was discussed. The conclusion to be drawn from the meeting was that the most important things that can be done just now to put more harmony into such relations are: First, for the employers to develop in their own breasts an honest desire to see their workmen get an absolutely square deal, and second, to convince foremen and mine bosses of that and train them how to handle the men they boss.

WORKS FOR BETTERMENT OF LABOR RELATIONS

Some active work has been done during the past year by the Congress to further the cause of better relations. W. A. Grieves, of the Jeffrey Manufacturing Co., chairman of the industrial co-operative division of the Congress, read a report showing that in twenty-eight states subcommittees have made surveys, are encouraging such co-operation between men and employers and are telling the public about it. Mr. Grieves said the average mine operator has just a little bit more desire to set up good feeling and mutual understanding between himself and his men than the average factory owner has. But the public does not believe it. Various agencies, stimulated mainly by professional union leaders, have spread the spirit of discontent as far as possible by misrepresenting the operator. But mining is said to have 50 per cent too many men in it still, which indicates that the conditions therein must not be so bad after all or men would not stick.

Mr. Grieves read a questionnaire which has been sent out to employers, and summarized the responses. This indicated, among other things, that out of a group of sixty-two replies, twenty-eight have a definite and complete plan of industrial relations working and only eight are not entirely satisfied with their results. Mr. Grieves urged that the Congress put someone permanently in charge of promoting industrial relations, for it is a big job and well worth the whole time of a good man.

Norman W. Schlichter, a man who has circulated for twenty years through many industries to encourage better relations between employer and employee, declared the American public believes that nine-tenths of industrial management is wrong and that labor is nine-tenths right. This is due, he said, to propaganda put across by publicists, preachers and reformers at the instance of union leaders. This thing is growing, because labor leaders have learned that the insistent voice is the one that is believed.

Resolutions Passed by the American Mining Congress

Favoring appointment of a committee to develop and put into service a training course for foremen and other section executives in coal, metal and other mining industries.

Favoring appointment of a committee to investigate the present gold situation and to recommend such measures as seem best able to protect the gold standard in the United States and throughout the world.

Favoring selective immigration, operative prior to embarkation, or such other procedure if a better plan be proposed, as will tend to increase the proportion of workers among aliens admitted to the United States to the end that mining and other industries may have a better labor supply.

Favoring co-operation in any transportation movement which will benefit the bituminous-coal industry of the United States in its export trade, investigation showing that if rates on overseas shipments of coal were lowered 75c. a ton America could compete with Great Britain.

Favoring uniformity of blue-sky laws, aid for small operator

to help him raise capital, and condemnation of "the intent and purpose of such measures as the Denison blue-sky bill."

Denying that the producers of silver seek an unfair interpretation of the Pittman Act in their protest against the Treasury Department's revoking of silver allotments for subsidiary coinage.

Tendering the support of the Congress to the movement for the organization of a silver export association.

Urging the reduction of state and local taxes, abolition of all double and super taxation and the creation of a tax court of appeals to work independent of the Bureau of Internal Revenue at Washington.

Reaffirming the 1922 position of the Congress in favor of a sound economic policy for the development of water power in the South to prevent power monopoly.

Urging a joint commission to facilitate the co-operation of this country with Mexico in the development of Mexican mining properties.

Employers must be the ones to raise that insistent voice in the future if they would retain control of their own industries and property. The truth about the present industrial order must be put across to the public. By publicity, missionary work and through good, wholesome and honest relations with labor, they must teach their labor the origin of capital, the political rights of labor and the improvement that labor has made under the existing system in this country. This, he said, can best be done through training of foremen and bosses.

Secretary Callbreath of the Congress emphasized the importance of foremen training. By a vote of the meeting a subcommittee was created to consider and report on whether the Congress should prepare and offer such a course. A. B. Jessup, of the anthracite wage scale committee; Mr. Wulff and George R. Stahl, of Denver, Colo., named on that subcommittee, reported that evening to the Congress at the industrial co-operation dinner that a permanent committee be created to work out a plan and put it into effect during the coming year.

The 200 men and women at the industrial co-operation dinner heard a good deal about the unreasonableness of union labor from Lawrence F. Abbott, publisher of *The Outlook*. Mr. Abbott spoke with keenness and good humor about the difficulties of employing union pressmen.

He thinks it probable that the early abuse of power by capital is what turned the union into a fighting organization, but whatever the reason, capital now should do everything it can to remove the causes of the present state of war. Arbitration and employees' elective representation in industry are the best methods. But they cannot succeed in mining unless mine operators get thoroughly sold on the idea of reciprocal relations. There is no other road to permanent industrial peace.

DEFENDS EXISTING SYSTEM OF IMMIGRATION CONTROL

A defence of the present system of immigration control was offered by Edward J. Henning, Assistant Secretary of Labor at Washington. Mr. Henning put a good deal of force into his talk and held his audience well. He deplored the fact that so many big employers want unrestricted immigration, saying that cheap labor of the sort admitted with the Ellis Island bars clear down is merely European refuse and is, in the long run, the most wasteful, most undependable and most expensive labor there is, not to mention its unhealthy effect upon the blood and stamina of the nation.

Selective immigration, so much desired by many other employers, cannot be practiced, he said, because of the national pride of the other countries. He said the only sound answer to the present shortage of labor is limited immigration, a better distribution of the labor already in this country and more manual training for the upcoming generations.

Wednesday morning's general session centered upon problems of the coal industry. Albert J. Nason, head of the Illinois Coal Corporation, presided. The first address was that of John C. Brydon, president of the National Coal Association, which appeared in full in last week's issue of *Coal Age*. Phil H. Penna, secretary of the Indiana Bitu-

minous Operators Association and a warhorse of national importance for a generation in the dealings between mine owners and miners, was scheduled to speak on "The Position of the Operators in the Central Competitive Field." He opened by declaring no man can tell what is the position of the Central Field operators for they do not themselves know from day to day, and that it is seldom possible for them to get a majority vote on anything. However, they come nearer agreeing upon the fact that the control of their own industry has been taken away from them than upon any other one thing. Collective bargaining in what remains of the field—part of Ohio, and all of Indiana and Illinois—while not perfect, has proved the best method that could be devised, he declared, and not only operators and miners but the public has benefited by it.

MINERS' UNION USING UPLIFTERS AND POLITICIANS

The only trouble with it now, he insisted, has nothing whatever to do with the method, but is that the miners' union has been able to make profitable use of the "damnable uplifters and truculent politicians" who have upset calm negotiation between men and operators. There is no such thing any more as real collective bargaining, he said.

In 1916 there was, though. Operators and miners then were able to make their own contracts and a certain large group of coal contracts made during that year showed Indiana lump averaging \$1.30 to the consumer, and screenings 80c. But since then the miners have learned that what they cannot get from the operators they can get from politicians at Washington. The effect of this on the price of coal to the consumer is known to everybody. The non-union policies that West Virginia, Alabama and other fields cling to so tenaciously now will some day prove the salvation of the whole industry, he declared.

In the Central Competitive Field there is no hope for relief soon from union domination, Mr. Penna said.

Mr. Penna knows a cure for all these labor ills in coal. Here it is: "If we all considered the rights of others and were willing to fight for our own rights, the problems would be solved. Unfortunately, in operators' ranks, there are always some who can see only the dollar. They wouldn't fight for their own rights, nor respect the rights of their employees. It is men like that who have forced the union to develop into the dominating thing it is today. But there they are, in the industry, and because of them it is necessary for others to be fighting labor all the time, foolish though that practice is.

"Some day the people of this country will get so tired of this fighting at their expense that a revival of true Americanism will occur—the kind of Americanism that makes a man give a square deal to all others and insist upon a square deal for himself. Then we'll have men in Washington with backbone enough to enforce the Constitution. The authority of the nation will recognize the right of men to organize and to refuse to work when they want to; and it will recognize the equally sacred right of men to remain unorganized and will protect them in that position. All this is merely 100 per cent Americanism."

An appeal that the truth about coal be told the public was made by F. D. Rash, of the St. Bernard Mining Co., of Kentucky. He was scheduled to talk about the relation of

transportation to the coal industry, but dismissed the subject of transportation with a brief word about the unbalanced condition of freight rates and then turned to labor and the interference of the politicians in coal problems. He said the volume of "bunk" handed the people of this country during every coal crisis is stupendous and often comes from such high places as to be severely damaging.

Anthracite came to the fore in the extempore speech of A. B. Jessup, of the recent anthracite wage-scale committee. He opened with a little more sarcasm for the U. S. Coal Commission by saying that public expenditures such as the \$600,000 spent by the Commission without result are good reasons for the depreciation of the value of the dollar.

Mr. Jessup declared government interference in the recent settlement of the anthracite strike gave the miners more than 100 per cent more than they really expected. He said the best they had hoped for was a 5-per cent increase in wages and this only on a long-term contract. But Washington passed the buck to Harrisburg and Governor Pinchot told the miners they were entitled to 10 per cent more pay because of the skill required by their work and the hazards of it.

A luncheon at noon for exhibitors and members of the Manufacturers' division of the Congress and a hilarious exhibitors' entertainment in the basement of the Auditorium that night wound up Wednesday's proceedings.

ATTACKS TREASURY'S WAY OF COMPUTING DEPLETION

Taxation got a good deal of attention during the convention, in several sessions of the taxation division. Paul Armitage, of New York City, one of the noted authorities on mine taxation and chairman of the general tax committee of the Congress, charged that the Treasury Department's only method of computing depletion is in disregard of the express terms of the law, which provides that a reasonable allowance for depletion and depreciation of improvements shall be granted according to the peculiar conditions of each case.

Wade Kurtz, of Joplin, Mo., reiterated the charge made previously that the government ignores established accounting practice, built up before income-tax laws were heard of, to meet the needs of short-life operations. He urged a protest against the rapid crystallization of ill-advised decisions by rules for which no official apparently is responsible. He said if the department would deal with actualities and not with fictions, they would get cases settled more promptly.

That the discoverer of a mine is justly entitled to a value for discovery which may be returned as capital representing the years of toil, hardship and expense in prospecting, exploration and development of the mine, is the view of George E. H. Goodner, of Washington. Mr. Goodner explained the discovery provision of the 1921 revenue act which has given the government as well as taxpayers much difficulty. This is another provision of law which the income tax unit partly ignores and thus defeats the expressed intent of Congress.

In the final tax conference of Friday, Walter A. Staub, of New York, explained many of the changes that have been made in the 1921 revenue act with reference to reorganizations, pointing out a number of conditions under which it would be of advantage for mining corporations to reorganize if they own property carried on the books at less than the present value and which are therefore unable to profit fully by depletion and depreciation allowances. Arnold R. Baar, of Chicago, spoke on taxation of dividends and other corporate distributions with particular reference to distributions from capital, from depreciation and depletion reserves, and from realized or unrealized appreciation in value of capital assets. All the taxation papers have been printed in pamphlet form by the Congress.

At the banquet closing the convention Friday night W. H. Finley, president of the Chicago & Northwestern Ry., made an appeal for a reduction in the legislative restrictions thrown around the railroads of the country, and declared that since wages form 80 per cent of all railroad expenditures, freight rates should not be reduced until wages come down.

Senator Irvine L. Lenroot, in his address on "Government in Business," said there is a powerful effort now being made to sovietize this country that has already led to an economic unbalancing by which one class tries to take all and leave nothing for the remainder of the people. This will eventually prevent prosperity. He appealed to the business interests of this country to take an interest in their government, not merely to satisfy their own immediate desires but with the future of the nation in mind. The best basis he can think of for this is an intelligent co-operation with labor and agriculture.

The technical side of the convention and the very good machinery exposition will be treated in a later issue of *Coal Age*.

Underground Loading Machines a Live Topic at Mining Congress

Failure to Provide Cars Fast Enough Handicap to Success—Modified Mining System Suggested—Concentration of Workings Cuts Operating Expense

Underground loading machines—the liveliest mechanical subject of the convention of the American Mining Congress—came in for discussion at the Thursday afternoon standardization conference after D. J. Carroll, engineer for the Chicago, Wilmington & Franklin Coal Co., had read a short report of the Congress' committee on mining and loading equipment. He said the committee made a futile effort to collect some complete data on the loaders now in service, and got reports on only 29 machines. In the discussion that followed it developed that there are nearly 200 loaders of various kinds now in service in the country, which moved Colonel W. R. Roberts, chairman of the standardization division, to say that the country has not waked up yet to the swift spread of these machines.

In his report Mr. Carroll said 24 of the 29 machines covered in his committee's scattered survey are Joys, 4 are Myers-Whaleys and one is a Goodman whose service has been discontinued. The two qualifications machines must meet, he said, are that they must not break down coal more than hand loading and they must stand the gaff of wear and tear. He stated it as the committee's opinion that the price of loaders must be lower. Machines now range from \$5,600 to \$9,000, which makes the average about \$7,500. A wage scale for machine operators is going to be hard to get. The present temporary arrangements in union fields cannot be maintained much longer. But cutting machines were recognized by the union after a long fight and loaders will win also.

N. D. Levin, chief engineer of the Jeffrey Manufacturing Co.'s mining department, said the biggest obstacle in the loading machine's way is the failure of operators to devise a scheme for getting cars to them fast enough. He doubts if it ever can be done on a room and pillar system. He thinks the mining system must be changed so that a loader can stay in one place and work continuously for a whole shift.

Mr. Carroll, who was about the only man to talk for the operators in the conference of about 50 machinery men, said the mine cannot afford to change its system until the machine has proved itself worthy of it, which it has not yet done. The best machine performance he had ever heard of was 150 tons a day. In Orient No. 2 mine of his own company, where there are 13 loaders—the largest single installation in the world—the best of them have loaded only 45 tons a day.

William Whaley, president of the Myers-Whaley Co., of Knoxville, Tenn., said one reason for such small production per machine was the fact that all of the machines in Orient No. 2 are on narrow entry work. In a lignite mine in Colorado, he said, one of his company's loaders averages 100 tons a day—a bulk greater than that of 100 tons of bituminous coal—and one in Tennessee, operating under perfect conditions, regularly loads 150 tons working only about 60 per cent of the time. This indicates that the loader, if given a chance, can get out a tremendous tonnage. In wide work a loader ought to handle 200 tons a day some

day soon, he said. Anything less than 100 tons a day is uneconomical. Training of crews is one way he advocated of raising the capacity of a machine.

Mr. Levin took the floor a few minutes to suggest that machines could be used to advantage in a modified room and pillar system if rooms were widened out to 200 ft. or more, supporting the roof with jacks when necessary. This would enable the loader to stay a whole shift in one place. Tonnage ought to be raised to 300 a day by that method.

The question of breakage by machines was raised. Mr. Levin said a loader his company had once maintained an average of 70 per cent of coal above 1½-in. size. Mr. Joy said his machines, working in the Pittsburgh seam, get as high as 70 per cent lump now.

The Joy machine is calculated for room and pillar work now, but the head of the concern guessed that eventually some other system will be adopted to increase not only the output of loaders but of cutting machines too. Cutters ought some day to cut as much as 600 tons a day, he thinks.

He explained the low tonnage performance of the Joys in the Orient mine—about 45 tons average—by the fact that they are able to run only about 20 per cent of the time. This is the lowest output of any of the 150 or 160 Joys in the country and they require more repairs than any others of the 52 working in the Middle West. The union labor handling the machines has absolutely no consideration for them, he said.

Defending the high cost of loaders, he declared operators have told him they save enough in miners' houses alone, where they reduce working forces by the use of loaders, to pay for the loaders. Loaders, he said, concentrate the working area of a mine to half the expanse operated ordinarily without them, thus effecting great economies of trackage, wiring, haulage time and power consumption. They also reduce the amount of timber used for props because a face is advanced so fast that roofs do not have so much time to weaken.

Governor Smith Begins State Coal Inquiry

Beginning an inquiry into the fuel situation in New York State Governor Smith on Sept. 30 asked Edwin J. O'Malley, Commissioner of Markets of New York City, and the men who acted as County Fuel Administrators for the State Fuel Administration last winter to supply information as to the anthracite supply, the prices being charged and for evidence of profiteering.

In his letter to Commissioner O'Malley the Governor said: "I am endeavoring to gauge the coal situation as it affects the State of New York and I shall appreciate your assistance in securing and forwarding to me at the earliest possible moment specific information on conditions in the City of New York."

George J. Eltz will represent the Coal Merchants Association of New York City in the efforts being made by the Department of Public Markets of the city to insure a supply of anthracite domestic coals and stability of prices, according to an announcement issued Sept. 28 by Mrs. Louis Reed Welzmler, Deputy Commissioner of Markets. Mrs. Reed Welzmler has been conducting an investigation of the coal situation, fearing a serious shortage of domestic coals, and late in the week announced that arrangements had been made whereby householders could obtain a supply of coal and that efforts would be made to urge the operators to allocate a larger proportion of the output to New York City. There also was made public at the investigation a schedule of mine prices of several operators for domestic coals. They follow:

	Egg	Stove	Nut	Pea
D. L. & W.	\$8.75	\$8.75	\$8.75	\$6.25
Lehigh & Wilkes-Barre	8.75	8.75	8.75	6.25
Lehigh Valley	8.75	8.90	8.90	6.35
W. & P. (Erie)	8.95	8.95	8.95	6.15
Delaware & Hudson	9.00	9.00	9.00	6.15
P. & R.	9.15	9.15	9.15	6.60
L. C. & N.	9.25	9.25	9.25	6.50
D. & E. (O. & W.)	9.25	9.25	9.25	6.65
Weston Dodson	9.75	9.75	9.75	7.50
Hanna (Sus.)	9.85	9.85	9.85	6.75
Thorne Neale	10.25	10.25	10.25	7.40
Markle	10.45	10.45	10.45	7.50
Buckwheat, 1st Quality, \$3.50	Buckwheat, 2d Quality, \$2.50	Buckwheat, 3d Quality, \$1.50		

Lewis Condemns Coal Commission As "Most Inefficient of All"

Declares It a "Lamentable Failure"—Says
Its Recommendations "Fail to Ecompass One
Great Object for Which It Was Created"

The U. S. Coal Commission has failed lamentably to help the coal industry and its recommendations "fail to accomplish the one great object for which it was created," according to a press dispatch of a statement by John L. Lewis, International president of the United Mine Workers, issued at his home in Springfield, Ill., Sept. 28. The death of the Commission, which expired Sept. 22, leaves the industry suffering from the same ailments and ills as was the case preceding its creation, the statement declares, adding that it will "go down in history as being perhaps the most inefficient of all federal commissions."

President Lewis' statement follows:

"The taxpayers of the nation should be deeply gratified to know that the life of the U. S. Coal Commission legally expired Sept. 22. The Commission has been in existence for a year and has succeeded in expending more than \$600,000 of the people's money. The work of the Commission in so far as the coal industry is concerned is a lamentable failure and has not even justified the existence of the Commission or the funds expended. Its report is a maze of well-worn generalities which could have been written by any well-informed mine superintendent within a sixty-day period.

"The Commission's recommendations fail to encompass the one great object for which it was created, namely, the stabilization of the coal industry as affecting both the opportunity for employment on the part of the miner, reasonable profits for the operator and a fair price of coal to the consumer.

"The death of the Commission leaves the industry suffering from the same ailments and ills as was the case preceding its creation by congressional enactment. It will go down in history as being, perhaps, the most inefficient of all federal commissions from which our country has suffered. It has, however, furnished positions of public distinction to a number of excellent gentlemen who know less about the coal industry than when they started investigating a year ago.

"The Commission surrounded itself with a large corps of needy college professors and so-called experts of the intellectual variety, who wrote reams of staff reports which have been from time to time given publicity. It is generally conceded that one can prove anything he chooses by reference to these staff reports.

"The fact that many of these reports contradict each other seems to rest very lightly on the shoulders of the Commission. The fact that these reports contain mis-statements due to a woeful lack of knowledge on specific subjects is also of small concern to the Commission. The final report of the Commission should be duly filed and the dust of the ages allowed to collect thereon."

MEETINGS OF THE DIRECTORS and of committees of the National Coal Association, and of secretaries of member associations have been definitely arranged to be held at the Hotel Biltmore, New York, as follows: Policy Committee, 9:30 a.m., Tuesday, Oct. 9; Government Relations Committee, 12 noon, Tuesday, Oct. 9; Membership Committee, 2:30 p.m. Tuesday, Oct. 9; conference of secretaries, 3:30 p.m. Tuesday, Oct. 9; Directors, 9:30 a.m., Wednesday, Oct. 10; Publicity Committee, 12 noon, Wednesday, Oct. 10.

A MINING RECORD TO SHOOT AT.—Peter Stark, who has just completed seventy-five years' work at Thankerton colliery, Holytown, Lanarkshire, claims to be the oldest working miner in Great Britain. He has been employed in the colliery since he was nine years old and although is eighty-four years old, is still quite hale and hearty, and continues at his work. Mr. Stark can recall the time when women were employed in the mines.

Dr. Honnold Resigns Secretaryship of Illinois Operators' Association

Dr. F. C. Honnold, moving spirit of the Illinois Coal Operators' Association, offered his resignation as secretary-treasurer of the organization at its annual meeting in Chicago Tuesday. He has been willing to resign at previous annual meetings but the association has always prevailed upon him to continue the effective work in statistics and publicity which he has carried on to the great good of the organization. This time he told his associates, before the meeting, that his decision was final; so the association had no choice but to acquiesce. Rice Miller retains the presidency; Vice-President L. H. Smith has succeeded Dr. Honnold as treasurer and C. E. McLaughlin is the new secretary.

Dr. Honnold will remain a member. He is now the head of the Honnold Coal Bureau, a private enterprise collecting, compiling and distributing to operator clients data on production and distribution of coal in southern Illinois, a work which once as handled as a part of the association's services.

The association also was expected to go through the formality of approving the creation of a central policy committee to handle for the three Illinois associations all questions of labor, operators' relations and general policy both within the state and between Illinois and other states. The plan already is approved by the other two associations and by the executive committee of this association. The members are to be these: For the Illinois Operators' Association, President Rice Miller, L. H. Smith, E. C. Searls, W. J. Spencer and James Needham; for the Fifth and Ninth Districts Operators' Association, President C. S. Krause and Herman Perry; for the Central Illinois Operators' Association, President H. C. Adams.

Court Upholds Sale of Lehigh Coal Stock

A final decree in the sale of the stock of the Lehigh & Wilkes-Barre Coal Co. has been filed by the U. S. District Court at Philadelphia. The court dismisses the objections of Isaac T. and Mary T. W. Starr, minority stockholders of the Central Railroad of New Jersey, to the sale of the stock of the Lehigh & Wilkes-Barre Coal Co. to the Jackson E. Reynolds Syndicate of New York.

The decree, signed by Circuit Court Judges Buffington and Wooley and District Judge Thompson, is based on the recent decision of the court that it would not set aside the sale because the evidence had showed it was made in good faith and in conformity with the U. S. Supreme Court decree for the dissolution of the Reading and its associated companies.

Sixty days from Oct. 1 are allowed for the filing of an appeal from the decree.

Crowell Urges Release of Coal Commission Report on Retail Trade

Samuel B. Crowell, president of the National Retail Coal Merchants Association, in a letter to former Chairman Hammond of the U. S. Coal Commission Oct. 1, urged immediate release of the Commission's report on the retail coal trade, believing "that the public interest demands that your findings concerning the retail coal trade and any recommendations you may have seen fit to make, should be given publicity."

"It has been stated," continues Mr. Crowell's letter, "that the question of retail coal prices is a problem of the 'state' rather than the federal government, and that the Governor of each anthracite-consuming state is appropriately interested to determine whether fair prices on coal prevail within his jurisdiction and is properly desirous of correcting any improper conditions that may exist. As representing the retail coal dealers I therefore urge immediate release of this report, believing that its value will be enhanced by prompt circulation."

"I take this opportunity to state that our association has

welcomed the investigation of your body and is confident that your report will show that the retail coal business is a highly competitive business, conducted under difficult conditions and that the retail coal dealer is rendering a valuable service to his community, efficiently and with full regard for the public interest."

Hudson Coal Co. Workers Place Grievances In Hands of District Union Officials

Urged by Enoch Williams, secretary-treasurer of District 1, United Mine Workers, general grievance committee-men of the Hudson Coal Co. voted on Sept. 29 to place their grievances in the hands of the district union officials for settlement. A general strike in the mines of the Hudson company, affecting 20,000 men, threatened for a while, the workmen alleging that discrimination was shown in the hiring of laborers, and protesting against the inauguration of the "special test," and the refusal of the colliery officials to bring rate sheets up to compliance with the new agreement.

Utilities Consume 3,027,384 Tons of Coal in July; Slight Gain in Power Produced

Electric public-utility plants consumed 3,027,384 net tons of coal during July, according to a report just issued by the U. S. Geological Survey. This compares with 2,953,358 tons consumed during June, according to corrected returns.

Fuel oil consumed by public-utility plants in July totaled 1,161,644 barrels, compared with 1,035,715 barrels in June. The average daily production of electricity by public-utility power plants during July was 146,300,000 kw.-hr., a slight decrease over the rate for June.

The average daily production of electricity for the first seven months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent; April, 149,100,000 kw.-hr., 39.9 per cent, and May, 150,100,000 kw.-hr., 41.3 per cent; June, 151,100,000 kw.-hr., 38.9 per cent.

W. Va.-Ky. Mine, Mechanical and Electrical Engineers Meet at Huntington Oct. 19

The third annual convention of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will be held Oct. 19 and 20, at Huntington, W. Va. At the first session, on Friday, J. H. Edwards will speak on "Mechanical and Electrical Equipment Records." There will be a further consideration of "All-Rubber Insulated vs. Ordinary Braid Covered Cables for Portable Extensions, Locomotive and Mining Machine Cables, etc.," and then an open discussion on "Purchased Power vs. Individual Plants."

L. G. Mason, of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., will speak at the afternoon session on "Construction and Care of Transformers," illustrating his address with slides. "What Can Be Done to Improve the Efficiency of Mine Pumping" will be another subject discussed at the session, and F. M. Reigher will speak on "What Service Are We Getting from Manufacturers in Supplying Repair Parts?"

The morning session on the last day of the convention will be taken up by a business meeting and addresses by M. A. Maxwell on "Hoisting Equipment" and J. J. Fluck on "Application of Fan Drives for Ventilation." An inspection of industrial plants will be made in the afternoon by the delegates.

AMONG THE CASES scheduled for early argument before the U. S. Supreme Court is the case of the Corona Coal Co. against the United States. This case involves the question of the proper basis of settlement for coal requisitioned by the Railroad Administration. It was dismissed by the Court of Claims for want of jurisdiction and an appeal was then taken by the coal company.

Operators Averse to Government Experiments with Their Industry as Suggested in Commission Report

Consumers Disappointed at Getting No Relief from High Prices or Guarantee of Steady Supply—Labor and Producers Object to Publicity of Accounts and Regulation—Supporters Realize Public Regards Report as a Dud

By PAUL WOOTON
Washington Correspondent of *Coal Age*

Opposition in surprising volume has arisen to the recommendations of the U. S. Coal Commission. The objections to the findings of the Commission fall largely into two distinct classes. The public seems to be disappointed because it sees in the report no immediate relief from high prices and no guarantee as to constancy of supply. Labor and the operators object to publicity of accounts and regulation.

The reaction of the public is thought to be due to a considerable extent to the fact it feels that it has been preyed upon by the coal industry—operators, mine workers, wholesalers and retailers. It has not taken time to attempt to fix the degree to which each branch of the industry is culpable. Apparently the majority of the people were in a frame of mind where they wanted to see someone punished. As a result the non-punitive character of the report in no way appeases the thirst for revenge.

The operators do not object so much to the step as they do to its direction. They are not willing to admit the interstate status of coal-mining operations. They do not agree with Governor Marshall in his contention that the essentiality of the railroad car—the property of an interstate carrier—to mining operations is such as to place the whole enterprise under federal jurisdiction. Many operators, if not most of them, interpret their status to be the same as a manufacturer or a merchant and do not admit that the mere fact that they do not warehouse their product before shipping it in interstate commerce affects their legal position.

It is quite certain, say representative operators, that business generally would not submit to licensing by the Interstate Commerce Commission until they had exhausted every legal measure to prevent it. The Interstate Commerce Commission could survey the field and come to the conclusion that there are too many automobile factories and decide to withhold trackage from a new plant. The same procedure could be applied to every industry if it is proposed to exchange the benefits of consolidations for those of general competition. Without passing on the advisability of such a policy, the operators are certain that they do not wish to be picked out for the experiment.

OPERATORS DECRY UNFAIR REGULATION

The thought also is expressed among operators that any regulation would be unfair which does not follow the coal through to the ultimate consumer. The operator contends that he receives a smaller portion of the sum finally realized for the coal than any other branch of the industry. If operators alone are regulated, the chance of reducing the price would be comparatively small. Seventy per cent of the cost of the coal is represented by labor, which offers, they contend, a more fertile field for regulation. The effect of the Commission's report would be, they contend, to subject the operator to more regulation than any other branch of the industry. Moreover they believe that the service demanded by the public is responsible for a substantial portion of the price of coal, one of the elements of cost to which the Commission paid comparatively little attention. It also was pointed out that there are snow birds among the retailers just as there are in the producing branch of the industry. This latter effective contributor to the ultimate consumer's cost would be without regulation.

There also is a generally held opinion that coal can be moved only to its so-called natural market. There can be

no zoning against quality. Unquestionably, it was said, the cost of clothing could be greatly reduced were all men to agree to wear the same kind of cloth. Different needs and different tastes make this impracticable, but not more than any effort to prevent the movement of coal out of its own zone.

The operators admit that there are too many mines, too many mine workers, too many wholesalers, and too many retailers. They also call attention to the fact that there are too many grocers, too many undertakers and that there were too many lawyers when Governor Marshall was admitted to practice in Columbia City, Ind. They agree that great economies could be effected were it possible to reduce all trades and professions to some scientific basis which would save the public the costs of unnecessary overhead. The practical difficulties in the way, however, are regarded as such as to hinder progress along those lines.

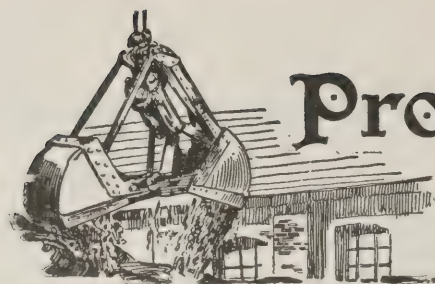
PLAN WOULD OVERBURDEN COMMERCE COMMISSION

To vest the authority suggested in the Interstate Commerce Commission, in an opinion expressed in operator circles, would throw upon that agency more work than it could be expected to do. A comparable situation would be to abolish all appellate courts and allow all cases to come to the Supreme Court direct.

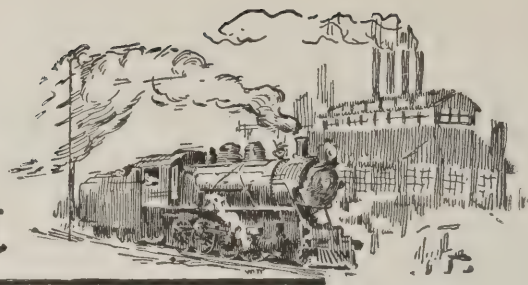
Those who think well of the report realize that the public regards it as a dud. They know it would be more popular had it appeared to be a live shell exploding with many casualties. Nevertheless they think it was wise for the Commission to prescribe a gradual cure rather than to make startling promises and attempt to perform a miracle. Consideration had to be given legal obstacles, for instance. Even had the Commission been so inclined, it might have recommended that it be made unlawful for the mine workers to strike. Such a recommendation might have gratified a certain element, but it would have run head on into the very sturdy stone wall which the Constitution of the United States has erected. Various curbs for the United Mine Workers of America might have been suggested but how could they have been put in force in the face of the decision of the Supreme Court of the United States in the Kansas Industrial Court decision, in which it is held that a man cannot be compelled to stay at his work and that wages may not be fixed compulsorily?

Refuse cars to wagon mines was another suggestion, but there again serious legal difficulties were in evidence. There also was the suggestion of giving 100 per cent priority to contracts. This failed to take into account how to supply the needs of the consumer who has failed to get delivery on his contract and who is estopped from purchasing spot coal. The legal obstacles even in requiring publicity of accounts are serious, as already has been demonstrated. The friends of the report believe that any commission of intelligent, honest men would have reached substantially the same conclusions were they to have before them the same evidence and were they to make the same careful analysis of it as was done by the late Commission.

The President is prepared to endorse the recommendations of the Coal Commission. It is stated at the White House that Mr. Coolidge expects to ask Congress to consider the legislation suggested in the report. The President also regards it as desirable that the public learn of the value of substitutes for anthracite. A greater use of other fuels, he believes, offers escape from high anthracite prices.



Production and the Market



Weekly Review

Activity in the coal market is centered in the anthracite situation. Demand for bituminous coal is dull and prices continue to go downward. Steam-coal buyers are practically out of the market in some sections, except when they can obtain coal at bargain prices, and industrial users in some instances have adopted a hand-to-mouth policy. The railroads have practically stopped adding to their reserve stocks, except on old contracts. A slight car shortage is reported in southern West Virginia and eastern Kentucky.

With most of the anthracite mines operating, coal is coming forward in good volume and demand for the domestic sizes is strong. Although the mines did not begin operations until Sept. 19, shipments during the balance of the week are estimated by the Geological Survey to have been 877,000 net tons. According to indications from early returns, during the week ended Sept. 29 they will amount to between 1,800,000 and 1,900,000 net tons.

OUTPUT AND MOVEMENT OF SOFT COAL STILL GOOD

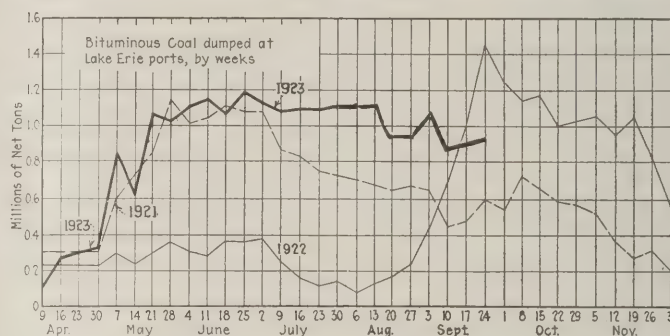
Production of soft coal continues above 11,000,000 net tons weekly, and during the last six weeks has averaged nearly 1,900,000 net tons daily. Movement continues good. There is not much activity in the steel industry and conditions are now being reached when new orders must be received or production must be reduced. On the other hand there are indications that textile plants are facing an upturn but reserve stocks of coal are so large that it will be some time before its effect could be felt in the coal market.

Operators and consumers are closely watching the outcome of the conference of railroad executives on the demands of the train and service brotherhoods for increased pay.

Coal Age Index of spot prices of bituminous coal at the mines declined to 196 on Oct. 1, compared with 200 the previous week. The corresponding average price was \$2.37, a decline of 5c. There were declines in

Pocahontas, southern Illinois, Pittsburgh, Springfield, Kanawha and Standard coals, and increases in eastern and western Kentucky and Clearfield coals.

Weather conditions affected the Chicago market last week, but prices did not soften a great deal notwithstanding the dullness. Both the steam coals and screenings are draggy. Steam coals are the slowest moving in the Ohio markets and there is little hope for imme-

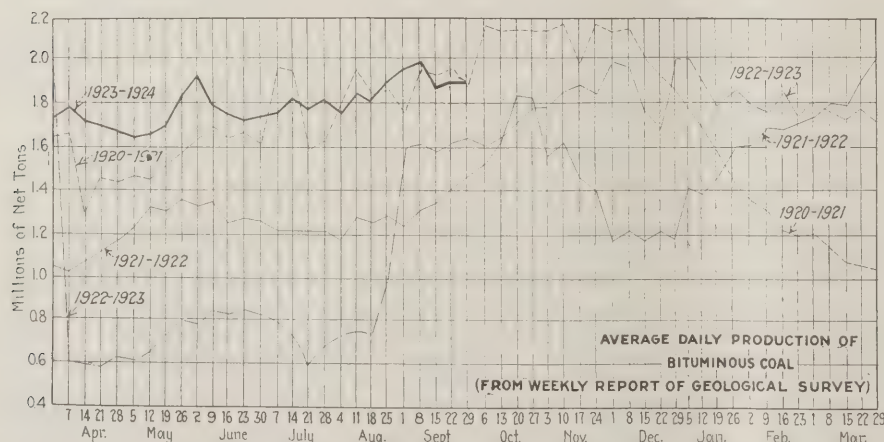


LAKE COAL DUMPED
(Net Tons)

	Week Ended	Season to
	Sept. 24	Sept. 24
Cargo	822,981	21,227,341
Fuel	55,077	1,142,520
Totals	878,058	22,369,861

mediate improvement. Pittsburgh reports no increase in demand and offerings have been increased, resulting in lower prices. Operators are delivering a good tonnage on regular contracts, although some consumers wish smaller shipments. Consumers appear to be without interest. New England's steam-coal market is further depressed, and there are few signs of inquiry during October.

Coke and bituminous screened coals are practically out of the market as substitutes for anthracite. Prices have dropped and there is little inquiry. Welsh anthracite continues to arrive in small quantities.



Estimates of Production (Net Tons)

BITUMINOUS

	1922	1923
Sept. 8	8,791,000	10,485,000
Sept. 15 (a)	9,737,000	11,378,000
Sept. 22 (b)	9,747,000	11,431,000
Daily average	1,625,000	1,905,000
Calendar year	1,162,000	1,793,000
Daily av. cal. year	261,193,000	402,105,000

ANTHRACITE

	1922	1923
Sept. 8	51,000	3,000
Sept. 15	1,127,000	2,000
Sept. 22	1,897,000	877,000

COKE

	1922	1923
Sept. 15	124,000	317,000
Sept. 22	139,000	327,000
Calendar year	4,623,000	14,174,000

(a) Subject to revision. (b) Revised from last report

Two contracts of 20,000 tons of coal each for shipment to France by Nov. 15 were reported to have been closed last week. This was regarded by some as indicative of an upturn in foreign demand. Generally, the export market is quiet and inquiries are few. Shipments from Baltimore during the week ended Sept. 22 totaled 11,785 tons, including 576 tons of bunker coal, while during the previous week the total dumpings, including bunkers, amounted to 16,054 tons.

Dumpings at Hampton Roads for all accounts during the week ended Sept. 27 amounted to 256,730 tons, a decrease of 112,423 tons when compared with the previous week.

Dullness Holds in Middlewest

In and around the Chicago market the prevailing dullness of the past two weeks continues. Warm weather has slowed down even the light but steady call for domestic coals, though the prices have not softened a great deal. But screenings have to be given away. Southern Illinois

has sagged to an average of \$1.25, with some unloaded at \$1.10. The top price of scattered sales of this coal is \$1.50. Central Illinois brings about \$1 and Standard district and western Kentucky fines are simply sunk. Much Standard "sells" at 60c. and west Kentucky unwashed screenings does little better. Railroad pressure is forcing the shipment of these coals at any price.

Around Chicago there is little doing in smokeless or anthracite. The new anthracite circulars showing company increases from 75c. to 90c. on the larger sizes have reached this territory. No fresh coal has reached there yet though it is expected daily.

With the close of September conditions are in a chaotic state throughout the southern Illinois field. The order issued by practically every coal carrier in Illinois to the effect that "no bills" would be counted as empties has had a depressing effect and this will directly be the cause of an advance in the price of the sizes that are easiest to move. Lump is moving fairly well, although some mines are long on it, but egg, nut and screenings seem impossible. Some mines have 100 cars of "no bills." Railroad tonnage is light, with mines working from two to four days a week.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Oct. 2 1922	Sept. 17 1923	Sept. 24 1923	Oct. 1 1923†
Smokeless lump.....	Columbus....	\$6.75	\$5.95	\$5.95	\$6.00@ \$6.25	
Smokeless mine run.....	Columbus....	5.75	3.00	3.00	2.85@ 3.35	
Smokeless screenings.....	Columbus....	5.75	2.35	2.35	2.25@ 2.50	
Smokeless lump.....	Chicago....	6.35	6.10	6.10	6.00@ 6.25	
Smokeless mine run.....	Chicago....	5.85	2.85	2.85	2.75@ 3.00	
Smokeless lump.....	Cincinnati	6.30	6.10	6.10	6.00@ 6.25	
Smokeless mine run.....	Cincinnati	5.70	3.00	3.00	2.50@ 3.00	
Smokeless screenings.....	Cincinnati	5.30	2.25	2.25	1.60@ 2.25	
*Smokeless mine run.....	Boston.....	8.05	5.05	5.05	4.75@ 4.90	
Clearfield mine run.....	Boston.....	4.50	2.15	2.15	1.85@ 2.60	
Cambria mine run.....	Boston.....	4.75	2.85	2.85	2.50@ 3.25	
Somerset mine run.....	Boston.....	4.60	2.35	2.35	2.00@ 2.75	
Pool 1 (Navy Standard).....	New York....	5.50	3.25	3.25	3.00@ 3.50	
Pool 1 (Navy Standard).....	Philadelphia..		3.25	3.25	3.00@ 3.50	
Pool 1 (Navy Standard).....	Baltimore....	5.75				
Pool 1 (Super. Low Vol.).....	New York....	4.85	2.50	2.55	2.25@ 2.75	
Pool 9 (Super. Low Vol.).....	Philadelphia..	4.60	2.65	2.55	2.45@ 2.80	
Pool 9 (Super. Low Vol.).....	Baltimore....	5.10	2.45	2.45	2.40	
Pool 10 (H.Gr. Low Vol.).....	New York....	4.65	2.15	2.15	1.90@ 2.35	
Pool 10 (H.Gr. Low Vol.).....	Philadelphia..	4.25	2.20	2.10	2.00@ 2.30	
Pool 10 (H.Gr. Low Vol.).....	Baltimore....	4.75	2.25	2.25	2.25	
Pool 11 (Low Vol.).....	New York....	3.85	1.85	1.85	1.75@ 2.00	
Pool 11 (Low Vol.).....	Philadelphia..	4.00	2.10	1.85	1.80@ 1.95	
Pool 11 (Low Vol.).....	Baltimore....	4.25	2.00	2.00	2.00	
High-Volatile, Eastern		Market Quoted	Oct. 2 1922	Sept. 17 1923	Sept. 24 1923	Oct. 1 1923†
Pool 54-64 (Gas and St.).....	New York....	4.15	1.75	1.75	1.60@ 1.90	
Pool 54-64 (Gas and St.).....	Philadelphia..	4.25	1.80		1.60@ 1.90	
Pool 54-64 (Gas and St.).....	Baltimore....	4.15	1.75	1.75	1.60	
Pittsburgh a/c'd gas.....	Pittsburgh....	5.40	2.95	2.80	2.50@ 2.65	
Pittsburgh gas mine run.....	Pittsburgh....	4.25	2.50	2.40	2.20@ 2.35	
Pittsburgh mine run (St.).....	Pittsburgh....	4.00	2.25	2.15	2.00@ 2.10	
Pittsburgh slack (Gas).....	Pittsburgh....	6.75	1.50	1.40	1.20@ 1.30	
Kanawha lump.....	Columbus....	6.75	3.15	3.15	2.85@ 3.50	
Kanawha mine run.....	Columbus....	5.90	1.90	1.90	1.75@ 2.00	
Kanawha screenings.....	Columbus....	5.90	1.25	1.05	1.00@ 1.10	
W. Va. lump.....	Cincinnati..	6.25	3.60	3.75	3.60	
W. Va. Gas mine run.....	Cincinnati..		1.60	1.75	1.50@ 2.00	
W. Va. Steam mine run.....	Cincinnati..		1.60	1.75	1.50@ 2.00	
W. Va. screenings.....	Cincinnati..	4.75	1.05	1.10	1.00@ 1.25	
Hooking lump.....	Columbus....	6.25	3.10	3.10	3.00@ 3.25	
Hooking mine run.....	Columbus....	4.90	1.95	1.95	1.75@ 2.00	
Hooking screenings.....	Columbus....	4.50	1.20	1.05	1.00@ 1.10	
Pitts. No. 8 lump.....	Cleveland....	4.85	2.60	2.60	2.20@ 3.00	
Pitts. No. 8 mine run.....	Cleveland....	4.40	2.05	2.05	1.90@ 2.00	
Pitts. No. 8 screenings.....	Cleveland....	4.10	1.25	1.25	1.10@ 1.20	
Midwest		Market Quoted	Oct. 2 1922	Sept. 17 1923	Sept. 24 1923	Oct. 1 1923†
Franklin, Ill. lump.....	Chicago....	\$5.40	\$4.05	\$4.15	\$3.75@ \$4.35	
Franklin, Ill. mine run.....	Chicago....	4.75	3.00	3.00	2.75@ 3.00	
Franklin, Ill. screenings.....	Chicago....	3.85	1.55	1.40	1.10@ 1.60	
Central, Ill. lump.....	Chicago....	5.10	3.00	3.10	3.00@ 3.25	
Central, Ill. mine run.....	Chicago....	4.55	2.20	2.20	2.00@ 2.25	
Central, Ill. screenings.....	Chicago....	3.35	1.20	1.00	.90@ 1.00	
Ind. 4th Vein lump.....	Chicago....	5.25	3.35	3.35	3.25@ 3.50	
Ind. 4th Vein mine run.....	Chicago....	4.85	2.60	2.60	2.50@ 2.75	
Ind. 4th Vein screenings.....	Chicago....	3.85	1.45	1.35	1.20@ 1.35	
Ind. 5th Vein lump.....	Chicago....	5.10	2.75	2.75	2.25@ 2.75	
Ind. 5th Vein mine run.....	Chicago....	4.65	2.10	2.10	2.00@ 2.15	
Ind. 5th Vein screenings.....	Chicago....	3.60	1.25	1.05	1.00@ 1.25	
Mt. Olive lump.....	St. Louis....		3.10	3.00	2.75@ 3.25	
Mt. Olive mine run.....	St. Louis....		2.25	2.25	2.20@ 2.30	
Mt. Olive screenings.....	St. Louis....		1.35	1.25	1.20@ 1.30	
Standard lump.....	St. Louis....	4.75	2.80	2.80	2.65@ 3.00	
Standard mine run.....	St. Louis....	3.75	2.05	2.05	1.80@ 2.30	
Standard screenings.....	St. Louis....	2.35	.95	.80	.50@ .60	
West Ky. lump.....	Louisville..	5.50	2.35	2.35	2.50@ 2.65	
West Ky. mine run.....	Louisville..	3.85	1.95	1.90	1.75@ 2.00	
West Ky. screenings.....	Louisville..	3.55	.80	.85	.70@ .80	
West Ky. lump.....	Chicago....	4.25	2.75	2.60	2.50@ 2.75	
West Ky. mine run.....	Chicago....	4.25	1.95	1.95	1.85@ 2.10	
South and Southwest		Market Quoted	Oct. 2 1922	Sept. 17 1923	Sept. 24 1923	Oct. 1 1923†
Big Seam lump.....	Birmingham..	3.75	3.75	3.75	3.65@ 3.90	
Big Seam mine run.....	Birmingham..	2.75	1.95	1.95	1.75@ 2.15	
Big Seam (washed).....	Birmingham..	3.35	2.35	2.35	2.25@ 2.50	
S. E. Ky. lump.....	Chicago....	6.25	3.35	3.35	3.25@ 3.50	
S. E. Ky. mine run.....	Chicago....	4.75	1.85	2.25	2.00@ 2.50	
S. E. Ky. lump.....	Louisville..	7.00	3.10	3.10	3.00@ 3.50	
S. E. Ky. mine run.....	Louisville..	5.35	2.00	2.00	1.75@ 2.25	
S. E. Ky. screenings.....	Louisville..	5.10	1.05	1.05	.90@ 1.25	
S. E. Ky. lump.....	Cincinnati..	6.50	3.35	3.50	3.25@ 4.00	
S. E. Ky. mine run.....	Cincinnati..	5.10	1.55	1.60	1.50@ 1.75	
S. E. Ky. screenings.....	Cincinnati..	5.00	1.00	1.05	.80@ 1.25	
Kansas lump.....	Kansas City..		4.50	4.50	4.50	
Kansas mine run.....	Kansas City..		3.50	3.50	3.50	
Kansas screenings.....	Kansas City..		2.60	2.60	2.50@ 2.75	

* Gross tons, f.o.b. vessel, Hampton Roads.

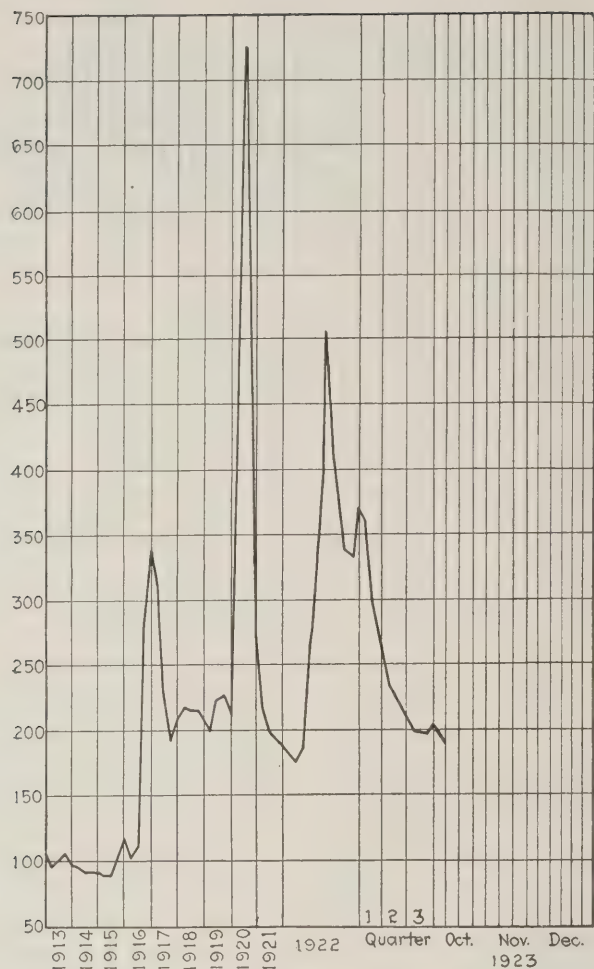
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Sept. 24, 1923		Oct. 1, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34		\$9.00	\$7.75@ \$8.25	\$9.60@ \$11.50	\$8.00@ \$9.25	\$9.60@ \$12.25	\$8.00@ \$9.25
Broken.....	Philadelphia..	2.39			7.90@ 8.10			9.85@ 12.25	8.75@ 9.25
Egg.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 11.50	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Egg.....	Philadelphia..	2.39		9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.60@ 12.50	8.00@ 8.35
Egg.....	Chicago*	5.06		12.50@ 13.00	7.20@ 8.25			9.85@ \$12.25	8.75@ 9.25
Stove.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 11.50	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Philadelphia..	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Chicago*	5.06		12.50@ 13.00	7.35@ 8.25			9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 11.50	8.75@ 9.25	9.85@ \$12.25	8.75@ 9.25
Chestnut.....	Philadelphia..	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Chestnut.....	Chicago*	5.06		12.50@ 13.00	7.35@ 8.35			9.60@ 12.50	8.00@ 8.35
Range.....	New York....	2.34			8.25		9.00		9.00
Pea.....	New York....	2.22		7.00@ 11.00	6.15@ 6.30	6.75@ 7.50	6.15@ 6.65	6.75@ 7.50	6.15@ 6.65
Pea.....	Philadelphia..	2.14		7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.25@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea.....	Chicago*	4.79		7.00@ 8.00	5.49@ 6.03			6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York....	2.22		4.00@ 5.00	4.00@ 4.10	2.75@ 3.50	3.50	2.65@ 3.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14		5.00	4.00	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice.....	New York....	2.22		3.00@ 3.25	2.75@ 3.00	2.25@ 2.50	2.50	2.15@ 2.50	2.50
Rice.....	Philadelphia..	2.14		2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley.....	New York....	2.22		1.75@ 2.00	1.50@ 2.00	1.25@ 1.50	1.50	1.15@ 2.50	1.50
Barley.....	Philadelphia..	2.14		1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye.....	New York....	2.22			2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Oct. 1	Sept. 14	Sept. 17	Oct. 2
Index	196	200	200	404
Weighted average price.....	\$2.37	\$2.42	\$2.44	\$4.89

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

The independent mines are doing better than the Association mines, are getting better working time and moving some coal, although the price is much lower.

St. Louis Does Little Business

Conditions in St. Louis proper are disappointing to the coal trade. The public is not buying to the extent that was expected and such coal as is moving is independent high-grade coal. Country domestic business showed a little Standard. Anthracite has no call. Neither has smokeless. Coke shows little activity.

A check-up of dealers shows that several of them are paying less than the circular of \$4.35 for southern Illinois high-grade coal. Country domestic business showed a little improvement for a few days and fell off the last few days of the month. Country steam is not a factor any more. Local wagonload steam picked up, but carload is impossible and nothing is moving to speak of, excepting a little fine sizes to Omaha and Chicago.

Kentucky Prices Sag

Reports from all Kentucky fields show that prepared coal, especially in the larger sizes, is active, while steam coal is general draggy. Steam buyers are showing practically no interest in mine-run in view of the quantity and

quality of screenings available and the prices quoted, while movement of prepared coal to the Lakes and to retailers in various sections is resulting in a plentiful supply of screenings.

Western Kentucky pea and slack is quoted at 70c.@85c. in the Louisville market, with eastern Kentucky non-gas screenings at 85c.@\$1.15; best Harlan gas coal screenings \$1@\$.125; good steam mine-run from both eastern Kentucky and western Kentucky, \$1.75@\$2, gas mine-run, \$1.90@\$2.25.

While a number of operators are trying to talk \$4 and \$4.25 block coal in eastern Kentucky, some are offering as low as \$3.50, for lump sells at \$3@\$3.50 and it isn't easy to sell block for more than lump. The market as a whole is about holding its own except on screenings, which are 10c.@20c. a ton lower for all fields than they were a week ago. Car supply is fairly good, weather conditions favorable, and movement could be much worse.

Nothwest Trade Is Easy

Nobody in the Northwest appears to be worrying just now over any kind of fuel. A wave of warm weather took the life out of even the domestic anthracite business although little of this coal is to be had and dealers are not accepting big orders for it from anybody. The region served by the Head-of-the-Lakes needs only about 400,000 tons more of anthracite and feels dead sure of getting it. Prices have not changed at Duluth on any grade of hard or soft coal.

In Milwaukee, retail anthracite prices took a 50c. jump Oct. 1, notwithstanding the general protest against price and in spite of a state investigation now going on. Rural retail prices went up 70c. on domestic sizes and 20c. on pea. Minneapolis sees nothing cheering in the present situation but looks for a killing frost at any time. This would have the well-known "salutary effect" on a low market in which good southern Illinois lump has been selling for \$3.75, Hocking for \$6@\$6.25 and smokeless for \$6.25@\$6.50.

Receipts at upper lake docks have fallen low. September figures, not yet available, will show that month to have been the least active month of the summer and early fall. Only 35 cargoes of soft coal and none of hard reached Duluth last week. Heavy shipments in July and August have saturated the Northwest. At Milwaukee 630,419 tons of anthracite has already been received. Only 360,070 tons arrived during last year's short season. Soft-coal receipts also are almost as great, already, as they were last year.

Western Trade Is Better

The West feels a little better about coal. Cooler weather has covered the mountain region, where Colorado domestic coals have been moving in good volume and where screenings has not dragged as elsewhere. In Kansas City a better demand for the whole Southwest district is noted, so that prices on the most popular sizes are shading upward, though without a general advance yet. Kansas quotations are: Lump, \$4.50; mine run, \$3.50; screenings, \$2.50@\$2.75. Arkansas semi-anthracite is quoted thus: Lump, \$6.50@\$7; mine-run, \$3.50; screenings, \$1.75@\$2.

Ohio Markets Dull

Weather conditions have placed an important part in the coal situation in Ohio. Smokeless lump and egg and domestic sizes in high-volatile coals in the Cincinnati market are not in heavy demand, but so far have not been hit by the price concessions that have been made to keep other coals moving. So far there are no indications that the stagnation will affect the October quotations. Car supply has been waning and in parts of Kentucky mines have been running on a two-day-a-week basis because of this. Retail quotations range as follows: Pocahontas lump, \$10.50@\$11; run-of-mine, \$7.50@\$8.25; bituminous lump, \$7.50@\$8; run-of-mine, \$6.50@\$7, and slack, \$4.50@\$5.50. Mine quotations for West Virginia 2-in. lump range \$2.50@\$3, and for southeastern Kentucky 2-in. lump, \$2.50@\$2.75.

The Columbus market is quiet in all respects. There has been a let-up in the domestic-coal situation while steam demand is slack because of heavy reserves. Retail stocks are fair and there is not much disposition to increase them at present. Shipments from the Pocahontas and New River fields are being interfered with because of car shortage. The Southern Ohio Coal Exchange reports a production of 183,784 tons from 443 mines during the week ended Sept. 15. Car shortage caused a loss of 9,908 tons and no market a loss of 475,136 tons. Demand for bituminous coal in the Cleveland territory was quiet during the past ten days, some asserting that it has been many months since so few inquiries were received. Industrial plants that filled their bins because of the anthracite situation are now consuming that surplus. It is also suggested that the slack demand may be due to decreased operations, as well as the belief that bituminous coal will be available at present prices for some time to come. Car supply in the eastern Ohio field is adequate for all requirements.

Demand for coal in the Pittsburgh district does not seem to have increased. Offerings have increased, however, as operators run out of the extra orders they took in August, where there was some forward buying by usual hand-to-mouth buyers. There has been a disposition on the part of consumers with contracts to take smaller tonnages during this month, the most conspicuous instances by byproduct coke interests, some of whom are cutting down tonnages by 10 to 20 per cent. Increased offerings have affected prices and prices for slack have reached new low levels, sales having been made at less than at any time since last year's coal strike started.

Operators in central Pennsylvania declare that prices are down to rock bottom and in some instances below the cost of production. Business is dull. Offering at Buffalo are plentiful but demand is slow, with no indications of immediate improvement.

New England Market Depressed

In New England the steam-coal market is still further depressed. There are few signs of inquiry during October, and it almost seems as if the trade could not be in worse spirits than now. Pocahontas and New River are now freely quoted at \$4.90 per gross ton f.o.b. Hampton Roads for No. 1 grades, and several agencies have intimated that \$4.75 would be accepted.

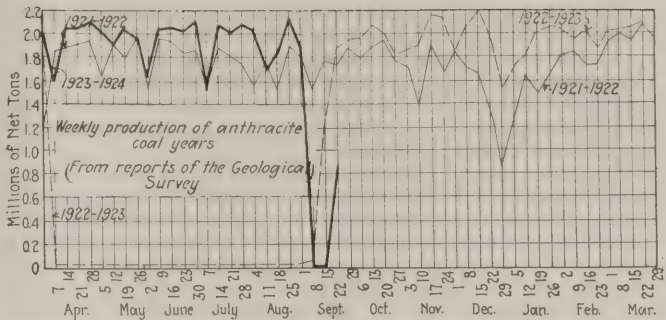
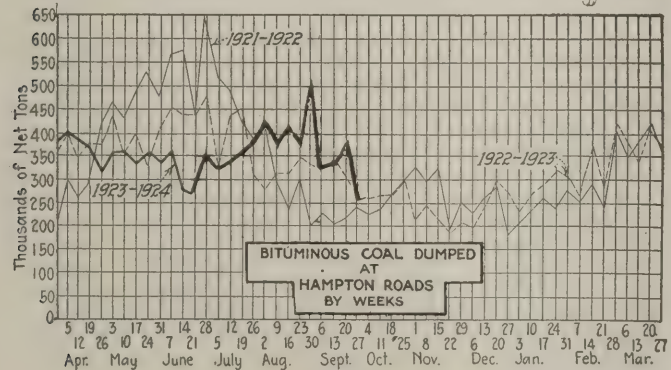
While there are indications now that the textile industry is looking up somewhat, the reserves of coal are large all along the line. In some of the cotton centers water is very low and this probably will be reflected later on in better inquiry for coal. However, it will be hard to see results from this until a month or two hence.

Both all-rail and by water there is virtual stagnation so far as spot deliveries are concerned. Factors who have coal afloat or in transit seeking the market may find hard going and today there are no bright spots anywhere.

A much reduced tonnage is being dumped at the New York and Philadelphia piers. A certain amount of contract coal is being shipped, especially to the railroads but for the industries generally in this territory movement is extremely light.

Seaboard Soft-Coal Market Slow

While the spot market for bituminous coal is quiet at New York, contract coals are moving in fair volume,



although some consumers holding contracts have asked that deliveries be lightened. The cheaper coals are scarce at the New York tidewater, most of the demand being for the better grades because of the low prices prevailing. At Philadelphia there is no activity. Prices remain soft and there are signs that they may go lower. Some distress coal is available. The railroads are storing coal on account of old orders. The market at Baltimore is flat, dealers reporting few orders. Dullness is apparent in West Virginia, with spot buying on a more restricted scale in all sections. Although car supply is ample for the needs of most mines there are instances, particularly on branch lines where mines are being handicapped by irregular supply. Production is being maintained largely by contracts, particularly those with the railroads.

Spot business at Birmingham is extremely light. Competition is keen and the smaller producers with no contracts are making some business at low prices. Operating conditions are being maintained in many instances because of contracts with railroads, utilities and industrial plants.

Soft-coal movement from Lake Erie ports during the week ended Sept. 23 were 878,058 net tons, as compared with 843,370 tons the previous week, an increase of 34,688 tons. Dumpings during the corresponding week of 1922 totaled 1,453,684 tons with cumulative shipments of cargo coal during the present season to Sept. 23 amounting to 21,274,219 tons, as compared with 17,690,177 tons in the corresponding period of 1921. There was no anthracite shipped by the Lakes during the week ended Sept. 23, the total shipments during the season to that date amounting to 2,375,212 net tons, which was approximately 1,000,000 tons less than in the corresponding period of 1921.

Anthracite Domestic Coals in Demand

All the larger companies having announced their new schedule of prices for domestic coals, the larger retail dealers at New York advanced their prices 75c. per ton to \$14.25 for the larger sizes. Demand for the domestic coals continues strong, but local retail dealers are not inclined to pay the high prices quoted by some of the smaller producers. While some quotations as high as \$13 were made late in the week the general market ranged between \$12 and \$12.25. Pea coal was easier, while the steam sizes were hard to move at company circular. Shipments are coming forward in fair volume. At Philadelphia consumers are not urging deliveries as strongly as a few weeks ago and in some instances when deliveries are made the coal is refused, the consumer saying he had gotten coal from another source or is in no hurry for it now. Stove and chestnut sizes are mostly in demand. Steam coal movement is slow. Quotations by one retail concern are: Egg, \$15.75; stove, \$16.25; chestnut, \$16, and pea coal, \$12.25. One New York retail concern received a cargo of Welsh anthracite last week which will be sold to consumers at the same price as domestic anthracite.

Car Loadings, Surplusages and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended Sept. 15	1,060,580	171,830		
Previous week	928,858	152,996		
Same week in 1922	937,221	171,460		
Sept. 15, 1923	69,080	19,790	12,245	6,478
Same date in 1922	22,969	17,614		
Sept. 7, 1923	67,651	13,501	10,501	5,595

Foreign Market And Export News

British Coal Prices Show Slight Decline; Market Outlook Better

There was a decrease of 75,000 tons in the coal production of Great Britain's mines during the week ended Sept. 15, a cable to *Coal Age* reporting the output to have been 5,245,000 tons, as compared with 5,320,000 tons the previous week.

Stormy weather seriously interfered with loading and caused losses in mining. Quotations show decreases.

The Welsh coal market is quiet again. The trouble between Italy and Greece, contrary to the general expectation had an adverse effect on the trade by leading to the practical withdrawal for several days of Greek tonnage, due to the fact that underwriters require heavy war risk premiums in respect of Greek steamers and their cargoes.

The situation in the United States anthracite field did not have any material effect on the Welsh market; a few market-testing inquiries coming through. There is plenty of coal of all kinds, the market is decidedly weak but operators indicate advanced figures for forward positions.

Anthracite is scarce and is bringing high prices. Unbroken large is 52s. 6d. per ton, and machine-broken cobbles and nuts 65s.

The Newcastle market is improving. Merchants holding coal are willing to sell at present prices, which show a considerable advance on those of August, but they hesitate about accepting business for October until they see how the market is going to shape.

Little has come of American inquiries, but the European market is expanding and business is brightening. All the best grades of steam and gas coals are heavily booked through this month.

Hampton Roads Prices Low

Business at Hampton Roads last week was slack, with exports dwindling in volume and general movement at the piers falling off. Shippers attributed the dullness to the disposition of consumers to use up supplies they were stocked with in anticipation of a prolonged strike in the anthracite region.

Domestic business showed improvement, while the coastwise trade held its own, with brighter prospects for the immediate future. The bunker business was normal, and showing promise of getting the benefit of the increase in general shipping.

The tone of the market was weak, prices having dropped to a lower level than at any other time this year.

United States August Domestic Coal Exports

(In Gross Tons)			
Coal	1922	1923	
Anthracite.....	28,704	442,475	
Value.....	\$245,701	\$4,812,137	
Bituminous.....	425,530	2,117,084	
Value.....	\$2,880,201	\$10,542,796	
Coke.....	26,121	99,237	
Value.....	\$293,043	\$896,665	
Eight Months Ended			
	1922	1923	
Anthracite.....	1,049,534	3,270,104	
Value.....	\$10,833,068	\$35,443,144	
Bituminous.....	5,091,726	13,566,001	
Value.....	\$27,275,873	\$76,238,000	
Coke.....	220,809	837,240	
Value.....	\$2,025,287	\$9,303,952	

French Coal Market Satisfactory

The French coal market continues satisfactory. Demand for house and industrial coals is fair, with supply of the former below the requirements. Coal dealers in Paris report that their supply of British anthracite is scarcely sufficient to meet the demand, with comparatively little of Belgian and semi-bituminous coals on hand. Deliveries both of French and Belgian coals are slow. It is not expected that prices for French coals will change during October.

The rolling car crisis continues acute and the mines are lacking facilities for loading their daily output. Coal movement in the ports is slow.

During the first ten days of September the S. C. O. F. received 41,822 tons of coke from the Ruhr. Conferences are being arranged for between representatives of the French Government and the Commission for Reparations

looking to a revision of the mode of fixation of German requisitioned coke. Efforts will be made to readjust the prices to be paid for coke.

The Bankers Trust Co. of New York, has received from its French Information Service statistics showing that the production of the Sarre coal mines has been increased about 25 per cent under French administration. In 1919 these mines produced 8,758,356 metric tons and in 1922 this was increased to 10,943,311 tons, according to these statistics.

Export Clearances, Week Ended Sept. 29, 1923

FROM BALTIMORE

For Germany:	Tons
Ger. SS. Eisenach	3,569
For Italy:	
Jap. SS. Baltimore Maru	8,216

FROM HAMPTON ROADS

For Newfoundland:	
Amer. Schr. Lucia P. Dow, for St. Georges	1,453
For Malta:	
Ital. SS. Teresa	3,286
For Spain:	
Nor. SS. Vindegen, for Puerto Tarifa	4,226
For Cuba:	
Amer. Schr. Anna R. Heidritter, for Sagua	945
Amer. Schr. Nancy Hanks, for Cienfuegos	1,772
For Colombia:	
Amer. Schr. Mabel Gale, for Puerto Colombia	1,087
For Virgin Islands:	
Amer. Schr. Stephen R. Jones, for St. Thomas	6,421
For France:	
Br. SS. Skipsea, for Marseilles	3,545

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Sept. 20	Sept. 27
Cars on hand.....	1,255	1,282
Tons on hand.....	71,058	69,763
Tons dumped for week.....	112,753	68,333
Tonnage waiting.....	5,500	7,407
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,816	1,760
Tons on hand.....	107,040	106,150
Tons dumped for week.....	130,026	97,720
Tonnage waiting.....	9,748	7,110
C. & O. piers, Newport News:		
Cars on hand.....	1,897	2,240
Tons on hand.....	98,435	118,675
Tons dumped for week.....	86,822	63,170
Tonnage waiting.....	3,205	2,750

Pier and Bunker Prices, Gross Tons

PIERS			
	Sept. 22		Sept. 29†
Pool 9, New York.....	\$5.25@	\$5.60	\$5.15@ \$5.50
Pool 10, New York.....	4.85@	5.10	4.75@ 5.00
Pool 11, New York.....	4.50@	4.75	4.35@ 4.75
Pool 9, Philadelphia.....	5.30@	5.60	5.30@ 5.60
Pool 10, Philadelphia.....	4.60@	5.15	4.65@ 5.20
Pool 11, Philadelphia.....	4.30@	4.70	4.35@ 4.70
Pool 1, Hamp. Roads.....	5.00@	5.15	4.90@ 5.00
Pools 5-6-7 Hamp. Rds.	4.30@	4.60	4.50
Pool 2, Hamp. Roads.....	4.75@	4.90	4.60@ 4.70

BUNKERS

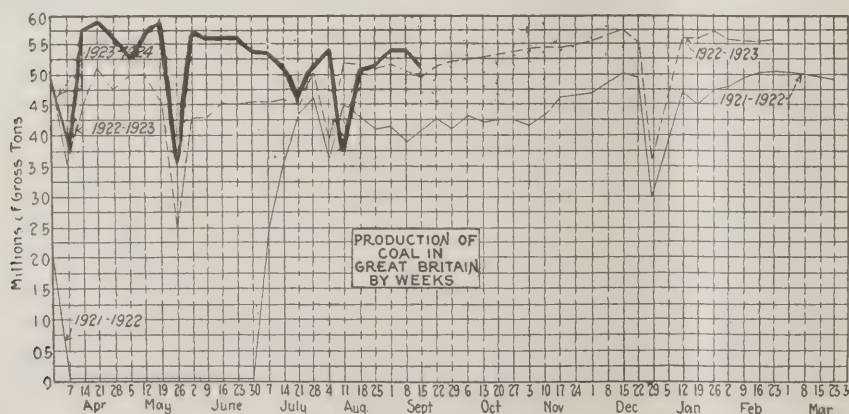
Pool 9, New York.....	5.55@ 5.90	5.45@ 5.80
Pool 10, New York.....	5.15@ 5.40	5.05@ 5.30
Pool 11, New York.....	4.80@ 5.05	4.65@ 5.05
Pool 9, Philadelphia.....	5.60@ 6.00	5.60@ 6.00
Pool 10, Philadelphia.....	5.05@ 5.45	5.10@ 5.50
Pool 11, Philadelphia.....	4.65@ 5.00	4.65@ 5.00
Pool 1, Hamp. Roads.....	5.00@ 5.15	4.90@ 5.00
Pool 2, Hamp. Roads.....	4.75@ 4.90	4.60@ 4.70

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Sept. 22	Sept. 29†
Admiralty, large.....	28s.@ 28s.6d.	28s.
Steam smalls.....	19s.	20s.
Newcastle:		
Best steams.....	24s.@ 24s.6d.	24s.
Best gas.....	24s.@ 24s.6d.	24s.@ 24s.6d.
Best bunkers.....	22s.@ 23s.6d.	21s.6d.@ 22s.

†Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

Convicts employed in the Banner Mines of the Pratt Consolidated Coal Co. staged a strike or riot Sept. 10 during which mining machines, pumps and other machinery in the workings were considerably damaged by being dynamited. The rioters held full sway in the mines for twenty-four hours, during which time production was completely stopped and the output was under normal for several days account of the damaged equipment. The rioting was instigated by white convicts recently sent to Banner from Aldrich Mines and was based on alleged dissatisfaction with the warden and physician, tasks imposed and other complaints. The mining officials have no jurisdiction over the convicts, being worked by the State Board of Supervisors, and are fed, clothed and worked under the complete control of the convict department.

The County Coal Co., with mines in the Cahaba Valley, near Birmingham, on the Central of Georgia Ry., is reported considering the opening of an additional slope and the construction of a washery. Clem Sussong, of Birmingham, is general manager, and William F. Sussong, Carnegie, Pa., president.

The Black Creek Coal Co. is reported to have sold one of its mines at Nauvoo, to the Monroe-Warrior Coal Co., which also will operate another mine of the Black Creek Co. under lease at the same point.

Truck No. 1 of the Birmingham Mine Rescue Station, is now making a tour of the mines and industrial works in the district, giving instructions in mine-rescue and first-aid work. James M. Cobb, foreman, is in charge of the work.

CONNECTICUT

The Norma Company of America has placed contracts for the erection of the first unit of its new plant at Stamford, on a 17-acre plot facing the main line tracks of the New York, New Haven & Hartford R.R., adjacent to Glenbrook Station. The new plant will be equipped to manufacture Hoffmann precision roller bearings, the American rights to which, as well as to all other Hoffmann products, were recently acquired from the Hoffmann Manufacturing Co., Ltd., of Chelmsford, Essex, England. The plant also will be equipped for the expansion of the manufacture of Norma precision ball bearings.

ILLINOIS

A state charter has been issued to the **Miner's Run Coal Co.**, of McIntyre. Its purpose is prospecting for and mining coal and the manufacture of coke. The incorporators are: Fred B. Smith, Blossburg, treasurer; W. Scott Jenkins, Blossburg, and William F. O'Donnell, Morris Run. Each of the incorporators holds 2,500 shares of stock, the par value of which is \$1.

G. Wenselmann, of the Wenzelmann Manufacturing Co., of Galesburg, is about to open a shaft mine on his farm along the Minneapolis & St. Louis Ry. The main office of the mine will be in Galesburg.

As another aftermath of the Herrin massacre the **Southern Illinois Coal Co.**, owners, at the time, of the Lester strip mine near Herrin, is asking for a change of venue for its damage suit for \$175,000 against the County of Williamson. The company says it cannot get a fair trial in that county. Delos C. Duty, state's attorney for the county, has filed an affidavit in reply, saying: "It is my honest belief that a majority of the coal miners or members of the United Mine Workers of America themselves were not and are not in sympathy with the things that were done in and during the so-called Herrin massacre, and the majority of the citizens of Williamson County are not prejudiced against the Southern Illinois Coal Co. to such an extent that it cannot have a fair and impartial trial."

The Atomizing and Reduction Co., of Herrin, recently suffered a loss by fire estimated at \$60,000. The plant has been in operation for about three years and is one of the largest coking plants in Southern Illinois.

Fire caused damage of over \$5,000 recently at the plant of the **Odin Coal Co.** at

Odin. The machinery and equipment of the mine suffered to a large extent and it will be some time before the mine can again be worked. Several hundred men were thrown out of work.

The St. Ellen mine, at O'Fallon, has resumed operations after being idle for over four months. The mine is one of the oldest in the Belleville district and employs 400 men when working with a full crew.

No. 8 mine of the **Madison Coal Corp.**, near Carterville, will be closed down and abandoned in the next few months. The mine is a pioneer in the coal industry of southern Illinois and was operated back in the 90's by Sam T. Brush, of Carbondale, who died over a year ago. During the operation at that time a strike was called by the newly organized union men and Brush hired negro labor and private mine guards and operated the mine. Since that time the shaft has been known as the "Brush riot mine" at Carterville. The company will dismantle and remove all machinery and equipment of value.

The Jefferson Southwestern R.R., 11 miles long, was opened for traffic Sept. 15 when trains from Mt. Vernon were run to Nason, Jefferson County, a new field north of Franklin County, where the two shafts of the Illinois Coal Corp. are down about 500 ft. The coal is approximately 700 ft. deep under the property.

The mine of the Valley View Coal Co. at Coal Valley has started operations again. The mine had been idle practically the entire summer and is now working a full crew of men.

The Chicago Coal Merchants' Association reports the receipt of more voluntary applications for membership during the past few weeks than at any previous like period in its history, as a result of its recent activities among the retail coal dealers of the city. New members in the association as well as old ones, are receiving new membership certificates of handsome design, engrossed and bearing a gold seal.

The extensions at Mine No. 4 of Donk Brothers Coal & Coke Co. which have been in progress for several months to complete the mine as originally proposed are about completed. The mine has been running three days a week, hoisting 2,000 tons daily through the airshaft. The output will be increased to 3,500 tons as soon as the main shaft is finished and gradually increased as the mine is developed.

J. C. Core, with new offices in the Continental & Commercial Bank Building, Chicago, has been appointed sales agent for the St. Louis Coal & Iron Co., with Chicago and vicinity as his territory.

Fred Trubger, formerly mining engineer with the Southern Gem Coal Corporation, with headquarters in Pinckneyville, is now working as assistant to chief engineer White of the Union Colliery Co., at Dowell.

W. G. Hughes Coal Co., Chicago, has been incorporated with a capital of \$30,000 to deal in coal mines; incorporators, C. I. Abbat, W. G. Hughes and K. R. Leva.

Plans are being considered for erecting a "coal palace" at the state fair. The "palace" would be erected in order to advertise the huge coal resources of Carbon County, which has one of the largest deposits of bituminous coal in the world.

Incorporation papers have been filed at Springfield for the **Chicago Williamson Coal Co.** The capital stock is \$10,000. The company will engage in buying, selling and mining coal and other fuel. W. M. Stephenson, J. S. Bash and William J. Bash are the incorporators.

The Pigeon Creek Coal Co. has removed its general offices from Chicago to Booneville, Ind. W. R. Bootz has been elected secretary-treasurer of the company. He succeeds W. F. O'Shea who resigned recently.

Bertram E. Safford, formerly assistant to Charles R. Campbell, sales manager for the John A. Logan Coal Co., has been appointed manager of the Phoenix Coal Co. with headquarters in the Plymouth building, Chicago. The latter company is owned by Pratt Brothers, of Minneapolis.

The mine of the Pratt Bros. Coal Co., near Herrin, commonly called the Jeffrey Mine, during the month of July hoisted more than 52,000 tons, a record for the shaft. The mine employs approximately 500 men. Other mines in the same district are working from one to three days per week and some not at all.

The O'Gara Coal Co. has prepared a 250-ft. motion picture film for display to the public through the agency of the retailer. The picture follows the mining process through the various steps of under-cutting, loading, mule haulage to the main line, motor haulage to the bottom and hoisting. Preparation is then shown over the screens, the picking tables and loading booms and into the railroad cars.

INDIANA

Bronze medals have been received by the Terre Haute Humane Society for the two men who several weeks ago saved the life of the pony, Rex, which had been confined in a mine cave-in at Bicknell for ten days. Hope of saving the pony was abandoned by the rescue crew because it would be necessary to enlarge the hole through which the men escaped. Corn and oats had been supplied to the pony through the same pipe through which the entombed men received their food while in the mine. The larger medals are to be awarded to William Thurston and John Cottrell, two of the rescued miners, who, on learning that the rescue crew had given up hope of saving the pony, set about to rescue it and succeeded. Smaller medals, given by the American Society for the Prevention of Cruelty to Animals, were received for Ralph Manson, Peter Brown, Edward Reister, Lon Crawford and William Bailey, who assisted in the work.

The Modern Fourth Vein Coal Co. has been incorporated with a capital of \$350,000 to mine and deal in coal at Jasonville. The directors of the company are John Williams, T. G. Williams, C. W. Wenner, W. C. Clifford, F. W. Adams, O. H. Finnical and F. B. Grove.

KENTUCKY

B. Blenkinsopp, State Mine Inspector, in a recent report, stated that 30 per cent of the state mines were down. The semi-annual report, issued Aug. 7, showed that during the first six months of 1923 a total of 18,424,599 tons of coal was produced, as compared with 17,267,132 tons last year in the same period. Harlan County, or District No. 5, led with 3,888,472 tons, with 83 mines in operation, employing 8,131 men. District No. 6, comprising Lecher, Knott and Perry counties, produced 3,204,656 tons in 127 mines. Eight thousand more men are employed this season than last at the same time, there being 56,447 men employed, as against 48,000 last year. The report states that 69 mines have been abandoned or shut down temporarily this year, and the average number of days worked is 54 as compared with 69 for the first six months of 1922.

The Democratic party in Kentucky on Saturday, Sept. 8, nominated William Jason Fields, of Mt. Olivet, Carter County, to run for Governor, to succeed J. Campbell Cantrill, who died after receiving the nomination. The new nominee has been in Congress for 10 years as Representative from the Ninth district of Kentucky. It is understood that he will carry out the late Mr. Cantrill's platform, which was not antagonistic to the coal interests of the state. Charles I. Dawson, Republican nominee, also is favorable to the coal interests. Considerable interest is manifested by coal men in the nominations, as it is well understood that a hard fight will be made before the next Kentucky Legislature, early in 1924, to place a production tax on all coal mined in the state.

The Pacific Coal Co., Louisville, capital \$20,000, has been incorporated by C. D. Glass, Walter S. Lapp and J. E. Miller. Mr. Glass has been well known in the Louisville and western Kentucky districts as a coal man for years.

W. M. Jones, of Huntington, W. Va., H. B. Jones and W. S. Hamilton, Louisville, represent a syndicate that has recently bought the **Kentucky, Rockcastle & Cumberland R.R.**, running from Heidelberg, Ky., about 28 miles through Lee, Jackson and Owsley counties of eastern Kentucky. The road was originally built to reach 27,000 acres of timberland of the Turkey Foot Lumber Co. It will be extended a quarter of a mile to the Kentucky River, where loading docks will be installed so that transfer can be made to barges for movement to Louisville and Cincinnati, and a large rail and water coal movement will be developed.

The Rockport Coal Co. of Rockport, is planning to shut down soon to install additional screens and loading booms, and while down will install concrete foundations for a crushing plant.

The Turner Elkhorn Coal Co., of Lexington, capital \$100,000, has been chartered by Joseph S. Claybrooke, John I. Claybrooke and James R. Claybrooke.

The Dawson Daylight Coal Co., of Louisville, headed by K. U. Meguire, of the Harlan Coal Co., is planning a fine operation near Dawson Springs, which will have a modern five-track tippie rated at 300 tons an hour. Contract has been let for the tippie which has been designed and will be equipped by the Morrow Manufacturing Co., of Wellston, Ohio, and with its five-track arrangement will be able to produce all the sizes now made in Franklin County, Illinois. It will be equipped with a complete washery, picking tables, two loading booms, a crushing outfit, etc.

A gift of \$1,000 to the student loan fund of the University of Kentucky has been made by the West Kentucky Coal Co., of which C. F. Richardson is president.

The Kentucky State Federation of Labor at a meeting in Frankfort last week adopted resolutions in an effort to aid the union miner, these resolutions calling on all union men to demand union-mined coal and use their influence in developing a consumption of union mined coal only.

The See See Coal Co., of Pineville, capital \$75,000, has been incorporated by R. I. Cawthorne, Lottie E. Cawthorne and E. R. Martin.

With a capital of \$100,000, the North Star Coal Co., Madisonville, has been incorporated by L. C. Oliver, E. A. Oliver and L. P. Sisk.

The Westchester Coal Co., Island, capital \$125,000, has been incorporated by I. G. Reynier, Abraham Shapiro, and Lerbert L. Spitzer.

MARYLAND

Because of the unsettled labor conditions in the Gorge's Creek region, Abell Wolman, chief engineer of the State Health Department, has withdrawn his engineering force temporarily from the study of the sanitation problems. The Health Department's mission in this region for the last nine months has been to create sentiment for the support of a district water and sewerage system which would serve the entire area. The representatives of Mr. Wolman's department had held several meetings in the district and had gained considerable support before the labor situation became acute.

MINNESOTA

A series of recommendations has been made by a committee in Minneapolis of the American Federated Engineering Societies, relating to the coal problem and how to solve it. The committee sees in coal storage and summer movement, a big relief to the present difficulties of car shortage and congested demand. The committee sees the need of financing aid which could be done through a financing agency, warehousing committee or the municipality itself.

MISSOURI

Ernest R. Sweeney, member Gray-Bryan-Sweeney Coal Co. of Kansas City, is still missing. He disappeared Aug. 30. Hope for his return has virtually been abandoned by friends and relatives, although no effort has been made to close his estate. Ben R. Sweeney, a son of the missing man, has posted a \$500 reward for authentic information as to Sweeney's whereabouts or the recovery of the body.

Drillers testing for oil south of Chilli-cothe on Sept. 21 passed through a fourth stratum of coal, making a total of 22 ft. passed through in the last 170 ft. of drilling. The various depths are: at 360 ft. a 6-ft. vein; at 378 ft. a 3-ft. vein, both of fine grade bituminous; at 443 ft. a 7-ft. vein of semi-anthracite and at 524 ft. a 6-ft. vein of semi-anthracite. Geological surveys indicate the coal area in this field extends over 4,000 acres two miles in length. Recently a fine grade of rock asphalt was found in that section.

A state charter has been issued to the Jenkins Fuel Co., Plainsville, with a capital stock of \$8,000. The purpose of the company is to mine, wash and prepare anthracite. The incorporators are John E. Monahan, treasurer; Michael J. Piernock and Stephen G. Piernock, all of Plainsville.

The Big River Coal Co., St. Louis, has been incorporated under the laws of Missouri for \$6,000. The incorporators are A. B. Jefferis, L. M. Jefferis and J. R. Van

Slyke. The company will produce, prepare, buy and sell coal.

The Pennsylvania Smokeless Coal Mining Co., Ebensburg, has been incorporated at Harrisburg. This company has a capital stock of \$150,000 and its purpose is to mine, sell and ship coal. The incorporators are E. M. Burns, William M. Smith and Philip N. Shettig, all of Ebensburg, and Walter D. Brown, Ebensburg, is treasurer.

NEBRASKA

Governor C. W. Bryan of Nebraska, who announced on Sept. 13 that he had gone into the coal business not only for his own but any other state, declared that with the help of the people they can save \$15,000,000 in Nebraska alone, which the "coal combine" has been heretofore taking out of the state. He further announced that he would do all possible to break "the national combine." The Governor declared that while it was the duty of the federal administration to take a hand in lowering coal prices, it was not doing so, and that the State of Nebraska would take the matter in hand, so far as that state is concerned, ultimately extending any aid to other states if requested. The Governor is buying coal at the mine at \$3 a ton, and he had announced previously that it will be sold at this price, which includes 25c. margin for freight rates and handling.

NEW YORK

Through a certificate filed in the office of the Secretary of State at Albany by Wellman, Smyth and Scofield, New York City, the name of the O'Brien-Cuttle Coal Corporation of Manhattan Borough has been changed to the O'Brien Coal Corporation.

The following important changes in the branch offices of the Maher Collieries Co., of Cleveland, have been given out: F. B. Shondell, salesman at Buffalo, has gone to Toledo to open an office for the company; O. E. Southard remains manager of the Buffalo office; David Price, traveling agent, is establishing an office for the company in Cincinnati; Ross C. Wheatly, formerly soliciting agent of the Toronto, Hamilton & Buffalo Ry., will open an office for the Maher company in Hamilton. The company produces upward of 150 cars of bituminous coal a day.

G. N. Wilson, president of the Lehigh Valley Coal Sales Co., New York City, returned Sept. 21 from a month's vacation in Europe.

The Coal Hill Mining Co. of Pennsylvania, has filed a duplicate certificate of incorporation in the office of the Secretary of State and will enter New York State with its principal office at Binghamton. The corporation will deal in coal and coke.

Mortimer E. Cooley, president of the Executive Board of the American Engineering Council of the Federated American Engineering Societies, has announced that the coal problem will be among the subjects discussed at a meeting of engineers to be held at Rochester, Oct. 12 and 13. Of chief interest will be a report of the Federation's committee on coal storage, which has been conducting a study in co-operation with 107 local committees all over the country.

OHIO

A new issue of \$1,275,000 first mortgage 6 1/2 per cent gold bonds of the Maher Collieries Co. is being made. The bonds are dated Aug. 1, 1923, and mature in equal annual instalments of \$85,000 on Aug. 1, 1924, to 1938, inclusive. The 1924 and 1925 maturities are offered on a basis to yield about 6 1/2 per cent, and 1926 to 1938, inclusive, on about a 7 per cent basis. The properties of the Maher Collieries Co. are situated in Belmont County, and consist of about 7,000 acres of coal lands. The property has six mines. The proceeds of the sale of the bonds will be used to retire current indebtedness, for additional working capital for the development of the property and that of the subsidiary, the Marcoll Coal Co.

The Supreme Coal & Coke Co., of Cleveland, has been chartered with an authorized capital of \$10,000 to mine and sell coal and to deal in coke. Incorporators are Donald Kennedy, Ellen F. Kennedy, Thomas M. Kennedy, Jr., B. J. Cummings and T. M. Kennedy.

A fire in the large storage pile of the Philadelphia & Cleveland Coal Co. at Groveport, is causing some concern among officials of that company. The fire developed several weeks ago and is not yet under control. The pile consists of about 100,000 tons of screenings which is near the power plant of the Columbus Railway, Power & Light Co. The company has stopped the purchase of slack temporarily as a result of the fire.

PENNSYLVANIA

The Philadelphia & Reading Coal & Iron Co. is planning the erection of a new anthracite washery near Shamokin.

The Pennsylvania Coal Co. has purchased between 250 and 300 vacant lots in the Green Ridge section of Scranton. Underlying the surface are vast deposits of anthracite, which the company is understood to have plans for mining after the top veins have been exposed by stripping operations.

Work has been resumed at the Audenreid Mines of the Lehigh & Wilkes-Barre Coal Co., where the men had been on strike for more than a week, due to a dispute over the split plan proposed by the company. The order to return to work was issued Sept. 28 after a meeting of the local union. The return is at the direction of the board of conciliation, which ruled that in all cases where there have been suspensions owing to disputes over contract terms the men should return and have their cases adjusted by that body. About 1,800 men were affected.

The Jordan Valley Coal Co. started active operation with fully equipped heavy steam machinery Sunday, Sept. 2. A basket picnic was held on the property between Arlington and Granite Falls.

Members of the Scranton School Board have voted to purchase from the Se-Rob Coal Co. the coal under No. 19 school for \$7,333.75. Recently the company offered to sell its right to the coal to the school district for \$9,872.85. As a result of conferences with the owners this figure was reduced \$2,530.10.

It is said that negotiations are under way for the purchase of the Manown and Gallatin mines, located on the Pittsburgh & Lake Erie R.R. in Allegheny County, following an inspection of the property by J. H. Laughlin, an agent for the Independent Coal & Coke Co., of Pittsburgh. Both mines operate tipples on the Monongahela River.

The first wage scale in central Pennsylvania for men running underground loading machines became effective recently. Machine operators are getting \$7.60 a day and helpers \$7.50. This scale was worked out primarily for two Myers-Whaley machines now doing entry loading for Peale, Peacock & Kerr in the Ellsworth-Dunham Coal Co. mine at Arcadia.

Michael Delopvich, a miner, was paroled by Judge Fuller at Wilkes-Barre after being sentenced to serve one year in jail on an assault and battery charge. He told the judge that he was a good miner and was anxious to go to work as he had been idle for a long time. The judge released him on the condition that in case another strike was called that he report to court prepared to go to jail and serve sentence until work was resumed. The miner was glad to make the promise and walked out of the court house in a happy frame of mind.

Another effort, it is announced, will be started soon to extinguish the burning coal mines at Summit Hill and save the veins not already destroyed by the fire which has raged there for more than 65 years. The Drake Drilling Co. plans to sink 10-in. holes into the burning mines through which culm will be flushed. This will at least cut off air channels through which the fire might reach the Nesquehoning workings, as the flames have recently broken out anew between the Summit Hill No. 6 colliery and the Nesquehoning.

TENNESSEE

An application for an amendment to the charter of incorporation of the Kelley's Ferry Coal Co., increasing the capitalization from \$20,000 to \$25,000, has been filed in the County Court clerk's office at Chattanooga. The incorporators are A. W. Kelley, W. J. Nixon, F. L. Martin, G. W. Nixon and W. H. Pryor.

It has been announced that Pittsburgh capitalists have purchased 10,000 acres of virgin coal lands from the Wedensia Coal Co., west of Rockwood, and that options have been acquired on about 50,000 acres of coal properties owned by the East Tennessee Iron & Coal Co., and located in Campbell County. These options have several months to run before date of expiration. In the meantime abstracts of titles are being made, and other investigations are under way. Developments indicate that the options will be closed, and that not less than \$2,000,000 will be expended on the Campbell County tract alone.

It is also understood that about \$1,000,000

is involved in the purchase and proposed development of the coal lands near Rockwood. The plans for this are understood to be formulating, and work of construction on some of the new industries may begin at an early date.

TEXAS

W. C. Dodd, of Malakoff, has acquired the Crockett lignite mine, near Como, and will develop it.

VIRGINIA

D. M. Thornton, president of the Norfolk-Portsmouth Freight Traffic Commission, has resigned, and his successor has not been named.

Ellis Searles, of Washington, editor of the *United Mine Workers' Journal*, addressing the Norfolk Monday Club, declared the miner wants better wages, better living conditions, and to become a better American citizen. He declared government interference prolongs the settlement of differences between miner and operator, with consequent maladjustment of the coal situation.

WASHINGTON

Halbom & Stridell, of Kelso, are developing a coal mine on the Bingham place, southwest of Castle Rock, where a vein of excellent coal has been uncovered.

WEST VIRGINIA

The report of the State Department of Mines covering the fiscal year ending June 30, 1922, which has just come from the press, shows that the **total coal production in West Virginia for the period covered was 70,888,208 gross tons**, a decrease of 9,873,203 gross tons, or 12.23 per cent, as compared with production during the previous year. The total value of coal produced in the fiscal year ending June 30, 1922, was \$180,764,917.65. The value of all coke sold was \$1,026,414.16. Only 175,156 net tons of coke was manufactured in West Virginia during the period ending June 30, that representing a decrease of 661,572 net tons, or 79.06 per cent.

Coal concerns recently dissolved and the charters of which have been surrendered are as follows: **W. E. Griffiths Coal Co.**, **Sullivan Coal & Coke Co.**, **Pigeon Creek Mining Co.**, **Hess Coal & Coke Co.**, **Beckley Fire Creek Coal Co.**, **Maryland Coal Mining Co.**, **Big Vein Pocahontas Co.**, dissolved by decree of bankruptcy filed with Secretary of State.

W. J. Quinn has withdrawn from the Merrimac Fuel Company, of which he was vice-president, and will form other connections at Huntington.

An action has been instituted in the Circuit Court of Kanawha County by the **Holden Collieries Co. against the Boone County Coal Corporation** for the recovery of \$6,745.61 which the plaintiff claims is the difference between the contract rate for power the defendant agreed to furnish and the rate allowed by the Public Service Commission.

Pending repairs and improvements **No. 1 mine of the Rosedale Coal Co.**, in the Monongalia County field, has been shut down and during such suspension contracts for output will be handled from the No. 2 plant of the company, which has just resumed operations after having been shut down for repairs. It is desired to make changes in the power system and to move the motor generator plant to a new location.

Water from the bed of Decker's Creek broke through a heading and **flooded the Bretz mine of the Bethlehem Mines Corporation** at Bretz, near Masontown, late in September, causing damage estimated at \$100,000.

The **New River Company**, one of the heaviest producers in the New River field, in which New England capitalists are largely interested, have begun the publication of the *New River Company Employees' Magazine*, devoted to the interest of employees. This magazine is published at Macdonald, general headquarters of the company in West Virginia, the first issue appearing late in September. The company has adopted the policy of inserting "suggestion" sheets in each copy so that employees may be in a position to make safety-first suggestions.

That three miners were killed Sept. 24 in an explosion at the Bentwood Mine of the Wheeling Steel & Iron Co., at Wheeling,

became known when the bodies of **Joseph Birrello**, **Michael Corda** and **J. J. Carskaden**, the latter a fireboss, were found buried beneath tons of coal and stone.

The report of the State Tax Commissioner covering the operation of the gross sales tax in West Virginia for the fiscal year ending June 30, 1923, shows that of a total of \$2,938,932.90 collected in the fiscal year the coal industry paid \$1,219,724.11, or 41.50 per cent of the total collected. In the year ending June 30, 1922, the first year the gross sales tax was in effect, the coal industry paid a total of \$681,196.32, or 34.94 per cent.

Having recently purchased the holdings and plant of the Rivesville Coal Co., in the Marion County field, the **Edward Hines interests, of Chicago**, are now engaged in perfecting plans to install up-to-date machinery that will make it possible to increase the capacity of the plant from 600 to 2,000 tons per day. Increased trackage and siding room will be provided, the Baltimore & Ohio having agreed to install additional crossovers. The Hines interests control practically 1,000 acres of Sewickley coal in the vicinity of the Rivesville plant, much of which they bought at the time the purchase of the mining plant of the Rivesville Coal Co. was consummated.

The **J. D. Boone Coal Co.** recently began operation near Kanawha Falls in the New River field, but the principal office of the company will be at Fayetteville, in Fayette County, where offices are being fitted up for **James D. Boone**, superintendent of the company and other officers.

A mine fire at fan plant No. 35 of the Consolidation Coal Co., on the West Fork River near Watson, threatened to do a good deal of damage late in September, but was extinguished within a period of 24 hours through the prompt and efficient work of fire-fighting forces under the direction of **C. H. Tarleton**, manager of the West Virginia Division of the company, and **Frank Haas**, consulting engineer.

WISCONSIN

Governor John J. Blaine of Wisconsin has directed the division of markets of the state to make a searching inquiry into coal prices and profits, and methods of coal marketing. The inquiry will be particularly directed towards a marked difference in anthracite prices in favor of the Duluth market as against Lake Michigan ports, more particularly Milwaukee, which is a large coal-receiving port with excellent harbor and superior coal handling facilities. It is held that Milwaukee is being charged on the basis of the all-rail haul, when the much cheaper lake-and-rail rate should apply.

The **Smith Wrecking & Salvaging Co.**, of Milwaukee, is engaged in recovering about 3,000 tons of anthracite from the wreck of the steamer **Frank O'Conner**, which burned and sunk off Cana Island, Lake Michigan, several years ago. The coal lies in 60 ft. of water.

WASHINGTON, D. C.

The railroad relations committee of the **National Coal Association** for the coming year is as follows: **W. L. Andrews**, vice-president, Consolidated Coal Co., Baltimore; **D. H. Barger**, president, Smokeless Coal & Coke Co., Shawsville, Va.; **C. D. Boyd**, traffic manager, Hazard, Harlan and Southern Appalachian Coal Operators' Association, Louisville; **J. S. Brennan**, secretary, Somerset County Operators' Association, Somerset, Pa.; **A. W. Calloway**, president, Davis Coal & Coke Co., Philadelphia; **George H. Francis**, secretary, Keystone Coal & Coke Company, Greensburg, Pa.; **C. S. Garland**, superintendent of transportation, Hillman Coal & Coke Co., Pittsburgh; **C. J. Goodyear**, acting commissioner, Pittsburgh Coal Producers' Association, Pittsburgh; **S. C. Higgins**, secretary, New River Coal Operators' Association, Mt. Hope, W. Va.; **D. F. Hurd**, secretary, Pittsburgh Vein Operators' Association of Ohio, Cleveland; **S. Pemberton Hutchinson**, president, Westmoreland Coal Co., Philadelphia; **C. H. Jenkins** (chairman), vice-president, Hutchinson Coal Co., Fairmont, W. Va.; **John S. Jones**, president, Sunday Creek Coal Co., Columbus, Ohio; **E. C. Mahan**, president, Southern Coal & Coke Co., Knoxville, Tenn.; **W. J. Manley**, traffic manager, Logan Coal Operators' Association, Logan, W. Va.; **F. M. Manson**, traffic manager, W. J. Rainey, Inc., New York; **J. B. Pauley**, vice-president, J. K. Dering Coal Co., Chicago; **C. F. Richardson**, president, West Kentucky Coal Co., Sturgis, Ky.; **F. A. Sweet**, president, Stand-

ard Coal Co., Salt Lake City, Utah; **Jonas Waffle**, secretary, Indiana Coal Traffic Bureau, Terre Haute; **C. E. Warner**, traffic manager, Southwestern Interstate Coal Operators' Association, Kansas City, Mo.; **A. R. Yarborough**, traffic manager, Kanawha Coal Operators' Association, Charleston, W. Va.; **S. L. Yerkes**, vice-president, Grider Coal Sales Agency, Birmingham, Ala.

CANADA

The coal production of **British Columbia** during August totaled 222,296 tons, an increase over July output of 9,489 tons, an over June of 36,136 tons. May production was 59,984 tons lower than that of August. Mines on Vancouver Island produced 135,947 tons in August, a little over 61 per cent and 3,316 tons more than July. The Nicola Princeton mines produced 21,591 tons, an increase of 4,870 tons and nearly 10 per cent of the total production. The Crow's Nest Pass district produced 64,758 tons, an increase of 1,303 tons and approximately 29 per cent of the total for the Province.

Engineers and construction men of the **Dominion Coal Co.** are bending every effort to hasten to completion the huge steel bankhead which is in course of erection on the tableland known as O'Neill's Point jutting out seaward near Bridgeport. The shaft of the new mine, known officially as Dominion No. 1B, was completed some weeks ago. The company also is sinking another shaft at Lingan.

The strike of about 1,000 coal miners at Drumheller, Alta, which began Aug. 30, is over. The men returned to work Sept. 18 in accordance with the order of the district officials of the union, who declared the strike unauthorized. The trouble arose over the attempted introduction by the miners of the O. K. list system, under which all men taken on by the operators must be O. K'd. by the union before going to work. An investigation as to alleged discrimination against men will be held.

An effort by Attorney General Nickle of Ontario to induce the Canadian National Railways to increase the 10,000-ton maximum of coal shipments from Alberta under the \$7 freight rate has proved unavailing. Sir Henry Thornton definitely stated that the 10,000-ton allotment would be the limit and that the \$7 rate would cease at midnight Oct. 31.

R. M. Young, commissioner of the Western Canada Coal Operators' Association, states that information has been received to the effect that promoters were endeavoring to establish coal companies in Ontario for the importation of Alberta coal, stating that by purchasing stock, subscribers could have coal laid down in Ontario at \$11 per ton. It is not necessary, said Mr. Young, for anyone to take shares in a company to obtain Alberta coal, as the operating mines are fully adequate to provide tonnage for any market that may open in Ontario, and he did not know of any place in Alberta where coal could be produced and sold f.o.b. cars at \$2, which is what a laid-down price of \$11 at Ontario points would mean.

D. H. McDougall has resigned his position as vice-president of the British Empire Steel Corporation after having been for 20 years associated with the constituent companies of that organization, his contract with the Nova Scotia Steel & Coal Co., of which he was formerly president, having expired.

In pursuance of the policy of putting coke on the market as a substitute for American anthracite for domestic use the **British Empire Steel Corporation** has appointed **Frank Lucas** head of the department for the sale of coke. Mr. Lucas has had wide experience and is an expert in the work of analyzing coal and coke.

Available statistics show that during the month of August the Sydney Mines collieries produced 84,900 tons of coal, the biggest output in the history of the Scotia pits. The near-approach to this figure was made in November, 1909, when 81,000 tons were hoisted to the surface. The 99,000 mark might have been exceeded had there not been delays in shipping, etc. This is a noteworthy performance in view of the fact that the areas at Sydney Mines are submarine, and are also the oldest mine workings in the Dominion of Canada.

A ruling of the Department of Excise and Customs at Ottawa, just issued, declares that in the matter of lignite and lignite coal dust, which are now admitted into Canada duty free, such coals are now to be defined as having not less than 6 per cent moisture content on the air-dried basis. Lignite coal, it is declared, includes all grades lower than true bituminous.

Obituary

Edmund Cobb Morgan, a noted inventor of coal-mining machinery, died suddenly July 13, 1923, of heart failure at his home on Riverside Drive, in New York city. Mr. Morgan was born in Ashkum, Ill., in 1867. When about 21 years of age he obtained a position with Elmer A. Sperry, assisting in the development of an Electric pick-mining machine. This work inspired him to make an improvement of his own on a pick machine. Mr. Morgan started as a pioneer in the electric mining-machine field and was responsible for the development of the first Morgan-Gardner mining machines. Later he developed an electric mine-haulage system and built a large factory in East Chicago. Later he formed the American-Morgan Co. for the purpose of building coal-mining and loading machines. During the last fourteen years of his life Mr. Morgan's time was devoted almost exclusively to the development of coal-mining machinery, particularly the combined coal-mining and loading machine. He had several applications for patents on coal-mining machines and systems in course of preparation at the time of his death. He is survived by his wife, a daughter, two sisters and a brother.

Frank E. McChesney, one time coal dealer in Troy, died suddenly at his home Sept. 19. Mr. McChesney was born in Brunswick, Rensselaer County, and came to Troy when a young man and became associated with the John Worthington Coal Co. He later purchased this business and conducted it for five years, sold out to Craver, Cowee & Baxter and entered the firm of the Great Eastern Storage & Warehouse Co., being treasurer of the company for a number of years. For the last few years he had been connected with the teaming and trucking business of Samuel E. Jordan, Troy.

T. H. Friel, a pioneer in the development of coal mining in the Birmingham district, died from an attack of heart trouble Sept. 13. Mr. Friel was widely known and at the time of his death was operating a mine in the Blue Creek district. He was 62 years of age and was serving as Mayor of North Birmingham at the time of its absorption by the greater city.

John L. Mitchell, former Cambria County (Pa.) coal operator and at one time owner of the Pennsylvania Coal & Coke Co. operations in Cambria County, died in a Chicago hospital recently. His home was at Royalton, Ill., where he had been connected with extensive coal operations, being one of the leading operators in the Middle West. He was 74 years old.

Recent Patents

Washer for Classifying Coal, etc. Lucien Malecot, Grand Croix, France; 1,462,418. July 17, 1923. Filed March 8, 1922; serial No. 542,069.

Coking of Coal. Stewart Roy Illingworth, Brynffedwen, England, assignor to Illingworth Carbonization Co., Manchester, England; 1,426,576. July 24, 1923. Filed Aug. 29, 1921; serial No. 496,743.

Spiral Separator. Frank Pardee, Hazleton, Pa., assignor to the Anthracite Separator Co., Hazleton, Pa.; 1,462,618. July 24, 1923. Filed Oct. 10, 1921; serial No. 506,755.

Mining-Machine Bit. Newton K. Bowman, Bowdli, Ohio; 1,462,681. July 24, 1923. Filed Dec. 15, 1921; serial No. 522,578.

Clamshell Bucket Operating Mechanism. Samuel O. Nafziger, Goshen, Ind.; 1,463,090. July 24, 1923. Filed Oct. 7, 1920; serial No. 415,248.

Association Activities

At a recent meeting of the St. Louis Coal Club two new members were admitted to membership and the following committees appointed for the ensuing year: Finance, Stanley Clark, F. W. Howell, H. G. Trier; sick, C. M. Snow, J. J. Connell, C. V. Beck; legislative, E. J. Wallace, Hubert Hoffner, F. L. Keightley; membership, A. W. Loomis, John Dearness, W. E. Bridges; entertainment, J. A. Jeffries, A. H. Beddoe and Homer McDonald.

Smokeless operators of southern West Virginia held their first meeting since June in Washington a few days ago. There was a large attendance, all the smokeless fields being well represented. In view of possible

changes in rates from Pittsburgh territory, transportation matters were considered of paramount importance. The belief was expressed that if rates should be rearranged from Pittsburgh territory, as requested by Pittsburgh operators, it would have the effect of zoning smokeless coal out of many of the Western markets and steps were taken to combat the move. The association elected a special committee consisting of G. H. Caperton, of Charleston, chairman; O. M. Deyerle, of Bluefield; P. M. Snyder, of Mt. Hope, and Justus Collins, of Charleston, to draft appropriate resolutions in connection with the death of Charles C. Beury, of Charleston, one of the founders of the organization.

Publications Received

Foundry Work. By R. E. Wendt, head instructor in foundry practice, Purdue University. Pp. 206; 5x7½ in.; illus. Price, \$2. In three parts. Part I covers fundamental principles of foundry work, the sizes and types of blast furnaces and the making of pig iron; part II provides instruction for practice in moulding, core-making and other parts of foundry work; part III describes the mixing and melting of metals. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

Mechanics of Machinery—Part I. By Robert C. H. Heck, professor of mechanical engineering, Rutgers College. Pp. 508; 6x9 in.; illus. Price \$5. The first part of a two-volume treatise covering the whole field of motions and forces in machines. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

Explosives. Census of Manufactures, 1921. Bureau of the Census, Washington, D. C. Pp. 10; 6x9 in.; tables. This report covers those concerns engaged primarily in the manufacture of explosives; it does not include those specializing in cartridges, detonators, fuses, etc.

Twenty-eighth Annual Report of the Mineral Resources of Tennessee. Department of Labor, Division of Mines, Nashville, Tenn. Pp. 135; 6x9 in.; illus.

The Department of Forests and Waters at Harrisburg, Pa., announces that a 28-page bulletin of the Coal Beds of Northern Somerset County, Pa., prepared by James D. Sisler of the State Geological Survey, is now ready for free distribution. The bulletin contains 36 analyses of various beds in different districts. The coal is valued highly for generating steam and for domestic fuel.

Traffic News

Milwaukee coal dock companies are jubilant over the decision of the Interstate Commerce Commission, upholding the system of group railroad rates established by the Wisconsin Railroad Commission. The report, which holds that the rates for intrastate transportation of soft coal from Lake Michigan docks are not prejudicial to Illinois mine operators, which has met the approval of the Commission's examiner, must yet be formally adopted by the entire Commission, but this usually is only a formality. Milwaukee dock men hold that if the plea of the Illinois coal men had prevailed, distribution from Milwaukee coal docks would have been cut down fully 50 per cent. At present Milwaukee distributes from 3,500,000 to 4,000,000 tons of coal a year. Not only does the decision protect Milwaukee's prestige as a coal distributing center but in the opinion of a leading dock man it saves soft-coal consumers about \$100,000 annually by giving them the benefit of competition between Illinois coal fields and lake distributing points.

A decision reached by several coal-carrying roads and made public at Chicago Sept. 24 to treat as empties all unbilled coal cars at mines in the daily allocation of cars may force many coal mines in Illinois, Indiana and western Kentucky to close. A slight car shortage in some of the producing fields and an accumulation of "no bills" at the mines were given as the cause. Most of the operators have sizes under lump in cars at the mines which cannot be moved because of a lack of orders. Heretofore, railroads have permitted producers to hold coal for billing without counting the cars on track against the shippers in furnishing cars for the daily run.

Reduced local coal freight rates on the three railroads entering Charleston became effective on Sept. 17. The reductions range from a high rate of \$1.26 to a minimum of

88c. from the plants in the various regions adjacent to Charleston to the industrial plants in the Charleston industrial district. S. P. Puffer, secretary of the Chamber of Commerce of Charleston, estimates that Charleston industries will be able to effect a saving of \$60,000 a year as a result of the reduction.

In an effort to avoid ordering a surplus number of cars for assignment to mines, mine owners in the Kanawha field have been asked by the Kanawha Operators' Association to order only such equipment as can be loaded out promptly; to give sufficient time to the car-distribution department where any certain class of equipment is required, to enable the car distribution department to assemble such equipment; to load all foreign cars placed at the mine in accordance with car-service rules; to advise the local car distributor on such days as mines order and are supplied more equipment than they are in a position to load so that the excess number of cars may be redistributed to mines in a position to load them on the same date. These instructions are in accordance with the policy of co-operation pledged at a meeting held on Aug. 16 at Huntington between the operators, representatives of the American Railway Association and officials of the Chesapeake & Ohio when it was agreed by representatives of four associations served by the C. & O. that they would co-operate with that line to the fullest extent in seeing that foreign-line equipment was loaded in the direction of the home line or if destined beyond that the home line could participate in the haul. As a means of reducing the number of empty cars left over daily at the mines the C. & O. has arranged to have continuous service in effect in the office of car distributors at Thurmond, Handley, St. Albans, Logan and Ashland.

Questions involved in the traffic case of the Larsen Coal Co. and the Domestic Coal Co. against the Michigan Central Ry. Co. and the Big Four Ry. Co. will be considered at an Interstate Commerce Commission hearing, to be held at Indianapolis, October 25. Examiner Carter will preside.

The North Carolina Corporation Commission is opposed to leasing the Carolina, Clinchfield & Ohio R.R. to the Atlantic Coast and the Louisville & Nashville or the Seaboard Air Line, believing that it should be made part of a "comprehensive system of railroads" serving the state.

A new railroad to be built in Monongalia County, West Virginia, by the Edward Hines interests, of Chicago, will make it possible to develop between 10,000 and 12,000 acres of Sewickley and Pittsburgh coal in the Indian Creek section of the county. The new line is to be about three miles in length and will form a connection with the Arnettsville terminal of the Indian Creek & North-ern R.R.

Provision is to be made by the Chesapeake & Ohio for the better handling of traffic and particularly coal traffic through Ashland, Ky., by the expenditure in all of about \$2,250,000 in that city for various improvements. It is proposed to spend a part of that sum for additional terminals through which it will be possible to route freight trains including heavy coal trains from the Big Sandy Division over the Front Avenue tracks and thus relieve congestion on the main line tracks in the city. The freight station will be enlarged and additional trackage provided in the city. Approximately \$2,500,000 is being expended in the vicinity of Huntington, \$1,500,000 of which is for double-tracking the Big Sandy Division. All expenditures are a part of the road's \$37,000,000 improvement program.

Coming Meetings

American Gas Association, annual meeting Oct. 15-19, Atlantic City, N. J. Secretary-Manager, Oscar H. Fogg, 342 Madison Ave., New York City.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

American Welding Society. Oct. 24-26, Pittsburgh, Pa. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 24

NEW YORK, OCTOBER 11, 1923

Number 15

More Pay—But Less Coal?

NOW that the anthracite miners have gained their uniform eight-hour day—and 10 per cent more pay—it will be interesting indeed to see which way the production per man will tend. In a statement issued immediately after the settlement President Lewis, declared the miners could have won all their demands after a full-length strike and would have done so had it not been that the representatives of the mine workers were “fully conscious of the public interest.” He said further that the miners have “the natural desire that goes with good citizenship, to obviate public embarrassment and discomfort.

If he means what he says he will encourage the men in the anthracite fields to produce and handle all the tonnage of which they are capable in their new eight-hour day every day the whistle blows. That certainly will be in the “public interest” and will help “obviate public embarrassment and discomfort” because it will be a real influence in restraint of the rising cost of anthracite to a public that is already paying heavily for that fuel. Any mine can produce coal cheaper when it is working at capacity, for its full eight hours than it can when its tonnage men at the faces begin slacking off at 2 p.m., leaving little for the rest of the employees—usually more than 50 per cent of the total—to do the remainder of the day except draw a full day's pay.

Somehow one is doubtful that Mr. Lewis intends to give any such encouragement. Instead, the leader of the union appears to be doing his best to make the men feel dissatisfied with their 10-per cent increase. They are encouraged to think the companies owe them more than they are getting. In one breath Mr. Lewis told them he had won for them a notable victory, and in the next that the new wages “are not sufficient to compensate the mine workers for the particular service they render.” There certainly is nothing in history to indicate that unionism teaches men to deliver a full day's work in the anthracite mines. Every increase in pay and improvement of conditions since 1900, when the union got its foothold in anthracite, has failed to stop the steady decline of production per man, so there seems to be no hope now.

Cash Value of a Convention

THE value to the coal industry of a convention such as the American Mining Congress tried to have at Milwaukee two weeks ago, and such as it should have in the future, has an illustration in the Middle West. Loss of coal by overshooting is a common liability. It is especially common in one particular region where too heavy shots have blown coal to dirt for so long that it was accepted as something that was too bad but probably could not be helped. Two months ago an operator in that region was asked to present at the

Mining Congress convention a study of explosives and their proper use. The operator got busy learning all practices in his own territory.

By the time his paper was prepared for the Congress-Milwaukee convention he was so impressed with the losses his own company had been suffering from hard shooting that he was no longer lackadaisical about it. He was so surprised to find that the average shotfirer in his employ was an intelligent and conscientious workman that he wondered why he had never tried to get acquainted with him before. And he found the average shotfirer was so heartily in accord with him in the belief that lump coal could be increased by more careful shooting that he wondered why he had never before enlisted his shotfirers' aid.

The conference on coal shooting which the operator led at the convention raised wideawake interest. This interest was heightened by the fact that he brought some of his own new-found, intelligent shotfirers to the meeting to clinch his points with practical comments.

Aroused, he went home and started a movement in his own mine for more careful shooting. Other operators say they are with him. Leaders among his own employees say they are with him. And so, after all these years of accepting things as they were, something is happening in that region which may add 10 or 15 per cent to the proportion of lump coal the field produces. And it is principally because that operator was called upon to talk at the convention. There are benefits to conventions of that kind. Let us have more of them. And let coal men take part in them.

When a Little Less Is Something More

TO THE operator standardization appears solely as a call to give up certain of his equipment and substitute other of a more general applicability. He realizes that as soon as standardization prevails at his mines—if he has mines with many gages and many types of machinery—he will not have to keep so large a number of spare parts and that, moreover, his motormen and electricians will have less difficulty in understanding the machinery and will therefore be able to maintain and repair it much more readily. There is perpetual labor turnover where a man is turning from one machine to another of a type with which he is unacquainted.

Immersed in his own problem the operator does not appreciate just how the manufacturer views the matter. Here are two makers of some one class of machine. Their designs are different; both are good. If one manufacturer decide that standardization is desirable, he must get the other to assent to it. The maker of one machine must copy that of his rival or the rival must copy his or both must copy from each other to get a new machine that will serve as a standard for both.

In either case whatever concern does the copying

breaks from its own standard and all its clients buying its machines thereafter have difficulty with their stocks. They have thereafter two makes of machine. In fact as far as the change is made in the direction of copying the rival manufacturer's standards the consumer has the equipment that accords with that made by a rival instead of that which accords with that made in the past by the firm from which he has been buying.

During the war it was possible to wipe out such differences between manufacturers but the process did not go far. Any single item, of course, can often be dispensed with if it is not too intimately associated and fitted into other items. It is easy to change the bowl seat on an agricultural tractor but difficult to change a design in a motor if as a result of the change the new part will not fit the old part, making it necessary for manufacturer and consumer to keep large stocks that will accommodate both the old and the new equipment.

Standardization is so important, however, that clamor must be continued in its favor. Only perpetual effort will effect that which is so desirable. Certainly we should arrive at a condition under which it will be possible to have each manufacturer reduce his designs nearer to a standard and make his machinery as far as possible aggregations of a few standards. No one would make a mine car with all its rivets or bolts of a slightly different size, but we sometimes do almost as ill. In a single piece of machinery there often is altogether too much diversity. It is better to have a design which is in places too strong if thereby we can avoid having too many replacement parts.

By keeping this subject alive the American Mining Congress is performing a service to the industry. The manufacturer with too long a line is not a friend of economy. He serves well neither the operator nor himself. A variation that has no justification is to be avoided for the good of all concerned.

Earthquakes and Music

THE condition of a man's stomach has a good deal to do with his state of mind and tone of voice. In Illinois, where union coal miners' stomachs have been full for years, do we hear any sweet union utterances of brotherly love for operators? We do not. Instead, seismographs record the disturbances set up by union demands and condemnations. But how is it in that part of the State of Washington covered by District 10 of the miners' union organization? The tone of the union official voice is melodious and soothing there, for a man eating only one meal a day, so to speak, and that one paid for by a public that grudges the high cost of it, realizes that he cannot get the other two by raucous roaring. So peace reigns in District 10, albeit a worried peace.

Last April the miners of that district, after a long and losing battle for standard union wages, took a 10-per cent reduction with greatest reluctance because there was absolutely nothing else to do but starve. The coal of the region simply could not be sold when the production cost included the country wide union scale. The market for it has been limited indeed, even with wages 10 per cent below the scale, thanks to competition from oil, wood, and coals from Canada and non-union Northwestern fields. Any coal mine in that territory has market difficulty enough even at favorable wages. It is not a question of what operators wish to pay. It is a cold question of economics.

But the union miners of Washington with their one meal a day are not convinced. To them the whole source of their trouble is non-unionism in their own state, in Vancouver Island, in Colorado, Utah and North Dakota. Could they but solidify the miners in those districts and level up by force the scale of wages, their troubles would be over. So their perennial campaign is on once more. There must be something going on lest the union organizers be out of a job. The foundation for the campaign is harmony. Everything possible will be done to convince the whole West that union miners are a sane, reasonable and peace-loving class of men. Those in Washington are doing their level best to prove that unionism is willing to give and take and that it is easy for peaceful relations to exist between miner and operator.

So far as the average rank and file miner is concerned, such a Utopian condition could exist. The operator of non-union Colorado and non-union Utah does not feel that the average of his men is vicious. It is as high an average as that of most other industries where friendly relations are maintained between employer and employee. But unfortunately the average opinion of miners is lost when unionism enters. Only the opinion of a dominating few strangers prevails. That is the main reason why there is so little mutual satisfaction in dealings between the operator and the miner of Illinois or any other solidly unionized state. That is the reason why the seismograph records the crashing official utterances of unionism in well-fed Illinois while today in District 10 of Washington a delicate phonograph recorder makes music of union words.

SOME CHICAGO RAILROAD MEN say the coal industry ought to have a labor board such as the railroads now have. In spite of its drawbacks and lack of power to enforce decisions, the labor board has improved conditions, and it ought to stop a lot of striking and grief in coal, they insist. They forget that such a board might, perchance, make a decision running counter to the wishes of John L. Lewis. Would it be obeyed? Did John L. Lewis obey the President of the United States just before the great strike of 1922? Does the miners' union obey anything or anybody? The answer is, "Pfft!"

STEINMETZ, THE ELECTRICAL WIZARD, believes he is 25 years ahead of his time with his prophecy that full use of electrical machinery will produce a four-hour well-paid working day. He ought to meet some of these union Illinois loaders coming out at noon after a fair morning's turn of cars and with \$10 due. They haven't waited 25 years and they refuse to use electrical loaders.

IT IS REALLY TOO BAD that some of these newspaper editorial writers who hoot at the United States Coal Commission could not have been on the Commission. Immersion for a year in the Sargossa Sea of the coal industry might impart some idea of how hard it is to straighten everything out with a few bold strokes. They should ask the editor-commissioner from Atlanta. He knows.

ONE OF THESE DAYS a man is going to devise a settlement of a strike that will not add to the public's burden of cost; and a grateful nation will probably elect him permanent dictator, or something.—*N. Y. Sun and Globe.*



*Town and Plant from Slate Conveyor**

Lynch Mine, Its Record Production and Operating Data

Every Mine Engineer Will Be Interested to Measure Results with Those of Biggest Producing Coal Mine in World, Remembering, Moreover, the Operating Difficulties of Lynch Field

BY ALPHONSE F. BROSKY

Assistant Editor, *Coal Age*, Pittsburgh, Pa.

BY PREPARING on the tipple and shipping 12,880 tons of coal in a single shift, the United States Coal & Coke Co. at the Lynch operation, Harlan County, Kentucky, achieved a world's record for the tonnage both prepared and loaded in a single day at a single coal preparator. Not even the huge breakers in the anthracite field have ever equalled this record. However, mere grossness of tonnage is of less importance to us than the significance which may be attached to it as a measure of advanced development in mine-plant layout.

If anything of the spectacular could be attributed to this record it would be the ease with which it was made. Without advance notice to the men and with scarcely a flurry, 6,784 tons of coal which was mined fresh that day, 2,587 tons held in the storage bin and 3,509 tons in mine cars were passed in one shift over the screens and picking tables to the railroad cars on three tracks under the tipple.

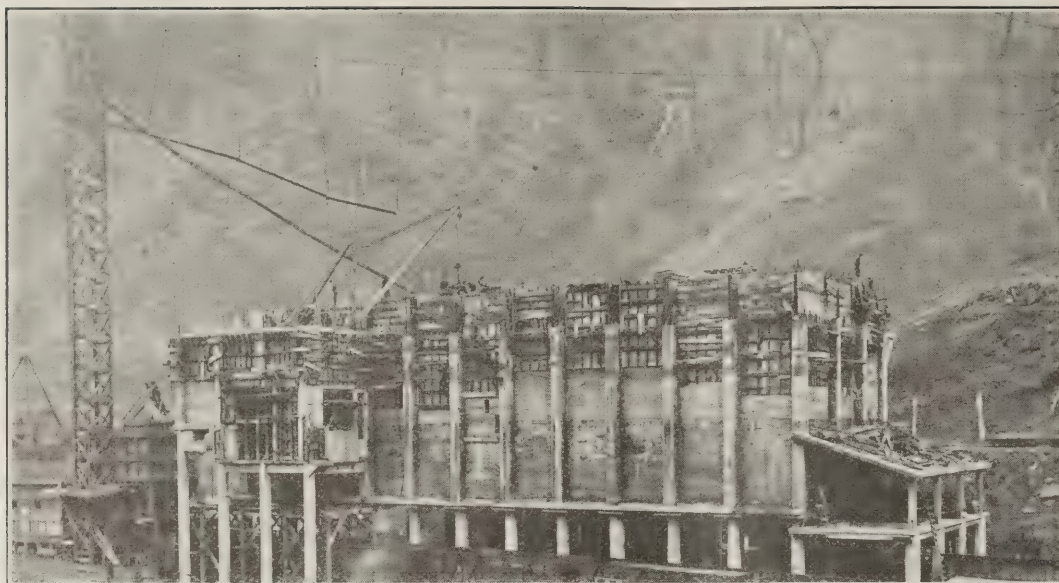
Another record was posted at Lynch when 167,346 tons of coal was mined during the month of May, 1923. This record supersedes that made at the Zeigler mine of Illinois in the month of March last year. The accomplishments at these operations are not to be compared, for conditions are vastly different. At the Zeigler mine coal is hoisted in skips up a single shaft.

*The headpiece shows in the foreground the dumphouse for No. 31 mine and somewhat further back the machine shop. In the rear is the opening to Mine No. 30, the bathhouse, the bank, the residences of the officials, the store and the hotel. The storage tracks above the tipple will hold more than 200 railroad cars.

Coal is won at the Lynch mines by drift mining, the coal being hauled from two openings on either side of a single tipple. In this regard Lynch had the advantage. But in the matter of grades of haulage roads and conditions favorable to mining, Zeigler had "the edge" as compared with Lynch because at the latter mine the coal is not flat, as in the former, but rises and falls everywhere in the territory thus far developed. It is not, however, my purpose to detract from the glories of either of these two mines. Following a statement of facts and conditions which governed them, comments will be made on the methods employed and on the equipment used at Lynch, which enabled a large production to be made despite difficulties in mining.

MAY PRODUCE TWO MILLION TONS THIS YEAR

Insufficient car supply, which has prevailed in practically all parts of the country, has had its effect on production at Lynch by making impossible greater development than that absolutely necessary to maintain a somewhat constant daily output. Indicative of this condition are the figures of production for the years since the mine was opened in the autumn of 1917. The production for that year was 12,392 tons; in 1918 it was increased to 541,344 tons, followed by 1,242,639 tons for 1919. For 1920 and 1921 the yearly productions were 1,338,707 and 1,541,629 tons respectively. In 1922 the production fell to 1,217,323 tons, due to a railroad strike. But for the first six months of 1923



Constructing Coal Bin

Tippel bin has a capacity of 5,000 tons and is said to be largest structure of its kind in the world. It was the biggest item in the cost of the tippel, but it is paying for itself by providing steadier operation. Note the elevator tower and suspended spouting by which concrete was poured into forms.

the output bounded to 1,004,424 tons, and no doubt it will pass the two-million mark for the entire year.

In less than six years the two mines at Lynch have developed to such an extent that they load over one tippel a production greater than other large mines which have reached the apex of production. At that, the mines at Lynch are still in their infancy. Some day each will produce more coal than has thus far been obtained from a single opening, and their combined tonnages will pass over the one tippel at the rate of 2,000 tons per hour.

The combined daily output from these two mines, which has averaged about 6,000 tons, cannot well be increased until such time as the carriers upon which its transportation depends can be so equipped as to assure a sufficient car supply to warrant that larger production. The town of Lynch has not been enlarged since its first construction, for this very reason. Only as many houses have been provided as are necessary to meet the requirements of the men needed to mine the coal that can be shipped. Likewise, no more men have been employed than can be assured a whole day's work on each working day. This is a rule which must be followed to obtain highest efficiency in mining.

However, the short supply of railroad cars which has acted as a deterrent to large production at Lynch afforded an opportunity to test the functioning of the enormous tippel running at 71.5 per cent of capacity. On the two working days preceding Feb. 12 no railroad cars were received. A delay in transportation and not a shortage of railroad stock must have been the cause of this failure, for on the big day 230 railroad cars were delivered. Each had a capacity of 56 net tons and all were loaded that day. A surplus at the end of the day's run was sufficient to fill 12 additional railroad cars.

A train made up of all these cars would be 1.65 miles long. Still more vivid than this mental picture is that of as many Lynch mine cars made into one trip as would be needed to hold the shipment for that day. Such a trip would be about 12 miles long. The principal roads in the two mines are laid with 40- and 60-lb. rails. The total length of roads equipped with rails of that length is 38 miles. Consequently the trip suggested would be one-third the length of these roads.

Incidentally the shipment represented about 0.75 per

cent of the total production of bituminous coal in the country for that day. Calculating the output of Lynch in another way, about 267 mines having the average production of Lynch could meet the present consumption of bituminous coal in this country. Less than one hundred operations having the ultimate capacity of the Lynch mines likewise could meet this market. We know that our coal bodies are not such as to make feasible the working of so many mines of gigantic output; nevertheless we can visualize what savings might be effected by such mass production. It is some assurance to know that the amalgamation of small into fewer large companies would partly bring about this change. Certainly with the stabilization of production, which is so fondly looked for in the future, a movement will be launched in this direction.

As has already been said, of the shipment that day, not all was fresh mined. On the two idle days preceding, development work was prosecuted as usual and in those working places needing attention coal was mined. In every mine there are places in which the

TABLE I—TONNAGE AND MEN EMPLOYED BY SCHEDULES,
MAY, 1923

	Tonnage	Company Men	Coal Loaders	Slate Loaders	Machine Men	Top Company Men	Underground Company Men	Company Men On Night Shift	All Men
May 1	5,890	705	446	76	78	286	348	71	1,306
2	6,099	752	440	116	78	282	382	88	1,385
3	6,374	760	476	114	78	285	389	86	1,428
4	5,590	741	488	114	80	283	382	76	1,42
5	6,286	749	502	91	76	286	368	95	1,418
6 Sunday	...	...	...	...	...	...	...	...	...
7	6,534	720	468	111	82	284	365	71	1,380
8	5,794	740	539	95	78	287	388	65	1,452
9	6,542	737	511	99	80	285	376	76	1,429
10	6,787	748	563	64	80	288	380	80	1,455
11	7,089	762	552	86	76	286	391	85	1,476
12	6,663	736	531	88	74	289	370	77	1,439
13 Sunday	...	...	...	...	...	...	...	...	...
14	5,379	687	417	80	74	287	319	81	1,258
15	6,402	702	472	102	76	282	369	51	1,352
16	4,988	729	426	105	74	285	369	75	1,334
17	6,561	789	485	99	78	283	357	89	1,451
18	6,476	738	482	102	76	286	383	69	1,399
19	6,020	771	425	109	74	284	413	74	1,378
20 Sunday	...	...	...	...	...	...	...	...	...
21	5,642	779	419	82	72	287	410	82	1,352
22	5,426	802	463	120	74	285	443	74	1,459
23	6,569	829	470	136	70	288	450	91	1,505
24	6,790	802	494	127	74	286	432	84	1,497
25	6,960	806	510	114	78	289	430	87	1,508
26	6,352	804	470	128	78	287	424	93	1,472
27 Sunday	...	...	...	...	...	...	...	...	...
28	5,676	725	403	82	78	282	379	64	1,288
29	6,231	746	450	113	78	285	402	59	1,387
30	5,712	783	453	130	78	287	413	83	1,444
31	6,524	797	479	99	76	290	421	86	1,451
Average	6,200	757	471	103	77	285	390	78	1,411

mining must be continued from day to day if the coal reached by them is to be completely recovered with the least effort or with the least exposure of the miners to danger. Especially is that true of pillar sections where a wing pillar or a stump has been left standing.

At Lynch the absence of railroad cars does not halve such work; though several days may pass without a delivery of cars, the most important work continues because facilities are afforded for the storage of the coal in the bin on the tippie and, if need be, some of the coal can be stored in the mine cars. Such a condition prevailed when the whistle blew on the morning of Feb. 12 and the tippie machinery began to move. In the bins were 2,587 tons of coal and on the tracks were 1,426 loaded mine cars, of which number only 1,148 contributed to the day's production. When all the railroad cars were filled, 278 mine cars filled with coal were left undumped.

Fresh-mined coal on that day aggregated 6,784 tons, which was loaded into 2,463 mine cars by 553 coal loaders. The average output per loader was 12.25 tons. It is less than that for the month of May, when the average output per loader per shift was 13.05 tons. It is natural to expect a change from time to time in the rate of loading coal where conditions are different from day to day. One day a working place may be on the level; the day following it might dip or rise. More will be said in a later article about these conditions and the difficulties in mining.

Of the 1,347 men on the payroll that day, 297 were engaged in outside work, and of the latter about 100 men were employed in construction work which will not be going on at all times. Including these men who had no direct part in the mining of coal, the production per man on the payroll is 5 tons; without them it is 5.43 tons.

SOME OF THE SLATE IS DUMPED IN MINE

Altogether there were 1,050 men underground, including 417 company men, 553 coal loaders and 80 machine men. The average output per man underground was 6.45 tons. In the Lynch mines during the month of May for every 4.6 coal loaders one company man was employed in loading slate. For every 4.84 cars of coal dumped on the tippie, one car of slate is hauled to the outside and conveyed to the hillside dump. In addition much slate is gobbled inside the mine. Where so much slate must be handled, the output per man is lowered.

Though the usual number of machine men in 40 crews were working that day, only 239 places were cut. More than twice as many places are cut normally by that number of crews. All the places were cut in a previous shift in the expectation that railroad cars would be received. Some of them were left standing while those loaded out contributed to the coal in storage in the tippie bin and in mine cars.

A more comprehensive study can be made of produc-



SURFACE PLANT AT LYNCH MINES FROM SOUTH SIDE LOOKING WEST

Fortunately, the Lynch Mines have little surface haulage. Just enough is provided to get the coal out of the cars and the empty trip assembled. In the foreground

can be seen one of the two dumphouses which handle the 1,800 mine cars which are brought to them by twenty-five locomotives. The tippie, conveyor sheds, slate conveyors,

junction tower for coal and slate conveyors, power house and machine shop readily can be distinguished. The hills show how the average cover soon becomes 2,500 ft.

TABLE II—TONNAGE AND OUTPUT PER MAN BY SCHEDULES
MAY, 1923

May	Output in Net Tons									
	Tonnage	Per Man On Payroll	Per Company Man	Per Loader	Per Machine Crew	Per Underground Company Man	Per Company Man On Day Shift Underground	Per Company Man On Night Shift Underground	Per Company Man On Surface	Per Man in Tipple And Dumphouses
1	5,890	4.50	8.35	13.2	151.0	14.00	16.95	83.0	20.60	137.0
2	6,099	4.40	8.10	13.8	156.0	13.00	15.90	69.2	21.60	142.0
3	6,374	4.45	8.40	13.3	163.5	13.40	16.40	74.2	22.40	148.0
4	5,590	3.90	7.55	10.4	140.0	12.20	14.60	73.5	19.75	130.0
5	6,280	4.45	8.40	12.5	165.0	13.50	17.10	66.2	22.00	146.0
6	Sunday									
7	6,534	4.75	9.10	13.7	159.0	14.90	17.85	92.0	23.00	152.0
8	5,794	4.00	7.85	10.7	148.5	12.80	14.95	89.5	20.20	135.0
9	6,542	4.55	8.90	12.7	163.5	13.90	16.50	86.0	23.00	147.5
10	6,787	4.65	9.10	12.0	169.5	14.70	17.80	85.0	23.50	157.5
11	7,089	4.80	9.30	12.8	186.5	14.90	19.20	83.5	24.50	165.0
12	6,663	4.65	9.70	12.3	180.0	14.90	18.00	86.8	23.10	155.0
13	Sunday									
14	5,379	4.30	7.85	13.0	145.0	13.40	16.80	66.4	18.70	125.0
15	6,402	4.75	9.10	13.4	168.5	15.20	17.30	24.0	22.60	149.0
16	4,988	3.75	6.85	11.7	135.0	11.25	13.50	66.5	17.50	116.0
17	6,561	4.50	8.30	13.5	168.0	14.70	18.40	73.8	23.20	152.5
18	6,476	4.65	8.80	13.4	170.0	14.30	16.90	93.7	22.60	150.0
19	6,026	4.35	7.80	14.1	162.5	12.40	14.60	81.5	21.20	140.0
20	Sunday									
21	5,642	4.15	7.25	13.4	157.0	11.40	13.75	69.0	19.60	131.0
22	5,426	3.70	6.70	11.7	146.5	10.50	12.90	73.0	19.00	126.0
23	6,559	4.35	7.90	14.0	187.0	12.20	14.50	72.0	22.70	152.0
24	6,790	4.55	8.50	13.7	184.0	13.10	15.80	78.0	23.70	147.5
25	6,960	4.60	8.60	13.6	178.0	13.50	16.40	75.0	24.20	162.0
26	6,352	4.30	7.00	13.7	167.0	12.30	14.80	68.0	22.10	147.5
27	Sunday									
28	5,676	4.40	7.80	14.1	145.0	12.80	15.00	88.5	20.10	132.0
29	6,231	4.50	8.30	13.8	160.0	13.50	15.50	106.0	21.90	145.0
30	5,712	3.95	7.30	12.6	146.0	11.50	13.80	68.8	19.90	133.0
31	6,524	4.55	8.20	11.1	174.0	12.90	15.50	75.9	22.50	151.5
Average	6,199	4.40	8.10	13.0	162.5	13.40	15.75	80.4	21.70	145.0

tion and the labor involved for the month of May of this year. For convenience, figures are compiled in Tables I and II, which furnish a ready reference. During that month of 27 working days the car supply was comparatively good. Consequently the Lynch mines were able to operate steadily at the average rate of 6,200 tons per working day. The maximum output for the mines to date was reached on May 11, when 7,089 tons of coal was mined. The lowest production per day during the month took place on May 16 when it fell to 4,988 tons.

The most notable fact which is revealed by figures

for these two days is that the operator's profit in mining is seriously affected by a fluctuation in car supply. Thus on the day of biggest production 7,089 tons was mined with 1,476 men at the rate of 4.8 tons per man, while on the day of smallest production 4,988 tons was mined by 1,334 men, at the rate of 3.73 tons per man. The difference in the output for these two days was 2,101 tons. Only 33 company men above those required for May 16 were employed on May 11 to produce this surplus tonnage. The production per company man on May 11 was 9.30 tons and on May 16 it was 6.85 tons, which means that the labor of company men cost about 36 per cent more on the latter day than it did on the former.

For the month of May, 2.1 man-hours was required per net ton of coal mined. If the 100 men on each day's payroll who are engaged in work other than that directly bearing on mining are excluded, 1.95 man-hours would have been expended in mining each net ton of coal. These figures may appear high, but one must consider at the same time the conditions which prevail in the Lynch mines, causing difficulty in mining.

OUTPUT PER MAN AVERAGES 4.7 TONS PER SHIFT

The men on the payroll during the month of May have been classified according to their several duties. In Table II is listed for each class the average output per man per shift. Those figures, which are compiled by including the full quota of company men on the surface, are really too low. Including all men on the surface, the average output per man on the payroll per shift during this month is 4.4 tons; not counting the hundred men whose duties do not concern the mining of coal, it is 4.7 tons.

Each of the 43 men employed in the dumphouses and on the tipple handles an average of 145 tons of coal per shift. The ultimate production of 16,000 tons per shift can be handled by the addition of a few more men on the picking tables and in the dumphouses. From this it may be deduced that the greater the output of the tipple the bigger the production per man employed on it.

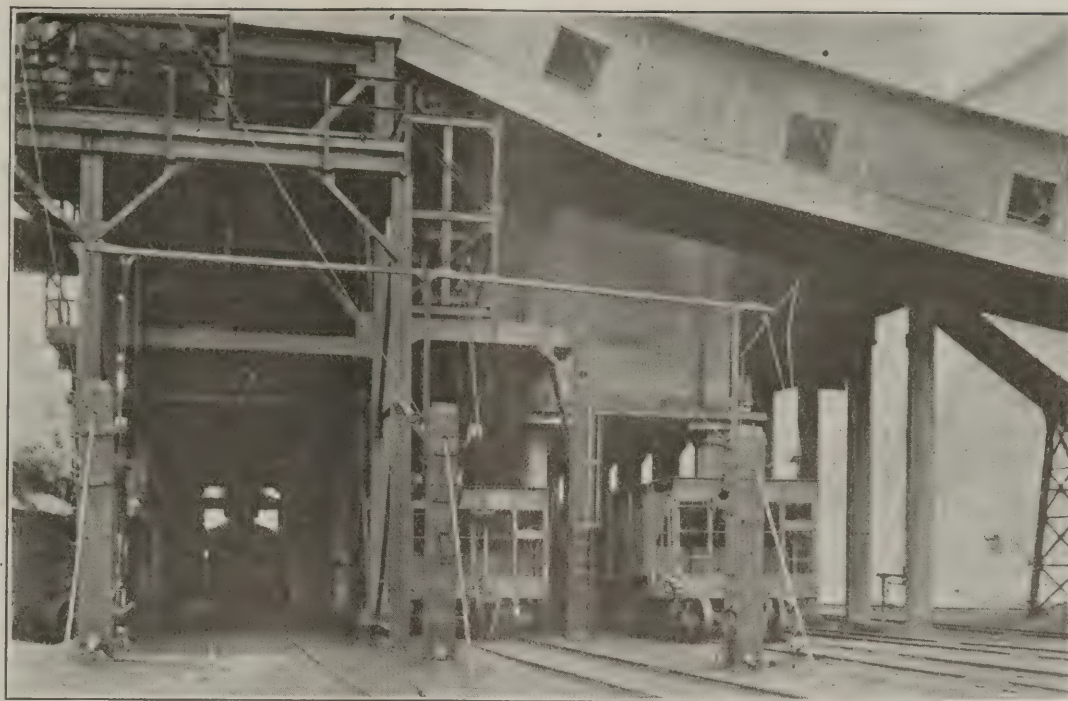
TABLE III—TONNAGE AND POWER CONSUMPTION, ACTUAL AND DEDUCED, MAY, 1923

May	Tonnage	Tipple	Power Consumption in Kilowatt-Hours								Per Ton Of Coal Mined	Derived By Formula*	Percentage Error Of Derived Value
			No. 30 Mine	No. 30 Dump-Houses	No. 30 Fan	No. 31 Mine	No. 31 Dump-House	No. 31 Fan	Shops	Total			
1	5,890	940	9,200	630	2,470	6,000	610	1,840	342	22,032	3.74	3.74	None
2	6,099	1,040	9,800	600	2,360	5,200	590	1,830	351	21,831	3.58	3.60	.05 high
3	6,374	980	9,200	620	2,520	5,200	680	1,800	245	21,245	3.34	3.40	3.6 high
4	5,590	1,090	9,900	680	2,490	5,500	690	1,860	374	22,584	4.02	3.94	2.0 high
5	6,280	960	9,600	650	2,440	5,600	660	1,820	397	22,127	3.52	3.50	.05 low
6	Sunday		3,000		2,290	1,600		1,910	159	8,959			
7	6,534	1,030	8,800	710	2,410	5,100	710	1,880	354	20,994	3.22	3.37	4.7 high
8	5,794	1,030	9,800	680	2,540	5,900	740	1,900	411	23,001	3.97	3.80	4.3 low
9	6,542	1,100	10,100	770	2,350	6,300	760	1,910	399	23,869	3.64	3.37	7.4 high
10	6,787	1,130	9,800	750	2,600	5,900	780	1,950	379	23,289	3.44	3.25	5.5 low
11	7,089	1,090	9,800	790	2,350	5,500	720	1,840	366	22,456	3.16	3.10	1.9 low
12	6,663	1,060	9,500	670	2,440	5,800	700	1,830	337	22,337	3.35	3.30	1.5 low
13	Sunday		3,100		2,510	1,100		1,890	138	8,738			
14	5,379	980	7,900	690	2,460	4,600	630	1,860	289	19,409	3.61	4.09	13.3 high
15	6,402	950	9,500	620	2,360	6,600	630	1,790	314	22,764	3.55	3.44	3.1 low
16	4,988	760	8,500	640	2,430	5,500	550	1,830	315	20,525	4.12	4.41	7.1 high
17	6,561	1,080	9,800	680	2,530	5,600	730	1,900	330	22,650	3.45	3.35	2.9 low
18	6,476	1,080	9,800	670	2,520	5,700	690	1,900	345	22,705	3.51	3.41	2.8 low
19	6,020	970	9,100	630	2,480	5,700	680	1,860	294	21,714	3.60	3.66	1.7 high
20	Sunday		3,100		2,530	13,000		1,920	109	8,959			
21	5,642	980	8,600	660	2,440	4,400	610	1,840	286	19,816	3.51	3.91	11.4 high
22	5,426	990	9,300	660	2,400	5,600	640	1,810	312	21,712	4.00	4.07	1.7 high
23	6,559	990	9,600	650	2,430	6,100	670	1,840	319	22,599	3.45	3.35	2.9 low
24	6,790	730	9,700	670	2,410	5,900	700	1,840	295	22,245	3.27	3.24	.09 low
25	6,960	990	9,700	640	2,590	6,300	730	1,880	319	23,149	3.32	3.16	4.8 low
26	6,352	890	8,800	540	2,460	5,600	500	1,860	299	20,949	3.29	3.46	5.2 high
27	Sunday		3,200		2,540	1,300		1,900	98	9,038			
28	5,676	1,030	7,700	690	2,400	6,200	730	1,790	298	20,838	3.67	3.89	6.0 high
29	6,231	930	10,200	590	2,390	4,600	590	1,800	357	21,457	3.45	3.53	2.3 high
30	5,712	1,150	9,500	720	2,370	5,700	650	1,790	347	22,227	3.89	3.85	1.0 low
31	6,524	1,060	10,100	690	2,480	6,000	720	1,730	334	23,114	3.55	3.38	4.8 low
Total	167,346	27,010	265,700	18,050	76,170	157,400	18,090	57,400	9,512	629,332			

* P = 22,000/T where P = power consumption per ton of coal and T = tonnage per day in period for which P is taken.

Railroad Tracks Under Tipple

Three railroad cars can be loaded on each track—that is, nine in all—at the rate of 500 tons in three minutes, the coal coming from the storage bin. The railroad cars run under the floor of the bin, which is an integral part of the tippie. The unusual posts under the bin, devoid of crossbracing, make travel easy and safe, despite the presence of moving railroad cars.



In Table III is given the power consumption by days for the month of May. The total power consumed in mining and handling the month's production of 167,346 tons is 629,332 kw.-hr., or 3.76 kw.-hr. per ton of coal mined. The total power consumed for mine and town during this period is 779,900 kw.-hr. The ratio between the consumption of power for purposes other than mining and that for mining is as 5 is to 21. From this ratio one perceives how big is the consumption of power in the modern mining community.

A comparison of the consumption of power at Lynch per ton of coal mined with the tonnage for the days in May, as exhibited in Table III, shows that these are algebraically related: that is, the power consumption per ton of coal mined under ordinary operating conditions varies inversely as the tonnage for that day.

Representing the power consumption per ton of coal mined on any day by P and the tonnage for that same day by T then

$$P \text{ varies as } \frac{1}{T} \text{ or } P = k \frac{1}{T} \text{ and } k = PT$$

in which case k is a constant equal to PT . But PT is the total power consumption for any day, so, by averaging the total power consumption for a specific period of days a constant k is obtained, which may be used in calculations for any day in that period.

EMPIRICAL FORMULA GIVES CLOSE RESULTS

The calculated value for constant k for the month of May, excluding Sundays, is 22,000. Then the formula as applied becomes: $P = \frac{22,000}{T}$ in which P is the power consumption for any day in kilowatt-hours and T is the tonnage in net tons.

Using this formula, I have derived for each day in May the power consumption per ton of coal mined. The derived values and also those calculated directly—by dividing the total power consumption for each day by the tonnage for that day—are listed side by side in Table III. A calculation has been made and tabulated showing how little in error is the derived power consumption per ton of coal mined when compared with

the directly calculated value. This error is expressed in a percentage.

The figures show that the relation actually does hold true on average working days. For 20 of the 27 working days the percentage of error of the derived value is less than 5 per cent and in most cases it is less than 3 per cent. For 7 days, however, it is more than 5 per cent. But the calculated values of power consumption per ton of coal mined for these seven days are more or less distorted as compared with the calculated values of power consumption per ton of coal mined on other days on which the tonnage produced approximated the respective tonnages produced for those 7 days.

One may deduce from this peculiarity that operating conditions on those 7 days were such as to cause a consumption of less or more power than would be consumed under average conditions. Nevertheless, the derived and the directly calculated values of power consumption per ton of coal mined are so surprisingly alike for most of the days tested as to hint that the suggested relation has a basis of truth. It is reasonable to expect this relation as the totals of power consumed, see Table III, for all working days are closely alike within limits. The power consumption for May 11 was only about 10 per cent greater than it was for May 16, and yet on the former day the tonnage produced was about 40 per cent greater than the tonnage mined on the latter day.

MAXIMUM PRODUCTION MEANS LOW POWER COSTS

Under existing conditions at Lynch—and those which now exist at any other plant, for that matter—the maintenance of a steady daily output, were it possible, would result in a considerable saving in the cost of power per ton of coal mined. Irregular car supply and a fluctuating demand for coal prevent uniformity in daily tonnage.

If 7,000 tons of coal is mined in the Lynch mines on Monday and only 3,500 tons are mined on Tuesday, the cost of power per ton of coal mined will be twice as great on Tuesday as it would be on Monday. Incidentally, this saving is only one of many which could



THREE OPENINGS TO NO. 31 MINE

One opening is occupied by the 12-ft. fan, which will pass 400,000 cu.ft. of air per minute against a water gage of 3 in. At present it develops only 120,000 cu.ft. of air per minute against a water gage of 1½ in. It is driven by a 100-hp. motor at 120 r.p.m. The small opening is for empty trips, the large for loads.

be made to reduce the cost of coal at the mine should our mines be provided with an opportunity to produce a uniform daily output.

The total capacity of the electric motors at the Lynch mines, for alternating current and direct current, is about 7,000 hp. This figure includes all motors used in mining and handling the coal but does not include those used for town purposes. Correlating horsepower with production, one finds that for an average of 6,200 tons of coal per day there is about 1.15 hp. per ton of average daily output.

For May 11, however, when 7,089 tons of coal was mined, there was only 0.99 hp. per ton of coal mined. With the present capacity of motors a much higher tonnage could be obtained. It is likely that no more than 0.75 hp. per ton of average daily output will be required when the mines are developed to capacity. But as the workings move further into the mountains the figure will be bigger. For the life of the mine a fair figure would be one horsepower per ton of average daily output.

DUMPHOUSES TO HANDLE 18,000 TONS PER SHIFT

Let us turn for a moment to the dumphouses and the tipples which played the important part in the record loading of Feb. 12. Each of the two dumphouses as designed is intended to handle 9,000 tons of coal in a nine-hour shift. The plan calls for two rotary dumps in each dumphouse. That these will be ample to handle 18,000 tons per shift is evidenced by the feat accomplished on Feb. 12. On that day two dumps, one operating in each dumphouse, handled 10,293 tons of coal. Of this quantity, the dump on the side nearest to No. 30 mine, from which most of the production now comes, handled about 6,800 tons of coal. At that rate four dumps will furnish a combined capacity 50 per cent greater at least than the tonnage they were expected to handle.

The most noteworthy and important feature of the equipment in the tipples is the belt conveyors. The success at Lynch of these devices for handling the coal from the mine car to the railroad car and for carrying the mine refuse to the slate dump points the way to their much more extensive use in the future.

Development of their application is only begun and gives promise that they will displace steel-pan conveyors for every purpose except for picking tables. Their life, figured in tons carried and not in years, is sufficiently long to warrant their adoption as an economy. Their ease of repair also commends them for more extensive use.

The normal capacity of the tipples is 2,000 tons of coal per hour. This aggregates 16,000 tons of coal per eight-hour day. The tipples are designed also to handle whatever slate incident to mining must be dumped on the outside. With all the conveyors carrying a capacity load it is estimated that about 18,000 tons of coal and slate combined can be handled in a single shift. The slate conveyors have a capacity greater than 2,000 tons per eight-hour shift, but it is not likely that even that quantity will have to be handled at the tipples in any one period of eight hours.

Of great interest are the mining methods at Lynch by which, considering the youth of the mine, the present unusually large rate of production is derived, and by which in the future the present rate will be nearly trebled. A system which, without jeopardizing plans for future development, will yield 1,242,639 tons of coal in one year, as in 1919, less than two years after ground was broken, holds enhanced possibilities for mammoth yearly production six, eight or ten years hence.

How today's output is attained or how in the future it will be increased threefold is a logical question to ask. It is not so much a question of how the coal is mined as it is what methods are employed to get the coal to the surface. So gigantic a production for one mine—1,000 tons per hour, hauled over one haulage system—has never been achieved in drift or shaft mines. But there is no reason why it cannot be obtained, from a drift mine especially.

Difficulties encountered in shaft mines—such as congestion of trip traffic at the shaft bottom through the impracticability of constructing sufficient storage tracks—have limited the output to a maximum normally of about 6,000 tons per day. Our past methods of hoisting coal to the surface and the size of our mine cars have in many cases restricted production. Had the methods and sizes been revised some of the shaft mines already constructed would have attained a daily output equal to that which some of the new shaft operations are expected to develop. From the latter as much as 10,000 tons of coal per day will be taken, but for that end equipment of greater capacity than that now used has been designed, and with this new machinery will go methods differing in general from those hitherto adopted.

Marked Increase in Germany's Imports Of Coal During Ruhr Blockade

Imports of bituminous coal during the period January to June of this year were 14,720,646 metric tons, according to the German Bureau of Statistics, as compared with 2,102,215 tons in the corresponding period of last year and 5,028,472 tons in the same months of 1913. The tonnage furnished by various countries is shown in the following tabulation:

	1923	1922	1913
Sarre.....	103,624	410,346	
Great Britain.....	7,756,627	1,526,581	4,379,817
Czechoslovakia.....	155,377	78,448	
Poland.....	6,549,641		
Belgium.....			189,173
Holland.....			264,112
All other countries.....	155,377	86,840	195,370
Totals.....	14,720,646	2,102,215	5,028,472

The increase of imports this year compared with last year is due partly to the Ruhr blockade and partly to the loss of the greater part of Upper Silesia. Over 6,200,000 tons was supplied from Upper Silesia, which supply figured last year as domestic production.



Typical Room, Lynch Mines, but Dipping 22 per Cent at Face

Lynch Coal Buried in Places 3,500 Ft. Deep; Methods By Which High Percentage Extraction Is Attained

New Measures Adopted to Hold Heavy Cover and Slate Roof—Every Loader Required to Clean Up His Room Daily—How Mine Is Laid Out—Swags, Hummocks and Loose Slate Afford Many Problems

AT LYNCH, methods of mine layout have been adopted permitting coal to be mined and hauled economically, not for the youthful years only but for the whole life of the mine. Although it has been granted by most mining men that the ideal system of mining, so far as percentage recovery and ease in extraction are concerned, is to drive to the boundary and to remove the coal on the retreat by rooms and pillars or by a system of longwall, that idea has been set aside as impracticable. The chief reason given is that a mine is opened for the immediate present as well as for the future.

However, if that ideal is removed from consideration, equally so is that crude plan whereby two or more independent panels are opened up and these worked in the manner of "catch as catch can." This is no longer tolerable by reason of its wastefulness of our declining coal resources. So far as railroad facilities and the market for coal will permit, uniformity in production should be perpetuated from day to day and from year to year throughout the life of each section. This is the fundamental principle upon which the Lynch system of mining is based.

At the Lynch mines the methods of mining originally adopted have been modified somewhat to cope with conditions which later arose. A general description of the plan of mining adopted in the early stages of operation was given in an article on the "Lynch Plant of the United States Coal & Coke Co.," presented by Howard N. Eavenson to the American Institute of Mining

and Metallurgical Engineers at its Wilkes-Barre meeting, Sept. 12-15, 1921. The article can be found in the issues of *Coal Age* Sept. 22 and 29 and Oct. 6 and 27 of that year, the second section relating specifically to the mine layout. These paragraphs which deal with this subject are repeated here to enable the reader better to note what changes are involved under present methods.

The excerpt reads: "The mines are laid out on a compromise between the advancing robbing system and operation on the retreat. Principal headings are driven so far apart that between them there is room for four rooms end to end. These headings have an empty and a loaded track and two airways and they will be driven up to the boundary without turning a room. They will be flanked by barrier pillars so wide that a full-length room may be driven in the distance across them, but the heading pillars will be left unworked till the boundary is reached, when rooms will be driven into them and the pillars brought back on the retreat. In the drawing these pillars are noted as the barrier section.

"Between two principal headings are, of course, two barrier sections, leaving two other sections each as wide as a room is long. These are used to maintain tonnage till the barrier is reached. Two room headings are driven and each removes what is marked as a room section. The coal from these sections is won entirely on the advance.

"Some of the principal headings will be three miles long. By the system described a uniform output can

FIG. 2

Digging Down a Knoll

Headings used for haulage must be graded to remove the many rolls on the seam. The top must be brushed or the bottom lifted almost everywhere along these headings. In this case 43 in. of bottom is being lifted in No. 6 right off No. 31 main. This is, however, not a particularly bad manifestation of these frequent bumps and sumps which make haulage difficult. Note how the workman is aided in his work by electric lamps.



tons of coal per day. To get this tonnage the section boss must see that all places in his precinct are loaded out.

A 14-ft. room in the 5-ft. seam being worked at this mine will give up seven cars of coal per cut, the total weight of which is about 21 tons. If the thickness of the coal diminishes to 4½ ft. at a point along a room heading, then the room may be made wide enough to yield the full quota.

In the early stages of development in these mines, when the workings were not far under the mountain, a good sandstone roof was encountered which held the weight of the cover above the rooms and headings securely enough to permit of a 36-ft. room. That width was enough to accommodate two or three men, and excellent results were obtained. Later, however, after mining activities were extended into the mountain, the roof changed from sandstone to slate and would not hold up over a wide place unless an excessive quantity of timber was used.

The great weight which the heavy mountain cover brought to bear on the coal was a factor influencing the change to a narrow room. In places the cover has a thickness of 3,500 ft., and the average is scarcely less than 2,500 ft. Thus the narrow room must be used.

There are yet other reasons for the adoption of the narrow room. The cover usually is heavy, greater even than that resting on most of the deep mines of Belgium. It is so heavy that it is advantageous to use it to break the coal in pillar sections. Thereby much difficult and costly machine cutting is eliminated. The narrow room affords a greater concentration of working places than does the big room. By making rooms narrow and pillars wide, the heavy cover will break out the coal, facilitating pick work and making machine cutting in pillars unnecessary. In consequence the more pillar work the better, for the coal is not mined to obtain lumps. More slate must be handled in a given area when the rooms are wide than when they are narrow, for the roof span is longer and the slate is subjected to a greater strain. Moreover, with a wide room more timbers have to be set.

In his article Mr. Eavenson says: "Between two

principal headings are, of course, two barrier sections, leaving two other sections each as wide as a room is long." These latter sections are termed room sections. In speaking of a territory that is mined as a unit, all the coal from which is hauled over one principal heading, I will use the term "mine area." In order that the reader may conceive what constitutes a typical mine area, he is asked to refer to Fig. 1. A four-sided territory inclosed by dot-and-dash lines and marked *ABCD* is pierced by No. 1 flat right off the main heading. It comprises a principal heading flanked by two barrier sections.

MINE AREAS MADE OF DIFFERENT WIDTHS

Though the typical mine area has only two-room sections, three-room sections have been included in several areas for the purpose of dividing the property to better advantage. The results from each are almost equally good, but the smaller mine area has advantages which will be discussed in connection with the haulage system. The area which is designated as *GFEDH* in Fig. 1 has three room sections. It will be noted that a barrier heading was started outby from No. 1 flat right off the main heading and then stopped because of adverse conditions. Consequently that block of coal which should have formed a barrier section to the outside of the barrier heading known as No. 1 flat right became the third room section of the adjoining mine area.

In Fig. 1 a double section is indicated by *FKLE*, consisting of two-room sections on the outby side and three-room sections on the inby side of the barrier or heading known as No. 7 flat left off No. 1 haulage right. This section was laid off in this manner primarily to divide up to better advantage the territory between the main heading and the boundary line on No. 1 haulage right. The territory inby beyond the first mine area of this heading was not large enough to accommodate two mine areas so what should have been the second and third mine areas were combined to form one double area.

The room section of a mine area closest to a barrier section will be termed the first room section and the one beyond it will be called the second room section. As

the two-room sections are completely mined advancing, the rooms in the second room section must be kept in advance of those in the first room section. Rooms are laid out in pairs—that is to say, on one side of the room the pillar is wide and on the other side it is narrow. Those in the second room section are driven alternately on 36- and 64-ft. centers, and those in the first room section are driven on 36- and 90-ft. centers.

STRONGER PILLARS LEFT IN APPROACHING GOAF

The reason for the difference is obvious. Rooms off the second room section of a mine area are stopped (or "butted off," in common mining parlance). Consequently they terminate in a block of solid coal, which aids appreciably in supporting the roof load. Rooms off the first room heading of a mine section are driven through to the goaf of the adjoining room section. The unbroken roof projects as a cantilever over the room pillars of the first room section into the mined-out goaf of the second room section. Therefore, the wide room pillar of the first room section is left wider than the wide room pillar of the second room section.

The 22- and 76-ft. pillars in the first room section and the 22- and 50-ft. pillars in the second room section are equivalent at least numerically to an average width of 42.5 ft. As the width of a room is 14 ft. and the average width of a pillar is 42.5 ft., the ratio of first mining to second mining is as 1 is to 3. This means that 25 per cent of the coal won from rooms is obtained by mining into the solid and 75 per cent is removed by drawing pillars.

Headings in mine areas whether they be for haulage purposes or for ventilation are now driven 12 ft. wide. As first designed the air courses are made wider, but as with the rooms their width was reduced in order that the roof over them might have better support. The air-courses and haulage headings of a room heading are driven on 70-ft. centers, but the four headings which constitute a barrier heading are driven on 60-ft. centers for the reason that they are further supported by the barrier sections on either side.

Rooms are driven so as to make an angle of about 70 deg. with the room heading. In the first room section they are 440 ft. long. Those in the second room section are driven so as to govern their length and to prevent "hogging" beyond that limit into the barrier beyond. Sometimes this butt-off is carried far in advance of the last room driven up to it.

Room pillars are drawn by first driving a pocket 14 ft. wide so as to cut off a wing wide enough to sup-

port the roof safely while further operations are being performed. Consequently the depth of the wing pillar from the pocket to the goaf varies according to the roof load upon it. Usually it is made deeper on a narrow pillar than on a wide pillar. A room pillar is brought back about 40 ft. before the adjacent one on the advance side is started.

When the first room pillar of a room section is brought back and to the heading, 18 rooms are being pillared back and 10 rooms are being driven up. Thus a typical mine area of two-room sections will furnish about 56 working places in rooms and 8 in the headings which are being advanced.

A group of sixty-four working places is supposed to yield 1,000 tons of coal or more each working day. A place 14 ft. wide, undercut $7\frac{1}{2}$ ft. in the 5-ft. seam being worked, will yield, as stated, 21 tons per place. A heading 12 ft. wide yields less than that, but the shortcomings of a working place in a heading so far as its yield per cut is concerned is balanced by the fact that more than 21 tons per working place is obtained when drawing pillars.

USUALLY OBTAIN MORE THAN 1,000 TONS PER DAY

For convenience one may assume that each working place theoretically yields 21 tons. If development in the headings is worked double shift, as is customary, no more than 48 cuts in 40 places would have to be loaded out. This gives elasticity to the average tonnage required from each working place and as a result more than 1,000 tons per day usually is obtained.

At this rate not all places have to be worked to produce the necessary tonnage for the area or if the average tonnage per place drops below this mark the basic tonnage for the mine area can still be maintained by working more than 42 places. Thus with all places in a mine area working, to produce 1,000 tons per day each place need yield only 13.9 tons.

By referring to Table II in the preceding article, the reader will discover that the average tonnage per loader per shift during the month of May, 1923, is 13.05 tons. In spite of the fact that much development work is being done and much rock has to be handled in some mine areas, the absolute average tonnage per man per shift required theoretically to produce 1,000 tons is almost obtained in actual practice.

Division of labor is not carried as far at Lynch as it is in some mines, as for instance in many of the coke region mines. It has been said that company men should be employed to prepare the coal at the face



FIG. 3

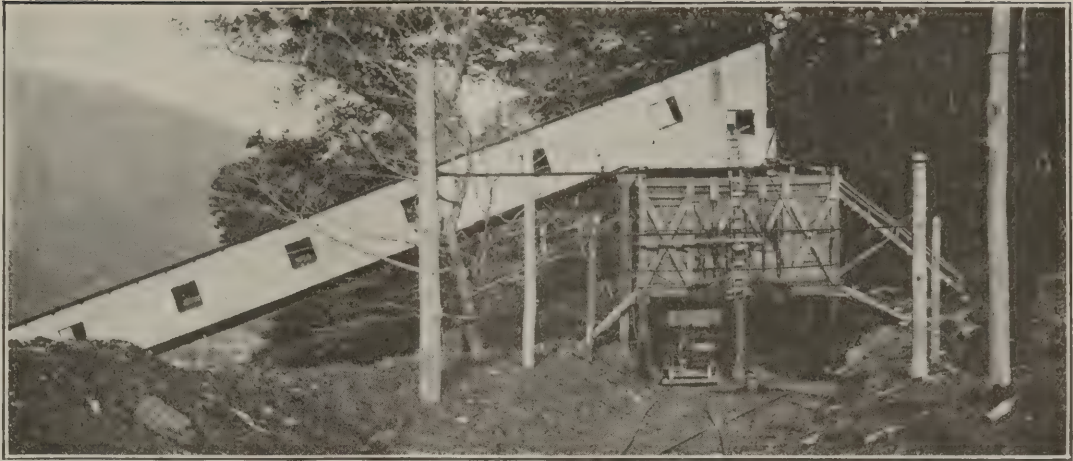
Driving a Pocket

Pockets, or cross cuts, are driven near the end of a pillar for removing the coal adjacent to the goaf. Note the excellent cap pieces and on the left the electric-light wire. Rails are laid only temporarily as in a few days the place is closed in.

FIG. 4

Filling Slate Larry

Slate is disposed of by conveying it to a storage bin on a belt conveyor 686 ft. long which rises 209 ft. above the tippie. Two refuse stacking cars carry the slate to the point where it is dumped on the mountainside.



for the loader, so that the latter will have no other duties to perform other than to load out his coal, square up his place and remove whatever slate near the face is in danger of falling. This company believes that a too intricate division of labor is not economical.

For instance, let us suppose that men are employed to drill the shotholes in the various working places in a given section of a mine. If an electric coal drill is used the time required to drill three holes is not more than five minutes. In most cases it is less. But the time required for the driller to move from one working place to another on an average is greater than five minutes.

The interval between actual working periods would be about ten minutes, which means that two-thirds of the driller's time is wasted in getting from place to place. But because of the recital of these facts it should not be supposed that the company discourages the use of the electric coal drills; it merely believes that more of them should be placed in the mines and so distributed as to be at the disposal of more men.

The initial cost of such drills is not high; in fact it is so low that by dispensing with the services of one driller for a period of one year enough could be saved to pay for as many electric coal drills as would be required, at the rate of one for every two working places, in the section otherwise looked after by one driller.

THINK LOADER SHOULD DRILL OWN SHOTHOLES

It is the belief of the management that the coal loader should drill his own shotholes, using either a hand auger or an electric coal drill. He also should lay his own track, a job that will take about fifteen minutes each day. The two operations along with the loading of coal are continuous, and no time is lost in needless travel. With but few exceptions loaders will quit work for the day as soon as they have loaded out one cut, even though they have completed it by noon. They feel that they have done a fair day's work and are satisfied with their day's earnings; consequently they leave the mine. A period of 30 to 45 minutes consumed in drilling shotholes and in laying track added to their time for loading coal is not an imposition upon them as some of it can be done while the loader is waiting for cars and the compensation is such as to remunerate them for this extra work.

Under heavy cover mine workings usually are dry if the strata are not broken. Underground circulation of water normally is downward but in mountains it is not likely to reach far from the surface vertically or far inward horizontally. Openings in the rocks are small because of the great weight of the cover and not con-

tinuous, so they do not form passages for the flow of water. Consequently even if water is present it is not likely to be flowing.

As a rule the workings are quite dry, for little water finds its way into the Lynch mines through the strata or otherwise. Some water gathers in a few confined swamps by filtration through those parts of the cover which are not thick. In such cases it is drained into the seam below, which is now being developed to provide drainage ways. Thence it is drained by gravity to the outside.

The rarity of blowouts of cable in the underground transmission system is indicative of the dry condition of most parts of the mine and the excellent drainage wherever water is encountered. Fiber conduits incased in concrete alongside and below the level of the track of main headings carry 16,000 ft. of alternating-current cables; about 4,000 ft. more is being laid and there is a certainty that the system will be 10 to 12 miles long when its maximum extension is reached. This phrase of the operation will be dealt with in an article later.

Big Looney Creek lies below the seam along that part of its course over the property which lies west of the drift openings; but to the east, in the direction of its headwaters, the stream lies above the body of coal. In that direction for some distance the cover between the stream and the coal is not thick. Fortunately, the acreage of coal which might in mining be affected by the close proximity of the stream is not large. The coal which lies under the stream and between the stream and the main heading of No. 30 mine as far as the heading has been extended cannot be mined extensively at the present time. A break caused by subsidence, were the coal to be mined out, would empty the stream into the mine workings.

However, some headings and rooms have been driven that do allow some of this water to enter. The water thus admitted is impounded by dams within the mines and furnishes a water supply for town purposes. Although pure it is, of course, treated before being used. The workings are driven northeast from the main heading, which runs practically with the creek, as shown in the map accompanying this article. To this end, five left flats have been driven from the main heading and five more are being driven.

Concrete dams are built 260 ft. from the main heading in what were the haulage roads and air courses comprising each left flat. These dams are put down to solid bottom and are extended 2 ft. into the roof and 9 ft. into both ribs. The thickness of the dams is 6 ft. at the bottom tapering to 4 ft. at the top. They

are poured with a rich mix to make them watertight and troweled to a smooth finish on the outside. For the core of the dams the rock aggregate is 3 in. and for the finish it is $\frac{1}{4}$ to $\frac{1}{2}$ in.

WATER IN UNDERGROUND RESERVOIR SERVES TOWN

An estimate of the capacity of this underground reservoir is 35,000,000 gallons. With the added capacity of the rooms and headings now being driven for the purpose, facilities for the storage of water will be sufficient to furnish a generous water supply for the town during the dry seasons when the creek dwindles from the torrent that it is in the spring of the year to the size of a brook.

At Gary, W. Va., where the company operates its other mines, the grade of the stream in its vicinity falls with the dip of the synclinal. Thus the stream bed is partly or entirely emptied of its water, depending upon the season, and flows in the openings in the strata instead of staying on the surface.

As a result ground waters are abundant, and holes drilled for water seldom are dry. At Lynch the reverse is true for the fall of the stream and the dip of the rock formations point in opposite directions. Consequently the supply of water from wells is small.

Underground storage of water is the only possible solution of the problem at the present time. A dam upstream is impracticable in that it would be a menace to the town and plant below.

Many difficulties are met in the Lynch mines. However, these are overcome so well—naturally at an increased expenditure for labor—that production does not suffer on their account. Most of them are caused by rolls in the coal which makes necessary much brushing of roof and taking up of bottom on entries that are used for haulage. Fortunately, from the crests and troughs of the waves in the seam the coal falls or rises again to a base level.

The coal may fall in a dip of 30 per cent for a distance of 100 ft., then extend across a level table for 100 ft. more, only to rise again to the base level. As a rule the rolls are not so pronounced, yet the undulation of the seam is persistent enough to add greatly to the labors of mining. Notwithstanding this, the main haulage roads in the mines are graded almost everywhere to $1\frac{1}{2}$ per cent or less in favor of the loads. The grades in room entries cannot be eased enough to permit of haulage by gathering locomotives. In consequence, mules and ponies must be used. Where the grades are too steep even for animals, hoists are used for hauling coal from the faces to the necks of rooms.

WORKING AROUND SINKS AND RISES IN HEADINGS

Sometimes where room headings dip or rise excessively and have to be filled or excavated accordingly, a so-called "monkey breakthrough" is driven 80 ft. from and parallel with the heading so as to connect in coal the two rooms on either end of the fold. Rooms are worked from the monkey breakthrough, and the pillar between it and the heading is recovered by splitting it and drawing both wings on the retreat.

In some places, as in 30-G section of No. 30 mine, the shortwall mining machines are lowered down a dip by attaching a hoist rope and retarding its passage with the brake on the hoist and with that on the cutting machine also. In loading or unloading a machine from its truck on a rise or dip, frequently an extra machine jack must be fastened from the roof to the bottom in

front or behind the rear axle of the truck, as the case may be. Though the cutting machine will cut as well in these places as on the level there is no way of predicting the characteristic of the bottom under the next cut. In a distance equal to the length of the cutter bar of the machine a dip in the coal may change to a rise, or vice versa.

A study was made by the company in both mines to determine the quantity of slate that would have to be handled in mining a basic production of 120,474 tons of coal. This production was chosen because at the time the study was made it represented the average output per month of 26 days. Actual measurements of the thickness of coal and slate that had to be handled in advancing the faces were made in each room, air-course, pillar and heading. The average thickness of coal derived was 57.57 in. and that of the slate was 8.13 in.

As 1 cu.yd. of coal in the solid weighs 2,160 lb., to produce 120,474 tons of coal, 111,550 cu.yd. of solid coal would have to be mined. The thickness of the slate that would have to be handled in advancing the faces would be one-eighth that of the coal and consequently 15,755 cu.yd. of slate in the solid likewise would have to be handled in advancing the faces. This slate would fill 11,820 mine cars, figuring that 1 cu.yd. of slate in the solid is the equivalent of 2 cu.yd. of loose slate and that the volumetric capacity of the Lynch mine car is $2\frac{3}{4}$ cu.yd.

But after the faces were advanced, 18 per cent of the original quantity of slate additional would have to be handled and this would be sufficient to fill 2,066 mine cars. The total quantity of slate that would have to be handled would fill 13,886 mine cars. Slate from all mines which would have to be hauled to the tippie would fill 8,598 mine cars.

WEIGHT OF SLATE LOADED HALF THAT OF COAL

As the capacity of the mine car is 3 tons, the basic production of 120,474 tons would require the handling of 40,158 mine cars of coal. This means that for every 4.84 mine cars of coal one car of slate would have to be transported to the tippie and dumped. The specific gravity of the coal is 1.28, that of the slate is 2.80, consequently by weight little more than twice as much coal as slate is handled over the tippie. In the face of this big difficulty in mining, the average outputs per loader, per underground man and per man on the payroll are indeed high. These figures were given in the previous article.

Most of the slate that would have to be transported to the outside would come from haulage entries. In No. 30 mine that chargeable to haulage extension would be 2,355 cars and in No. 31 mine it would be 3,645 cars. To the former would be allocated a basic production of 79,374 tons of coal and to the latter 41,000 tons. In extending the haulage roads in No. 31 mine three times as much slate would be transported to the surface per ton of coal mined during the extension as for No. 30 mine. Incidentally twice as much coal would be mined during that period in No. 30 mine as in No. 31 mine. It may be noted that the rate of drilling by compressed air in slate and sandstone for grading haulage roads is 1 ft. in six minutes.

IF FRANCE WILL ONLY WAIT a little while the German offers will be offers to accept an indemnity.—*New York Tribune*.

Underground Transmission with Substations Designed To Keep Voltage Drop Low in Lynch Mines

A Mine Power Plant—How the Load Varies Throughout the Day—Supplying the Town With Lights and Power—Underground Distribution System in the Mines.

A MODERN power plant and an efficient system of electrification and power distribution are prerequisites of mining on a scale as large as that at the Lynch mine, a giant in the group of bituminous mines which are classed as big producers. The need for a modern power plant is redoubled in this case because the mine is isolated and out of range of central-station custom power, which otherwise might be depended upon to provide standby energy should the generating equipment be crippled at the mine. Under any circumstances it is always highly desirable that an efficient system of electrification be planned before a mine is opened up. The system should be flexible so as to permit additions and changes required in each stage of the development of the mine.

In many mines the electrification plan provides for the use of direct current only, which is not desirable from the standpoint of efficiency; nor is it favorable for extensions as the mining faces move further from the source of power.

Underground transforming and converting substations, supplemented by ample copper to feed the lines from which the power is drawn, will remedy the power troubles that vex the mine superintendent who relies solely upon direct current for his electrical energy. An adequate number of substations properly located with respect to the loads help to maintain excellent voltage in direct-current lines, thus making the system at the Lynch mine comparable to modern methods employed in a metropolitan central-station distribution system or

an electric-railway layout in a large, heavy-traffic city.

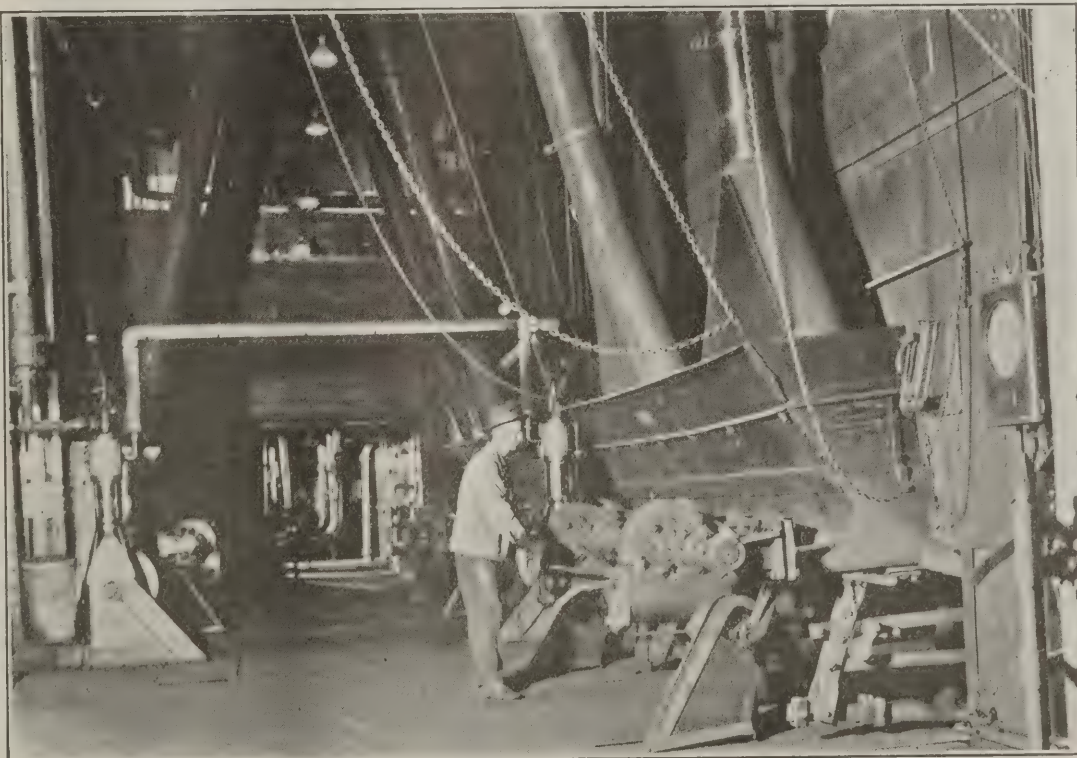
All particulars of the power plant at Lynch will not be recounted here for the reason that a general description has already appeared in these pages—see *Coal Age*, pages 453 and 454 in the issue of Sept. 22, 1921. In this article those details will be emphasized which deal with a few problems of installation, operation and maintenance of the power plant and the transmission system.

At the Lynch mines, steam at a pressure of 200 lb. and 100 deg. superheat is furnished by three 750-hp. Stirling water-tube boilers to two turbo-generators each rated at 1,875-kva. capacity, 6,600 volts, 3 phase, 60 cycles, and to the auxiliary steam equipment. The usual practice is to run two boilers at a time, holding one as a spare. The idle period of the latter affords an opportunity to make necessary repairs on it. In the course of a year all three boilers will have given about the same service, which is sufficient to necessitate a relining of each of the boiler furnaces once every ten months.

Peak loads on the plant now vary from 60 to 75 per cent of the normal rating of the two generators. It will not be long, however, until these peaks will approach the normal capacity of the generating equipment, at which time a third unit, for which space has been provided, will be installed. Though two of the boilers are sufficient to care for all the steam equipment at present, the three boilers now installed would not suffice for the addition of a third turbo-generator so also

Most Modern Boiler Room

Three Stirling water-tube boilers of 750-hp. capacity are fired by under-feed stokers. There is space for a fourth unit. Only two boilers are fired at one time. When the load on these boilers becomes too heavy to be carried by natural draft, a fuel economizer starts the forced draft; in fact, whatever equipment was deemed necessary to carry the plant load efficiently has been installed. Note the steam flowmeter on the right.



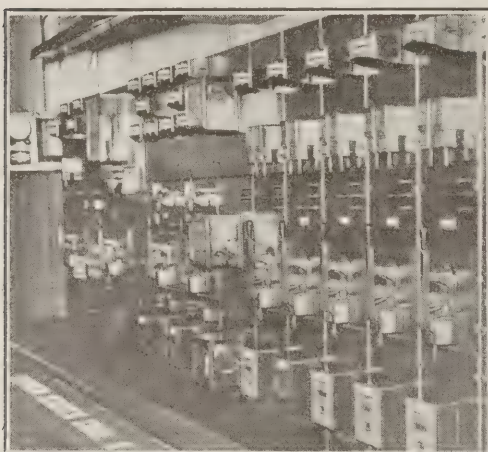
another boiler will be added. The necessity for excess boiler capacity at isolated plants which cannot be assisted from an outside source is obvious.

The boilers are carried at an average of 150 per cent rating for a period of 24 hours when a vacuum of 26.5 in. in the condensers can be maintained. Very seldom do they run at or below normal rating. During the day, from 6:30 a.m. until 4 p.m., they are fired to generate steam to the extent of 200 per cent of rating, while for the remaining hours of the day the load drops to 110 per cent of rating. During the latter period, when the load is light, one turbo-generator is idle. Whenever natural draft is insufficient to keep the boiler pressure at 200 lb., forced draft is started to maintain the plant efficiency as high as possible. Feed water comes from the water main of the town and requires no special treatment for boiler purposes.

Some difficulty has been encountered during the hot season of the year in maintaining a vacuum of 26.5 in.

The air washer consists of a centrifugal pump which forces water through spray jets to wash down the dust in the washing chamber. The air is forced against baffle plates which take out the moisture.

An interesting study was furnished by the chart of the kilowatt recorder taken at the plant on Aug. 11 for a period of twenty-four hours, tying in outside operations with those of underground and interpreting them accordingly. At midnight when the chart was started, the load varied but little from an average of 1,000 kw. until 2:30 a.m.; then it dropped off suddenly to a load slightly in excess of 800 kw., which was maintained until 5:30 a.m. The droop in the curve at 2:30 a.m. is natural. Coal cutters finish their cutting about this time, several locomotives used for hauling supplies, etc., are no longer running continuously and the machine shop, which is operated in two shifts, is closed at this hour. Street lighting, fans, pumps and other mine equipment constitute the load at this time.

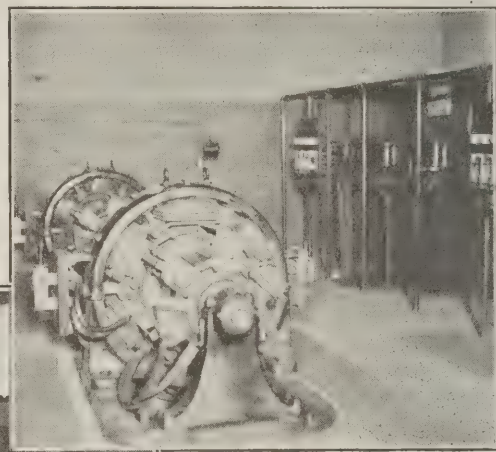
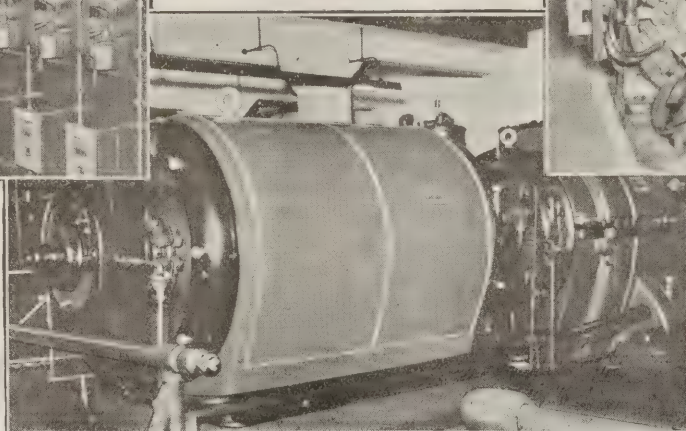


**Power House
Switchboard**

The switchboard depicted above is located on the same level as the turbo-generators and is provided with complete control and metering equipment for each circuit.

**1,875-kva. Turbo-
Generator**

For the day load when the mines are working the two generators are operated; during the night and on Sundays one is sufficient to carry the load.



An Inside Substation

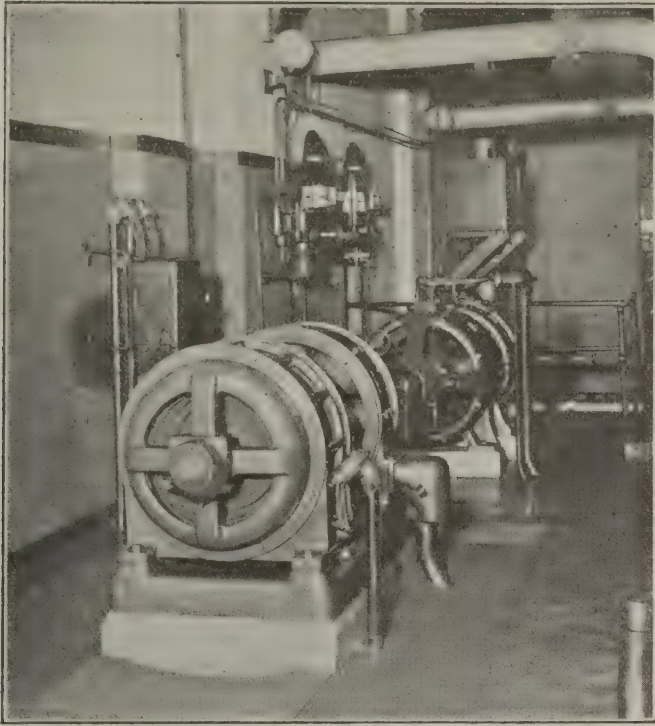
Each substation as shown above is housed in a concrete room near the load center. This arrangement makes possible proper voltage on all the feeder and trolley lines.

on the condensers. The water supply for condensing comes from the Big Looney Creek, which becomes low during the dry season. A spray pond which it was thought would adequately care for the needs of the power plant during low-water periods does not cool the water sufficiently for efficient condensing. Consequently a cooling tower is now being completed that will eliminate this trouble.

The air used for cooling the electric end of the turbo-generators is passed through an air washer. This is a particularly necessary precaution where the power plant is so close to the tippie. With a tippie of the size found at Lynch some coal dust is suspended in the air and finds its way into the generating equipment unless it is first removed. If the air were not washed, the capacity and efficiency of the generator would be reduced by a reduction in area of the air ducts and thus cause a rise in the temperature of the windings. Coal dust in the generator might be ignited by the slightest spark. With a generator revolving at 3,600 r.p.m. the rotor would coast for about twenty minutes after shutting off steam, with the result that in case of a fire in the generator it would be ruined before the fire could be extinguished.

From 5:30 to 6:30 a.m. the load hovered around 900 kw. Consequently one would surmise that the domestic load from the 998 houses inhabited by a population of 7,100 to be 100 kw. during this morning hour in which households prepare for the day. At 6:30 a.m. the load jumped to about 1,600 kw., which approximately was the integrated load for the day shift. The peak for the day was about 2,100 kw. At 4 p.m. the tippie stopped, though the operation of the mines continued and the load fell to 1,100 kw. The drop of 500 kw. from the average, however, cannot be attributed to the tippie alone. The mine locomotives begin to clean up their trips at about 3:30 p.m. and there is a gradual reduction of the load from this source until 5 p.m. It can be reasonably said that the tippie load is about 250 kw., including, of course, that power which is consumed in the two dumphouses. As the night shift came on and the machine runners began to cut their places the load rose to 1,300 kw., but gradually fell back again to about 1,100 kw. at midnight.

There are two individual 6,600-volt outgoing circuits from the power house for town use. One circuit supplies current for the houses only. The other circuit supplies



EXCITERS FOR TURBO-GENERATORS

current for business houses, the hospital, the office, schools, etc. The domestic and the business circuit are metered separately.

Outgoing lines from the power house pass through horn-gap switches on the hillside to transmission lines going to the upper and lower ends of the town. This precaution insures service to either end of the town in the event of trouble on the opposite end. Landslides, cold weather and lightning in mountainous districts are ever likely to cause trouble. Branch lines from the main transmission lines are stepped down to 110-220 volts. Branch lines and transformers are of a capacity and so distributed as to take care of individual sections of the town.

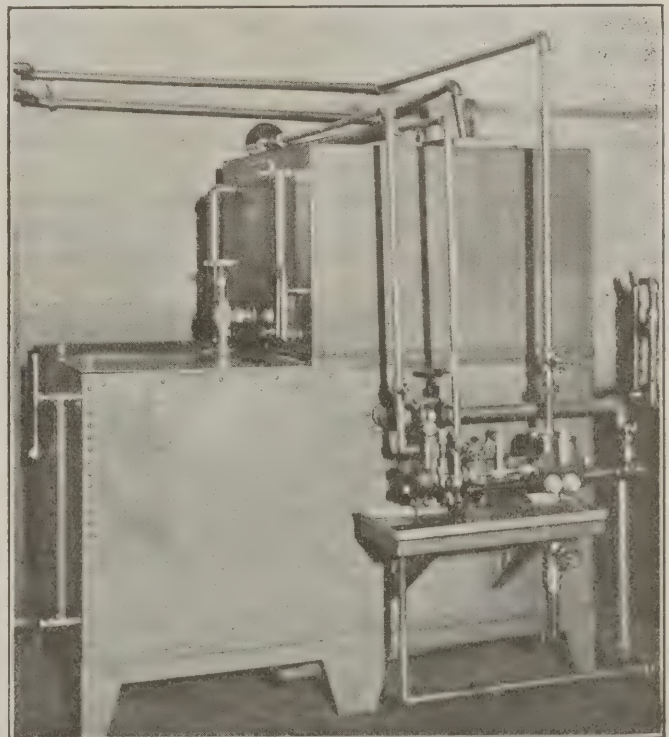
Three distribution circuits are used for the transmission of power from the power plant to the mines. All high-voltage transmission lines except those for town use are placed in underground conduits made of concrete. Each of the two mines has an individual circuit and so also has the electrically driven machinery on the surface. The last-mentioned circuit feeds the tippie, dumphouse, mine fans and shops, and on each tap from this circuit a separate meter is provided. The consumption of power in each mine also is metered separately. This arrangement distributes the cost of power in proportion to the amount used by each of the several phases of operation.

The circuit which feeds outside mine equipment is stepped down to 440 volts through five 200-kva. transformers located in the power plant. A bank of three of these transformers is connected in closed delta to feed the tippie, dumphouses and shops while the remaining two transformers are in open delta for the fans. The bus bars of each of these two banks of transformers may be interconnected through an oil switch so that in case of a breakdown to either set of transformers the fans may be operated. In that event, however, the tippie load would have to be decreased so as not to overload the working set of transformers—this arrangement has not yet been necessary. Con-

tinuous running of the fans is more important than tippie operation. The load on the tippie could be decreased by running one side and then the other alternately. A further reduction in the consumption of power in the tippie during such an emergency can be obtained by cutting out the grizzly screens and in the dumphouses by passing mine cars of slate through the dumps without dumping. This slate could be dumped at night.

From the busbars and oil switches the current is carried by a three-conductor braided rubber-covered cable of 000 wire to the floor and thence outside in metal conduits; there the wires enter 4-in. fiber conduit pipes of the drive-joint type which are embedded below the surface in concrete so that at least 3 in. of material protects the conduit pipe in any direction. In this manner the high-tension cables are extended to the substations in the mines, following the shortest paths possible, which are along the main haulage roads where they are placed below the level of the roadbed and near the rib on the trolley-wire side of the haulage entry. Wherever the mine track passes over the conduits, as, for instance, at a turnout, it is supported by extra heavy steel ties to prevent fracturing of the concrete.

At intervals of 500 ft., manholes fitted with covers provide facilities for laying the cable and furnish access for making repairs. The distance between manholes is made 500 ft. because the cable usually comes in 500-ft. lengths. Cables of this size in 1,000-ft. lengths are too heavy and bulky for handling underground. The reel upon which such a length is wound is so big as to be cumbersome and consequently could not be taken into the mines very easily. Moreover, it would be next to impossible to pull this cable through the conduit from manhole to manhole at intervals of 1,000 ft. Either the pull line might break or the insula-



OIL FILTER FOR LUBRICANT USED ON TURBO-GENERATORS

For efficient operation of the generators lubricating oil must be kept clean. Oil filters are indispensable in the power plant at the mine just as much as they are indispensable in the large central station.

tion might be injured. Even in pulling a 500-ft. length through a conduit the pull line broke on two occasions.

The pull line generally used is a $\frac{1}{2}$ -in. stranded wire rope of steel. As the conduits are laid, an auxiliary pull line of No. 12 galvanized iron wire is first put through from one manhole to the next. This preparatory precaution is taken because it was soon found that much trouble is met in pushing a small wire through the conduit for distances greater than 200 ft.

By resorting to the method described neither cable nor conduit is in any way injured. This is important, for if the conduit were injured a leak would develop, as a result of which water probably would flow into the conduit and cause the cable to break down.

As a precaution all joints of the fiber conduit pipes are dipped in tar before being driven together. Also great care is taken in laying the pipes and in placing the protective covering of concrete to insure a straight level or uniformly graded line between manholes and thus eliminate damage due to water which would follow at those points where water might collect in the conduit. Wherever there is a suspicion that a given section of the conduit is punctured, a piece of brattice cloth saturated with hot tar is wrapped around the concrete at the point where the leak is believed to exist. Leaks in manholes are stopped off with concrete and painted with tar on the inside. In rare instances a manhole is inundated and then a portable pump is utilized to remove the water. Manholes on the outside between the power plant and the mine openings are provided with drain pipes which lead to the creek.

Naturally in every manhole the cable is spliced. The commonly used splice was tried but did not give satisfactory service. The method of the telephone companies, whereby individual wires are dipped in paraffin to waterproof the insulation along the entire length of the wire and at splices, suggested the use of paraffin for splices in high-tension cable. The outside cover at the end of one piece of the cable is slit so as to envelop the conductors exposed in splicing and also several inches of the insulation on the mating piece of cable. Each conductor is taped in the customary manner, first with rubber tape and then with friction tape. The separating strands of hemp are carefully adjusted in place at the splice. The slit in the outside cover at the end of one piece of cable enveloping the splice forms a



AIR WHICH COOLS GENERATORS WASHED WITH WATER

Equally as important as the filtering of the lubricant is the washing of the air which cools the generators. The air washer is located directly below the gallery on which the turbo-generators are set.

cup into which is poured a copious amount of boiling paraffin. The envelope is then closed and encircled with friction tape, after which the outside is coated with paraffin.

Not a single splice of this kind has failed though the cables have been extended a lineal length of 15,000 ft. and many of these are known to have been submerged in water for periods of many hours without leaking.

The high-tension cable is laid under the floor of the substations and led to the busbars in metal conduits. From busbars and oil switches the alternating current is stepped down through banks of three transformers, each transformer having a capacity of 75 kva., to 103 and 206 volts. Synchronous converters, each with a capacity of 200 kw., are used to generate direct current at 275 volts.

Each mine has two substations, averaging $1\frac{1}{2}$ miles apart. In each mine the innermost substation is equipped with only one converter whereas the outermost substation has two. In the substation equipped with two



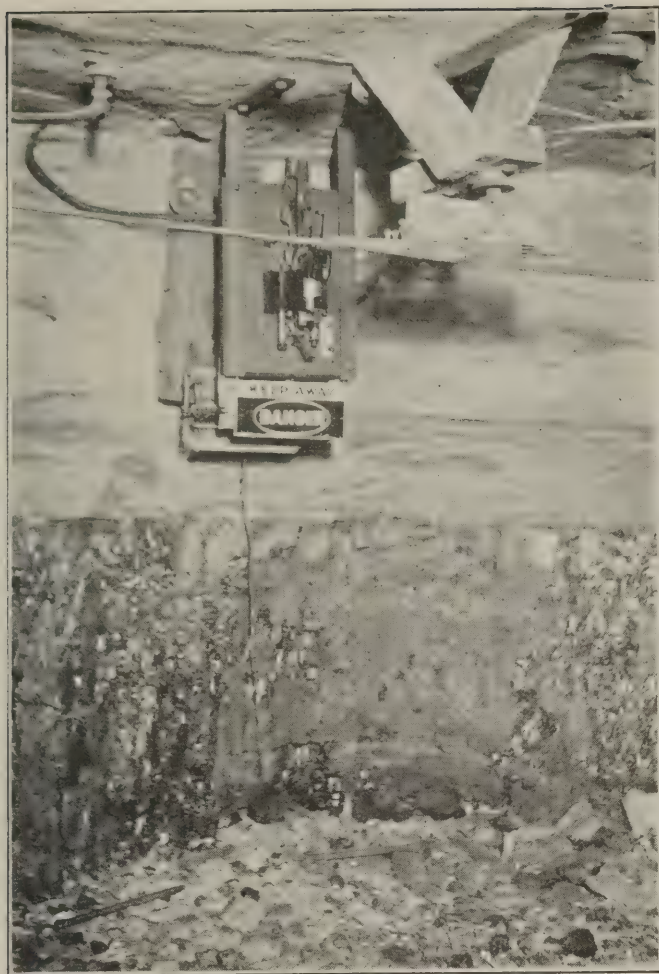
MANHOLE FOR ACCESS TO HIGH-TENSION CONDUIT

The manholes must be made waterproof as well as the conduit which stretches between them. A splice of the cable can be seen. The cover consists of $\frac{3}{4}$ -in. steel plate.

converters—generally termed No. 1—connection is made from the A.C. busbars through current transformers to three oil switches, two for the two converters in this substation and one for the single converter in No. 2 substation. In case of trouble in No. 1 substation the oil switches which control the current to converters in No. 1 substation are tripped open and No. 2 substation is unaffected. Of course the two substations are connected in parallel on the direct-current end to equalize the load between the two substations.

No. 2 substation in No. 30 mine is temporary. A new substation to take the place of the temporary substation is being built 5,000 ft. in by from the latter. This will make an interval of two miles between the two permanent substations in this mine. Housed by the same walls as those that form the substation will be a mine foreman's office and an underground restaurant. The latter is an innovation in mines and will be equipped with an electric range on which hot lunches will be prepared.

Feeders of 1,000,000-circ.mil. cross-section are carried from the substations along the main haulage roads of the mine. From them run 500,000 circ.mil. feeders along the main haulage road in each mine section. All feed cables are carried on the same hangers that hold the trolley wire. This arrangement is advantageous



AUTOMATIC RECLOSING CIRCUIT BREAKER IN NO. 31 MINE

This breaker is located at No. 1 flat right off No. 31 main taking care of an electrical section in which are included three adjoining flats to the right of the main heading. The breaker is set for 700 amp., that in the substation is set at 1,200 amp. A short in this section will not affect any other section; and when the short is removed the breaker will close automatically.

for several reasons: A feeder is not likely to be cut in two by a derailed locomotive or by a wreck of mine cars as would be the case were it hung from the rib; it is safer being up with the trolley wire and it simplifies the task of suspending it as one hanger serves for both feeder and trolley wire.

Strain insulators are placed on the feeders at intervals of 500 ft. Jumpers from feeders to trolley wire are spaced on 200-ft. centers to insure a minimum voltage drop when locomotives in a given section are taking a full load. Localized heating of the trolley wire, with subsequent elongation which causes it to drop, is prevented.

MINIMUM OF LINE LOSSES ASSURED

In these mines high-tension alternating-current distribution in underground conduits at 6,600 volts to all underground substations insures a minimum of line losses. Because large feeders are along all main haulageways it is rare to have a voltage drop of more than 15 volts at any face in any section at the present stage of development in both mines. It is the intention of the company never to have a drop of more than 75 volts; even when the workings are moved far under the mountains, more substations and feeders will be added to maintain a high direct-current voltage at all places.

Damp Carbide from Acetylene Lamp Ignites Coal Dust Warmed by Sun

BY ROYCE L. GRIMES

Electrical Engineer, Cleveland, Ohio

EVERYONE engaged in the mining industry knows that carbide generates great heat when it is dampened, but few indeed have suspected that it could attain such a temperature as to ignite dust from the average grade of soft coal.

Recently I passed by one of the tipples of a mining company located in Jefferson County, Ohio, and noticed that smoke was escaping from a pile of dust that had accumulated under the screens. It was during the noon hour, and the place was deserted except for the foreman of the tipple, the weighmaster and myself, so we proceeded to extinguish the flames. Upon examination of the dust as it was shoveled into the open we discovered small fragments of carbide, and upon further inquiry we were informed that an employee from the inside of the mine had passed this platform and emptied the contents of his lamp only about five minutes prior to my discovery of the fire. This we conceived to be a possible clue to the source of the fire, and I gathered a quantity of dust that was unburned and delivered it to the laboratory.

The analysis was as follows: Volatile matter, 36.81 per cent; carbon, 52.03; ash, 11.16; the sulphur percentage was 2.10 and the heat of complete combustion 14,500 B.t.u.

A quantity was placed in a suitable test tube and a fragment of damp carbide added. The tube then was sealed, but no apparent action took place other than the formation of gas from the carbide. A second quantity was prepared in a similar manner except that it was preheated to about 122 deg. F., which is about the temperature to which the dust upon the tipple was exposed for the rays of a summer sun at midday were beating upon it. To this warm coal a fragment of damp carbide was added. This test resulted in ignition within 4.5 seconds.

The tests that followed were many and varied but we learned through a series of experiments that from 4.5 seconds to approximately 40 minutes might be required to ignite this dust, the time depending upon temperature, quantity of dust and carbide, the atmosphere and other conditions. I hope to gather more data pertaining to this matter. Until more is discovered, however, it is well to keep in mind the possibility that loss of life, destruction of property and loss of employment may result from the careless disposal of used or partly used carbide.

Railroad Coal Consumption Up in July

Class 1 railroads of the United States consumed 8,315,000 net tons of coal during July, 1923, as charged to account 394, compared with 8,296,000 tons in the preceding month and 6,597,000 in July, 1922, according to a report by the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first seven months of 1923 these roads consumed 65,226,000 tons as compared with 51,736,000 tons in the corresponding period of 1922. The delivered cost per ton in June last was \$3.37; in July, 1922, it was \$4.32.

Consumption of fuel oil during July was 160,270,000 gallons, compared with 151,732,000 gallons in June and 120,809,000 gallons in July, 1922. The totals for the first seven months of 1923 and 1922 were 1,056,972,000 and 833,926,000 gallons respectively.

New Equipment

Two-Piece Chain That Does Not Buckle Or Come Apart in Service

A NEW two-piece chain suitable for elevators, conveyors, concrete mixers, stokers, ash conveyors, portable loaders and power transmission in general, suitable for operation on any standard sprocket from 1 in. pitch up, developed and placed on the market by the Anthracite Chain Co., Hazleton, Pa., is now being applied extensively at the coal mines.

This type of chain has no loose pins, the center links and pins being made up of one forging. This arrange-

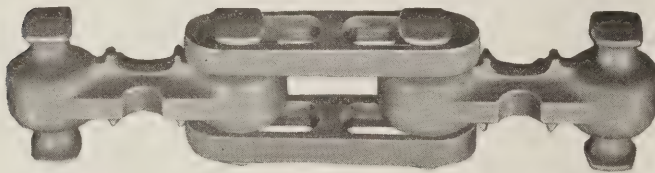


FIG. 1—CHAIN ASSEMBLED

Reducing the number of parts and still maintaining the serviceability and strength of the chain is a very important consideration in chain design. This chain seems to have all the desirable features and none of the objectionable features which are always troublesome.

ment reinforces the bearing surface of the pins and side links and also increases the diameter of the pins.

The development of this chain has been the result of a need for a stronger and more efficient chain with fewer parts than most of the earlier chains that were developed for service around the mine. The parts are made from high carbon steel drop forged and the chain is now made in pitches from 3 in. light to 9 in. heavy. This embraces eight different sizes.

Fig. 1 shows the chain assembled. It will be noted that the pins fit the side links in a way that forms a semi-ball and socket joint. This prevents side play, eliminating any possibility of climbing the sprocket. The ends of the center links that come in contact with the sprocket teeth are extra heavy to retain the pitch of the chain.

Fig. 2 illustrates how the chain is assembled. When in service only one-half of the pitch is required for slack

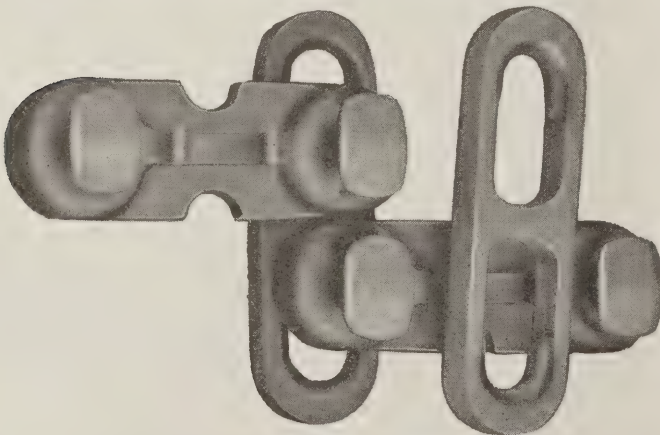


FIG. 2—HOW CHAIN IS ASSEMBLED

These links can be taken apart instantly without removing attachments, yet it is impossible for the chain to buckle or come apart in service.

to take the chain apart. Where it is necessary to reverse or back up the line, the stops and the back of the pins come in contact with the extreme ends of the side links and prevent back lash.

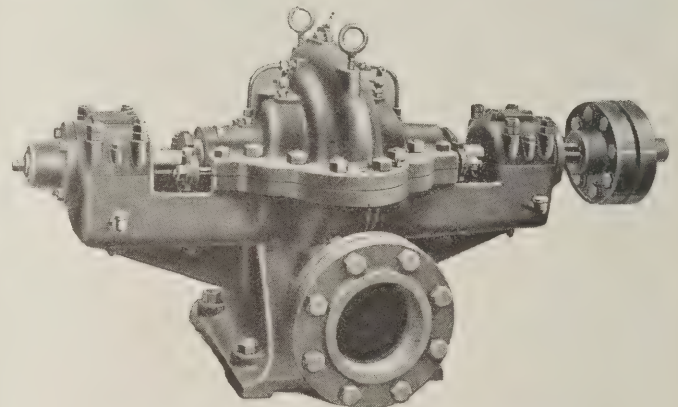
The attachments for the flights, carriers or buckets are made of certified malleable iron parts which grip the center link and are interchangeable with standard flights. The attachment bolt passes through the half circle in the center link thus preventing any slippage.

This chain has already been examined and approved by the Industrial Board of the Pennsylvania Department of Labor and Industry.

Single-Stage Double-Suction Centrifugal Pump Maintains High Efficiency

AFTER a careful survey of the latest technical data available, embodying a study of the practice of all manufacturers of centrifugal pumps both in this country and abroad, the Goulds Manufacturing Co., of Seneca Falls, N. Y., has developed a new line of single-stage double-suction centrifugal pumps. The main features of these new pumps are mechanical durability and maintained high efficiency.

The impeller is of the double-suction inclosed type. For bronze fitted pumps removable bronze shaft sleeves are provided to protect the shaft from wear and corrosion. The casing is horizontally split, making it possible for the pump to be opened for inspection without disconnecting either the suction or discharge piping.



NEW TYPE SINGLE-STAGE DOUBLE-SUCTION CENTRIFUGAL PUMP

Heavy construction, low maintenance, long life and maintained high efficiency, features always interesting to the mine manager, are claimed for this equipment.

The bearing housing is cast integral with the casing, which insures permanent alignment. Deep stuffing boxes fitted with split glands with swing bolts are furnished. The bearings are made of removable split ring oiling shells in a split housing. Any end thrust is taken up by a double-acting ball thrust bearing in oil bath.

The construction of the pump as a whole is substantial in every detail, the pump casing in particular being suitable for heavy suction pressures as high as 100 lb. Suitable bases can be made for mounting the pump as a unit in conjunction with an electric motor, steam turbine, gasoline engine or belt drive.

The various sizes available will make this type of pump popular for use in the mines and outside the mines wherever water must be handled in large or small quantities.



Problems of Operating Men

Edited by
James T. Beard



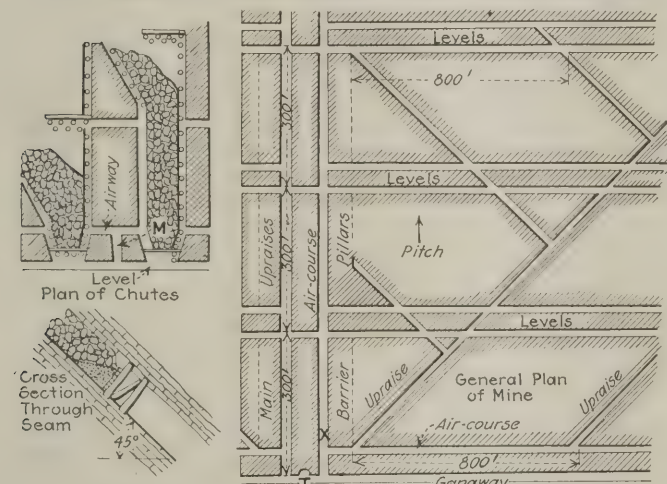
Working Two Coal Seams on Steep Pitches

Seams Reached by Cross-Tunnel—Gangways and Levels to Right and Left of Main Upraises—Slant Roads Pitching 35 Deg. Provide Conveyor System

HAVING had some experience in mining pitching seams, my attention was attracted by the inquiry of L. L. Travis, Ophir, Utah, *Coal Age*, June 7, p. 942, asking for the best method of working two steeply pitching seams, separated by 125 ft. of strata and having an inclination of 45 deg., approximately.

Assuming that the only way of approaching the seam is by driving the proposed tunnel from the hanging-wall side, and that the line of the tunnel is located near the center of the property, I would adopt a plan of development similar to one that I will try to describe.

Where the tunnel cuts the upper seam, marked T in the accompanying figure, I would start and drive



SHOWING GENERAL PLAN AND DETAIL SECTION

a pair of upraises on the full pitch of the seam, extending these openings to the surface. This work should be rushed so as to provide an adequate air-course for the further development of the mine. The two openings should be driven on centers determined by the depth of cover and other conditions relating to the nature of the roof, floor and coal.

Mr. Travis states that he contemplates the probable total extraction of one of the seams before developing the other. Let me suggest that the development of the second seam should commence when the output of the first has reached its peak. The total production from the property would thus be maintained more uniform, and the development of the second seam would probably be more easily financed.

If this suggestion is adopted and an air-course driven to the surface on the second seam, a drift can then

be driven from one of the main upraises on the first seam to the air-course of the second seam, as indicated at X in the general plan on the right of the figure. This would provide means of properly ventilating the first seam, when the barrier pillars of the upper air-course are being extracted.

The correspondent's suggestion of driving levels each way to the property lines, and upraises every 800 ft. is good and, as the editor has remarked, "cannot be improved." Then driving levels every 300 ft. from the main upraises will divide the whole property into blocks or panels 300x800 ft. in area. The upraises, however, must be driven in such a direction so as to give a maximum inclination of 35 deg. and enable the use of retarding conveyors.

ROOM-AND-PILLAR WORK, RETREATING PLAN

When the property has been developed to the crop and boundary lines the final operation of robbing back is commenced, for which a modified form of longwall retreating has been suggested. My fear is, however, that such a plan would prove a costly experiment in this case. Instead, allow me to suggest the room-and-pillar method of extraction, in retreating.

The rooms should be driven on the full pitch of the seam. The width of both rooms and pillars must be determined by the depth of cover and other conditions that characterize the seam. The room chutes should be kept full, until the room has reached its limit of 300 ft. The coal in the chute is then lowered enough to enable the miner to angle into the adjoining pillar as shown on the left of the figure. The angle will be determined by the nature of the roof strata overlying the seam.

As each slice of pillar is extracted and the coal lowered ready for another slice of pillar, a bulkhead (a cross-section, of which is shown in the lower left-hand of the figure) is built to protect the chute below. These bulkheads, cushioned with slack, as indicated in the figure, prove very effective in comparatively low seams, as we may class the two seams, in this instance.

The bottom slice of pillar may be cleaned out by building a loading chute in the manway M, between two adjoining rooms. The method of robbing the entry stumps would be the usual method, familiar to miners, in pitching seams. By this method a good percentage of extraction may be obtained. Manway lumber can be easily recovered, and if good bulkheads are built at the proper time, most of the props can be recovered.

TRANSPORTATION OF COAL

The inclination of 45 deg., in this case, insures the gravitation of the coal down the pitch and the only problem is its transportation along the levels. I would suggest utilizing the energy generated on the pitch to transport the coal along the levels. One of the leading manufacturers of conveyors states, "Retarding con-

veyors operating on inclinations above 26 deg. will generate power"; and, again, we are advised that "an inclination of 35 deg. is the maximum inclination for retarding conveyors."

Retarding conveyors can therefore be installed in the slant upraises, their number depending on the production of the mine. Each conveyor should be made in sections, so that when the level has retreated to the conveyor upraise a section can be taken out and installed in the level below. The coal from the higher level must then be taken to the next conveyor on the outbye side.

CONVEYOR SYSTEM GENERATES POWER

In order to utilize the power generated by the conveyors I would suggest coupling each conveyor to a small dynamo. Since the periods of generating will be intermittent, the current must be transmitted to accumulators, and there, in turn, tapped by feed lines, to transmit the power to where it may be needed.

On the levels, the coal is conveyed from the room chutes, in bottom-dump cars, and dumped into chutes feeding the conveyors.

For transporting the coal along the levels in as simple a manner as possible, hand tramming not being efficient, I would employ an electrically operated endless-rope system, provided the mine is non-gaseous; or compressed air can be used if the mine is gaseous.

Superior, Colo.

CYMRO.

Flooding of Mine Prevented by Changing Course of Creek

Door at foot of slope good for use in emergency—Permanent benefit obtained by changing the course of the creek—Instance cited.

REFERRING to the inquiry of Joseph Magdalena, which appears in *Coal Age*, Aug. 23, p. 291, and describes the trouble he has experienced with the flooding of his mine during the wet season, or at the time of a Spring freshet, kindly permit me to offer a suggestion that may be of service in his case, particularly if the mine underlies a creek bottom, as has been my own experience.

The suggestion he offers of building a strong iron door at the foot of the slope, on finding that the concrete wall and arch with which he lined the slope failed to keep the water out, is undoubtedly a good plan for use in an emergency. There are reasons, however, why something else should be done that will afford greater relief, by not interrupting the mining of coal during times when the door would have to be closed.

For this reason, I would look for some other means of keeping the water from running into the mine. It is possible, as I have already suggested, that this mine underlies a creek bottom; and, in that case, the accumulation of surface water in that area and the possible overflowing of the creek will make it difficult to keep the water from flowing into the mine through cracks and crevices in the overlying strata.

On this assumption, allow me to suggest as a remedy changing the course of the creek, should that be possible, so as to avoid its traversing the section immediately above the mine workings. This was done, in one instance I recall, and there was no further trouble from that source during the working of the mine. When the place was finally abandoned the creek was turned back into its old course.

It may happen that much benefit will be derived by building a levee to divert the course of the water, and lining the creek bottom with a good layer of concrete. It may be necessary to widen the bed of the creek to prevent overflowing the banks during a freshet.

Loogootee, Ind.

JACOB RILEY.

Official Responsibility for Mine Explosions

Improved mining laws not the most urgent factor in reducing the number of mine explosions—Enforcement of existing laws of still greater importance.

THE terribly fatal mine explosion at Kemmerer, Wyo., which occurred Aug. 14, a brief account of which is given in *Coal Age*, Aug. 23, p. 296, again calls attention to the question of doing what we can to reduce the number of these dread disasters. The Kemmerer explosion exacted a toll of 99 lives and would seem to have been preventable by more careful supervision.

I am reminded of an excellent article that appeared in *Coal Age*, some time since (Vol. 23, p. 302), in which my friend, C. W. Atkins, asked the question, "In what respect can our state mining laws be improved?" His letter impressed me, at the time, as being one of the best that have been written on this subject.

While there is no doubt in my mind but that our mining laws can be improved in many respects, I am convinced that that is not the most important factor in reference to reducing the number of explosions in the mines. One point that occurs to me just now is that clause, in Art. 4, Sec. 1, of the Bituminous Mining law of Pennsylvania, which makes the mine foreman, in the words of the law, "subject to the supervision and control of the operator."

OPERATOR MUST CONTROL HIS OWN PROPERTY

Without doubt an operator should rightfully be in control of the mine, which is his property, to the extent of employing a competent foreman whom he can trust to take charge of its operation in respect to safety. On the other hand, however, the man so placed in charge and made responsible for the safe conduct of operations underground must be free to follow his own judgment and experience, since he is the one in closest touch with conditions affecting the safety and lives of the men in his charge.

To divide this grave responsibility in respect to safety, between the foreman in charge underground and the operator or superintendent on the surface, is to my mind one of the mistakes in our present laws. In this and a few other respects, our laws can doubtless be improved; but I wish to draw attention to a still more important factor in the preventing of explosions in our mines.

We all know and realize that what improvements have already been made in our mining laws have proved to be a great benefit in reducing the number of mine accidents, wherever these laws have been enforced by the mine officials in charge. None of us can say, however, how much greater would have been the benefit derived from this source had these laws been enforced more universally and there had been greater co-operation in that respect between all mine officials in charge of operations above and below ground.

As illustrating this point, I recall an instance that occurred when I was working in a mine so gaseous that no open lights were permitted in the drift mouth. However, so lax were the restrictions placed on the under-

ground operations, in that mine, that the miners charged and fired their own shots. To cap the climax, the firebosses employed in the mine had their attention called, by the management, to the fact that they were reporting too much gas.

Actions of this kind or of a similar nature are more often the underlying causes of explosions in mines than may be generally imagined. That is my reason for urging, as a truth to be recognized, that the strict enforcement of existing laws now on our statute books is of greater importance than the framing of new laws if we would reduce to a minimum the liability to gas and dust explosions in the mines.

It may seem unreasonably drastic to suggest that an extreme penalty, similar to the penalties attached to

the taking of life by assault and battery, be exacted of mine officials holding responsible positions when the failure on the part of such an official results in the loss of life to mine workers entrusted to their care. It is my belief, however, that such drastic penalties would have a wonderful effect in changing the attitude of many higher officials, in reference to the safety of their employees.

One word more in closing. It is my belief that mine explosions can be almost wholly eliminated through the honest and hearty co-operation of all mine officials, in seeing that the mine is operated in strict compliance with the requirements of the mining law. If mine officials cannot stamp out this evil, let me ask, Who can?

Mayport, Pa.

JAMES THOMPSON.

Inquiries Of General Interest

Reducing Resistance to Flow of Air in Fan Shaft

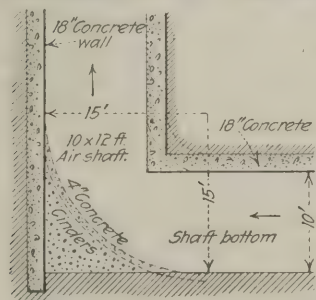
Obstruction Offered by Sharp Bends in Air-Course Not to Be Disregarded—Estimate of the Percentage of Loss on This Account

WE ARE about completing a new air shaft for the better ventilation of our mine. The fan to be installed is a double-inlet, reversible fan of the turbine type, 7 ft. in diameter and 4 ft. wide. At a speed of, approximately, 320 r.p.m., this fan is guaranteed to produce 200,000 cu.ft. of air per minute, against a total water gage of 4 in. The fan will be operated as an exhaust fan.

The fan shaft, which is 10x12 ft. in section, has been lined with an 18-in. concrete wall, extending from the bottom to the top of the shaft. About 15 ft. below the surface, a quicksand formation was encountered; and it was thought best to strengthen the concrete lining of the shaft, at this point, by the use of seven 40-lb. steel rails. These were placed across the shaft, four rails across the width and three across the length of the shaft, spacing them about equal distances apart.

In regard to these rails, the question has arisen, in the minds of some of our officials, as to whether this arrangement will cause an eddy and obstruct the flow of the air passing up the shaft. On this point, I should be glad to have the opinion of *Coal Age*.

Also, both our engineers and the maker of the fan advise me that a considerable gain in the efficiency of the ventilating system would be secured by rounding the airway or passage at the foot of the shaft, in the manner shown in the accompanying sketch. This would conduct the air current in a continuous curve, instead of causing it to abut sharply against the con-



CURVING SHAFT BOTTOM

crete wall at the bottom of the shaft, as it must do unless this change is made. I want to ask, will the striking of the air current against the concrete wall, in the present arrangement, cause any appreciable eddy or disturbance of the air passing up the shaft?

Blairsville, Pa.

MANAGER.

In answer to the first question asked by this correspondent, regarding the obstruction offered by the rails placed across the shaft about 15 ft. below the surface, as he has described, there is no cause for worry on this account. Estimating on a maximum air current of 200,000 cu.ft. per min., the velocity of the air is not excessive, being only 1,650 ft. per min. Even allowing for the reduction of the area of the shaft by the presence of the rails, the velocity of the air would be increased to 2,000 ft. per min. for an inappreciable distance only. If the rails are equally spaced in the shaft, there will be little or no eddy in the air current at this point.

ESTIMATING LOSS DUE TO SHARP BENDS

In regard to rounding the air passage at the foot of the shaft, however, a very considerable benefit will be derived by so doing, if this is done in a workmanlike manner. In replying to a previous inquiry regarding the resistance offered by sharp bends in an air-course, *Coal Age*, July 19, p. 111, reference was made to the investigation of this subject, by the Engineering Department of the University of Illinois co-operating with the Federal Bureau of Mines. The investigation showed that a sharp turn of 90 deg., or a right-angle deflection in an air-course, caused a theoretical loss in pressure equal to twice the velocity head of the current, whereas the same deflection, through a gradual curve, gave no appreciable loss.

Estimating on this basis and assuming an air current of 200,000 cu.ft. per min., passing in a 10x12-ft. airway or shaft, causing a velocity of, say 27.78 ft. per sec., the velocity head, expressed in inches of water gage, is $0.0144(27.78^2 \div 64.32) = 0.173$ in. Then, if the loss due to a square 90-deg. turn in the air-course is twice this velocity head, it would cause an increase of water gage of $2 \times 0.173 = 0.346$ or, say $\frac{1}{3}$ in.

Finally, estimating on a 4-in. water gage developed in the fan drift, the right-angle turn, at the foot of this upcast shaft, represents a loss of one-twelfth, or $8\frac{1}{3}$ per cent, making the power available for the circulation of air in the mine about $91\frac{2}{3}$ per cent of that indicated by the reading of the gage in the fan drift. This result is seldom appreciated in practical mine ventilation.

Examination Questions Answered

First-Class Foremen's Examination, Birmingham, Ala., July 23, 1923

(Selected Questions)

QUESTION—Which would you prefer in building airtight or fireproof stoppings; stone, brick, concrete, or hollow tile? Explain fully, stating the cheapest.

ANSWER—Each kind of material mentioned is fireproof and can be made airtight if carefully built as a mine stopping. The choice of material may depend, to some extent, on conditions in the mine in regard to the economy of construction. For example, a mine may furnish a large quantity of good rock for building stoppings, which if not so used would have to be stowed away as refuse or sent out of the mine. In that case, it would be economy to build good rock stoppings. In the absence of rock, however, the choice will generally lie between concrete and brick; and the former will most commonly be chosen, because of its general utility for the purpose. Hollow tile, unless of a form specially adapted for use in the mine, will seldom possess the required strength to withstand the roof pressure, particularly where there is any liability to squeeze, although the work of building stoppings with either hollow tile or brick may be more easily performed than when rock or concrete is employed.

QUESTION—Why should an up-to-date blueprint copy of the mine map always be on hand in the mine foreman's office; and what ready information will this furnish?

ANSWER—An up-to-date blueprint copy of the mine map will show, at a glance, the relation of different sections of the mine, and enable the foreman to plan the work intelligently. Constant reference to the map will avoid the habit of many mine foremen, who are prone to assume that their familiarity with the mine enables them to judge correctly of the direction and distance of driving certain rooms and entries. Mistakes made in this way often result in the loss of much coal that can never be recovered. Again, in case of accident in the mine, when rescue teams and helpers come from other mines and districts, an accurate mine map is invaluable in directing the rescue work that follows.

QUESTION—A water gage reads $2\frac{1}{2}$ in., on a door 5×7 ft.; what is the total pressure on the door? Show by example.

ANSWER—A water-gage reading of $2\frac{1}{2}$ in. corresponds to a pressure of $2\frac{1}{2} \times 5.2 = 13$ lb. per sq.ft. The area of the door is $5 \times 7 = 35$ sq.ft., which makes the total pressure, in this case, $13 \times 35 = 455$ lb.

QUESTION—What degree or percentage of pitch forms the most ideal condition for chutes?

ANSWER—The answer to this question will depend largely on the character of the floor of the seam and the nature of the coal, as these factors determine the ease with which the coal will slide down the chute. In general, however, it may be stated that where the inclination of the seam is less than 30 deg., it will be necessary to line the floor of the chute with sheet iron,

to enable the coal to slide freely. Coal that is hard and dry will slide easily over a sheet-iron floor, until the inclination gets as low as 15 deg. When the inclination reaches 30 deg., there is generally no trouble experienced in the sliding of the coal.

QUESTION—Which would you prefer, an airway 6×12 ft. or one 8×9 ft., in section? Give reasons.

ANSWER—Since both of these cross-sections show an area of 72 sq.ft., the one having the shortest perimeter, which is the 8×9 -ft. airway, will have the least amount of rubbing surface, for the same length of air-course. This airway will, therefore, present less resistance to the passage of the air current, other things being equal, and is the section to be preferred, as far as ventilation is concerned. There may be other considerations, however, that would alter this choice.

QUESTION—The velocity of an air current is 578 ft. per min. In an airway 6 ft. 8 in. high and 7 ft. 6 in. wide; what quantity of air is passing per minute? Show the calculation.

ANSWER—The sectional area of this airway is $6\frac{2}{3} \times 7\frac{1}{2} = 50$ sq.ft. Assuming the given velocity is an average for the entire section of the airway, the quantity of air passing is $50 \times 578 = 28,900$ cu.ft. per min.

QUESTION—In a ditch 18 in. wide and 12 in. deep, the velocity of the water is 5 ft. per min. How many gallons of water will pass in one hour? Show example.

ANSWER—The sectional area of this ditch is $12 \times 18 = 216$ sq.in. or 1.5 sq.ft. Then, assuming an average velocity of 5 ft. or 60 in. per min., the quantity of water flowing in this ditch, in one hour, is $(60 \times 60 \times 216) \div 231 = 3,366$ gal.

QUESTION—What percentage of stone dust would you recommend to render coal dust non-explosive?

ANSWER—Experiments by the Federal Bureau of Mines, on the fine dust of Pittsburgh coal have shown that a mixture containing 60 per cent of fine shale dust (free from combustible matter) or 60 per cent of limestone dust, prevented the ignition of the mixed dust, by a blowout shot. On the other hand, it was found that 75 per cent of either of these kinds of dust was required to prevent the propagation of an explosion that was once started. It is evident that very much depends on the inflammability of the coal, the fineness of the coal dust and whether or not the stone dust contains any appreciable combustible matter.

QUESTION—Where should stone-dust barriers be placed in a mine, assuming all entries working?

ANSWER—What is known as the "box barrier," in stone dusting, is a frail box filled with fine stone dust that will be blown into the air when the box containing it is broken by the force of the blast or concussion of the air, preceding the flame of the explosion. These box barriers are placed at the entrance of all splits in the mine and at intervals of 1,000 ft. or more, on all entries where coal dust is found in quantities that may prove dangerous.

CORRECTION

Attention is called to an error that occurred in finding the angle whose cosine is 0.1, in determining the bearing of a slant road having a grade of 10 per cent, in a seam whose inclination is 45 deg., *Coal Age*, Aug. 30, p. 328. The required angle whose tangent is 0.1 is $84^{\circ}15'$, instead of $89^{\circ}25'$, and the required bearing of the slant road N $84^{\circ}15'$ E, the road making an angle of $5^{\circ}45'$ with the strike of the seam.

56,000,000 Tons of Soft Coal in Storage Piles Sept. 1; Exceeded Only Twice in Last Seven Years

Consumers of soft coal continued to add to their storage piles during August and on Sept. 1, 1923, they had on hand approximately 56,000,000 net tons, according to a survey by the Bureau of the Census and the Geological Survey, under authority of the Federal Fuel Distributor. This estimate takes no account of the coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which item is classed as coal in transit. The passing of August, 1923, brought to a close a year of practically uninterrupted accumulation of stocks, and the stock-taking as of Sept. 1 revealed many interesting and important facts: Stocks on that date were 4,000,000 tons larger than on Aug. 1, 1923; 7,500,000 tons larger than on Nov. 1, 1921, and nearly 300 per cent larger than on Sept. 1, 1922; the course of stocks has been constantly upward during the past 12 months, except during February; during the 7 years for which records of stocks exist, the present supply has been exceeded only during the periods at the close of the war and just prior to the miners' strike of 1922.

Measured in terms of tons, stocks increased 7.7 per cent in August. Measured in terms of days' supply, the increase was 4.5 per cent. The smaller increase in days' supply is accounted for by the fact that the rate of coal consumption increased in August, thereby shortening the time that the available tonnage would last. At the rate of consumption during August the stocks on Sept. 1 were sufficient to last 46 days on the average, against a 44 days' supply on Aug. 1, at the rate of consumption in July. These averages are based on the assumption that the supply was evenly distributed.

In addition to the quantity estimated as being in the storage piles of actual consumers, the following quantities are known to have been in transit on Sept. 1: On the docks of Lakes Superior and Michigan, 6,400,000 tons; in

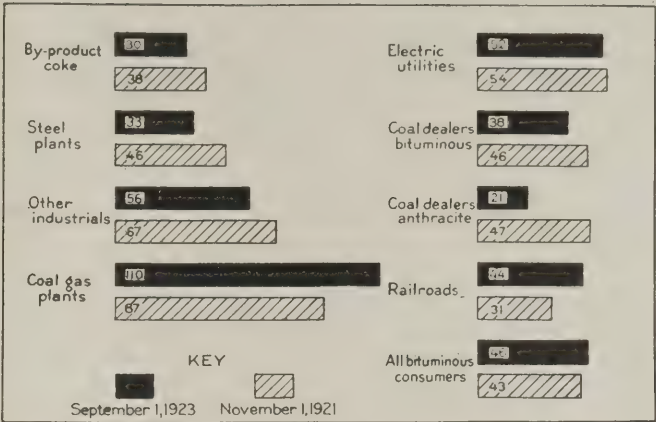


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS, SEPT. 1, 1923, AND NOV. 1, 1921

At the rate soft coal was burned in August, 1923, the total stocks on Sept. 1 were sufficient to last 46 days, an increase of 2 days over the supply on Aug. 1. The stocks on Nov. 1, 1921, were sufficient to last 43 days at the low rate of consumption then prevailing. Consumption in August was larger than in July, 1923, and further changes in the rate of consumption will be reflected in the days' supply.

storage at the mines, 440,000 tons; in cars awaiting dumping at lower Lake Erie ports, 625,000 tons.

The information shown graphically in Fig. 1 indicates that never before in the period over which reports on stocks extend, have consumers been so well supplied at this season of the year, except in the fall of 1918. The supply on Sept. 1, 1923, however, was more adequate than that on Armistice Day, because the present rate of consumption is less than during the latter part of 1918.

Estimates based on the reports from consumers and supplemented by information from other sources, indicate a total consumption in August of approximately 43,000,000 tons, or at the rate of about 9,700,000 tons per 7-day week.

Fig. 2, which is based upon the data in the table below, compares the days' supply held by the 7 principal classes of consumers on Sept. 1, 1923, with that on Nov. 1, 1921. In comparing figures of stocks on those dates two facts should be remembered; first, that while the actual tons of coal held by many of the consumers on Nov. 1, 1921, was much less than on Sept. 1, 1923, the days' supply on the earlier date was the larger, owing to the greatly reduced rate of consumption then prevailing, and second, that the two dates do not exactly correspond. A supply that had appeared amply sufficient to fill all needs on Sept. 1 might not be at all adequate two months later in the season. The average stocks on Sept. 1 were sufficient to last 46 days at the rate of consumption in August, against 44 days' supply on Aug. 1, 1923, 43 days on Nov. 1, 1921, and 42 days on Jan. 1, 1919, at the rates of consumption prevailing on those dates. Any appreciable change in the consumption rate in September will be reflected in the days' supply.

These statistics, shown by classes of consumers in Fig. 2

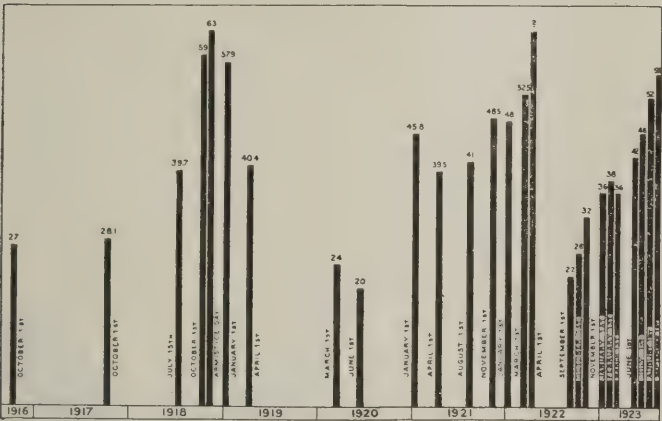


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO SEPT. 1, 1923

Figures represent million net tons and include coal in the hands of railroads, industrial consumers, public utilities, and retail dealers. Coal for steamship fuel, on Lake docks, in transit, and in the bins of householders is not included.

DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS, JAN. 1, 1919, TO SEPT. 1, 1923 (a)											
(Figures represent number of days supply would last at current rate of consumption at time of stock-taking.)											
	Nov. 1, 1918	Jan. 1, 1919	Jan. 1, 1921	Aug. 1, 1921	Nov. 1, 1921	Jan. 1, 1922	Sept. 1, 1922	Jan. 1, 1923	June 1, 1923	July 1, 1923	Sept. 1, 1923(b)
Byproduct coke plants.....	35	32	29	31	38	42	11	19	23	26	30
Steel plants.....	45	42	42	46	46	48	12	27	29	35	33
Other industrials.....	71	65	64	56	67	51	32	40	39	46	56
Coal-gas plants.....	85	81	55	79	87	89	34	60	75	89	110
Electric utilities.....	49	49	44	44	54	51	26	33	45	48	52
Coal dealers, bituminous.....	37	39	30	42	46	33	11	16	27	39	38
Railroads.....	31	32	23	32	31	35	13	16	21	28	44
Total bituminous.....	45	42	39	39	43	41	17	26	30	37	46

(a) The figures in this table are estimates based on incomplete data. (b) The rate of consumption used in calculating the days' supply on Sept. 1, 1923, was the quantity consumed in August. (c) Subject to revision.

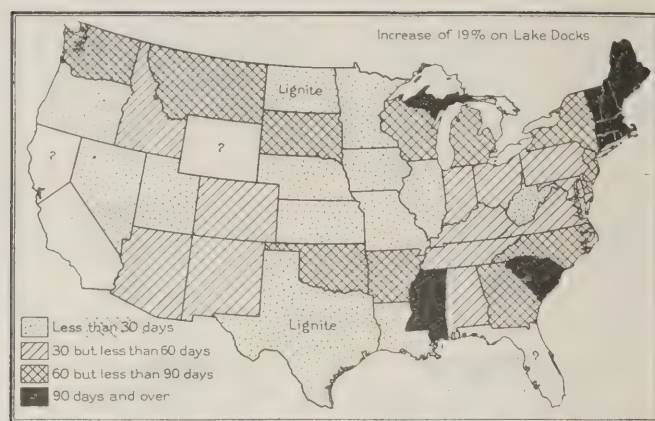


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS, SEPT. 1, 1923

At the average rate of consumption that prevailed in August, reserve stocks at industrial plants other than steel and byproduct coke would have lasted on the average 56 days. The map shows how the supply varied from state to state. Note the heavy stocks in New England and those in other states east of the Mississippi. Illinois and West Virginia only had less than 30 days' supply. Based on reports from 2,224 plants.

and in the preceding table are based upon reports of tons on hand and consumed received from about 5,000 consumers, so selected as to be fairly representative of all commercial consumers.

Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments, excluding steel and byproduct coke plants. This is the largest group of consumers and the one that shows best the geographical distribution of stocks. Changes in activity in this group are quickly reflected in the coal market, and likewise changes in the coal market soon become apparent in the reserve stocks of industrials.

Taking the country as a whole, the stocks held by general industrial plants on Sept. 1 were sufficient to last 56 days on the average, an increase of two days over the supply on Aug. 1. The importance of consumption in determining the adequacy of a known supply is strikingly illustrated by a comparison of stocks on Sept. 1 with those on Nov. 1, 1921. The actual tonnage on Sept. 1, 1923, was about 15 per cent larger than it was two years ago, whereas it would have lasted 11 days less time, owing to the present greatly increased rate of consumption.

The distribution of stocks as shown by the map in Fig. 3 closely resembles that on other dates when the reserves were large and business was active. The entire territory east of the Mississippi appears to be fairly well supplied, with the heaviest stocks in the long-haul sections such as New England, and the Southern Atlantic and Eastern Gulf Coastal States. The three coal-producing states, Illinois, Maryland, and West Virginia, had less than a 30-days' supply. As usual most of the Middle West and the lignite-burning states had less than 30 days' supply. The Northwest and Rocky Mountain States had supplies ranging from 30 to 90 days.

Reports from electric-utility plants indicated an appreciable addition to stocks, but consumption increased to such an extent that the days' supply—52—was the same as that on Aug. 1. On Nov. 1, 1921, such plants had a 54 days' supply, and on Jan. 1, 1922, a 51 days' supply.

Stocks at coal-gas plants continued to increase in August and a new record—104 days' supply—was established. This was 6 days' larger than the supply on Aug. 1, 1923, and exceeded that on Nov. 1, 1921, by 23 days.

Complete returns from byproduct coke and steel plants showed the following reserves on Sept. 1, 1923, at the rate of consumption in August, and on Nov. 1, 1921:

BYPRODUCT PLANTS			STEEL WORKS		
	—Days' Supply— Sept. 1, 1923	Nov. 1, 1921		—Days' Supply— Sept. 1, 1923	Nov. 1, 1921
Low-volatile.....	31	46	Steam coal.....	28	65
High-volatile.....	29	36	Gas coal.....	42	34
Average.....	30	38	Average.....	33	46

As in the case of the general industrials, a simple statement of the number of tons would not properly reflect the adequacy of the supply. Whereas the byproduct coke plants had 77 per cent, and the steel plants 24 per cent more coal on hand on Sept. 1 than on Nov. 1, 1921, the days' supply was 21 per cent and 28 per cent less, respectively.

The railroads added heavily to their supply of fuel coal during August, and on Sept. 1 had on hand close to 16,000,000 tons. This supply, which included the quantity in cars and chutes, as well as that in stockpiles, was sufficient to last 44 days, against a 39-days' supply on Aug. 1, 1921, and 31 days' on Nov. 1, 1921. The present supply is but 19 per cent less than the enormous total of 19,800,000 tons held by the railroads on April 1, 1922.

Retail dealers' deliveries of soft coal increased sharply in August, the average daily rate being more than 20 per cent higher than during July. Receipts were somewhat in excess of deliveries and there was a slight increase in the actual tonnage on hand. Retailers' stocks on Sept. 1 were sufficient to last an average of 38 days, against 45 days' supply on Aug. 1, 1923, 46 days' on Nov. 1, 1921, and 39 days' on Jan. 1, 1919.

All available information indicates that during August there was a comparatively small increase in the quantity of bituminous in transit, which probably did not exceed 2,000,000 tons.

Coal on the Upper Lake Docks.—Practically complete reports show that stocks on the docks of Lakes Superior and Michigan increased from 5,361,000 tons on Aug. 1 to 6,400,000 tons on Sept. 1, 1923. On Nov. 1, 1921, the total was 8,824,279 tons.

Reports from an incomplete list of producers whose store showed that the quantity held by them decreased 672,000 tons on Aug. 1, to 440,000 tons on Sept. 1. Unbilled coal standing in cars at the mines decreased from 560,000 to 470,000 tons, and on Sept. 1 coal awaiting reconsignment at junction points and terminals totaled 37,000 tons, against 65,000 tons a month ago.

Anthracite.—Retail dealers' stocks of anthracite decreased slightly in August, and their total supply on Sept. 1 was perhaps 8 per cent less than on Aug. 1. Reports from the dock operators indicated a total of 506,000 net tons on the Lake Michigan and Lake Superior docks on Sept. 1. Under the stimulus of urgent demand the production of anthracite in August was at a high rate that yielded a total output that has been exceeded but twice during the corresponding months of the past 10 years. It seems quite evident that but little of the household sizes were burned, and that practically the entire quantity of such sizes was added to stocks, either by consumers or retail dealers.

There are no available statistics on householders' stocks,

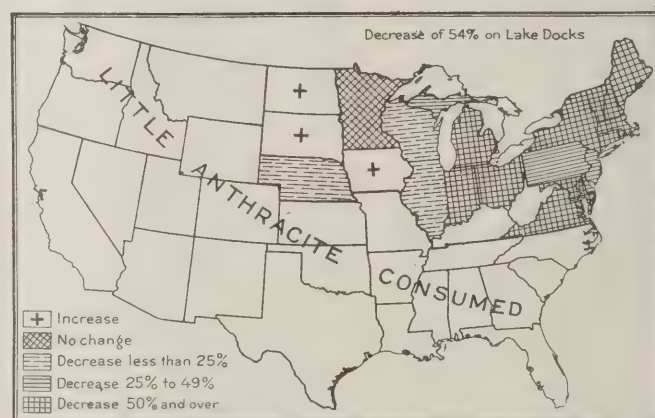


FIG. 4—HOW RETAILERS' STOCKS OF ANTHRACITE ON SEPT. 1, 1923, COMPARED WITH THOSE ON AUG. 1, 1921

Stocks of anthracite in retail yards decreased 7 per cent in August. The supply on Sept. 1 was sufficient to last 21 days at the rate of delivery that prevailed in August. The map shows how stocks on Sept. 1, 1923, compared with those on Aug. 1, 1921. In 12 of the 21 states where anthracite is consumed in quantity the supply on Sept. 1 was at least 50 per cent less than on the earlier date. Only in three states were the stocks larger.

but correlation of production figures and stocks held by retail dealers indicate that householders' bins must be fairly well stocked for this season of the year, even though the carry-over from last winter probably was unusually light. The recollection of their inability to obtain necessary supplies during the winter of 1922, and the apparent certainty of a strike on Sept. 1, 1923, appear to have induced many to obtain their supply earlier than usual. The result has been that current production has passed through the retailers to the consumers, and while retail stocks appear unusually low, the ultimate consumer is in a stronger position thereby.

The deliveries by retail dealers in August were at such a rate that retailers were not able to add to their reserves, and in fact their stocks declined. It has not been possible for the government to make a complete count, but reports from a group of 442 dealers who have reported regularly since 1919 show a total of 777,059 net tons on hand on Sept. 1, 1923, a decrease of about 8 per cent during August. These dealers had 19 per cent less than on Jan. 1, 1919; 47 per cent less than on Nov. 1, 1921; 44 per cent less than on Jan. 1, 1922, and 60 per cent more than on Nov. 1, 1922, when stocks were abnormally low as a result of the miners' strike last year.

Shipments of anthracite off the Upper Lake docks exceeded receipts in August, and the stocks on the docks on Sept. 1 decreased to 506,000 net tons. Stocks on Nov. 1, 1921, were 1,316,000 tons; Jan. 1, 1922, 1,331,507 tons; Sept. 1, 1922, 71,503 tons; Aug. 1, 1923, 608,726 tons.

Stocks of Coke at Byproduct Plants.—The rate of accumulation of coke at byproduct coke plants slowed up considerably in August. The total on hand Sept. 1 was 501,000 net tons, against 430,000 tons on Aug. 1 and 871,000 tons on March 1, 1922.

LATEST MAIL ADVICES from Great Britain are to the effect that no agreement has been reached in regard to the coal-trimming tariff. The matter is the subject of discussion between representatives of the Shipping Federation and the unions. Representatives of the Ministry of Labor also are participating.

Coal-Mine Fatalities High in August
Due to Kemmerer Disaster

Accidents at coal mines in the United States during the month of August killed 295 employees, according to reports from state mining departments to the Bureau of Mines of the Department of the Interior. Included in this number are 99 deaths in a gas explosion at Kemmerer, Wyo., on Aug. 14. The output of coal during August was 57,732,000 tons; thus the fatality rate per million tons was 5.11, compared with 3.55 in July. Without the Kemmerer disaster the rate for August would have been 3.39. The August rate last year was 3.72.

From the beginning of 1923 to the end of August, 1,738 fatal accidents have occurred at coal mines, representing a ratio of 3.99 deaths to each million tons of coal produced. During this period the fatality rate for bituminous-coal mines was 3.73 and that for anthracite 5.38. For the corresponding eight months last year—a period covering a five-months strike in the industry—the fatality rate for all mines was 4.17, the bituminous rate being 3.91 and the anthracite rate 6.79. Thus the accident figures for 1923 to date record an improvement over last year's record for both anthracite and bituminous coal mines.

The explosion at Kemmerer, Wyo., on Aug. 14 raised the number of major disasters during the current year to 6 with a total loss of 249 lives, as compared with 8 similar disasters causing a loss of 87 lives during the corresponding eight-months period last year.

The present year's record to date for all fatalities from all causes shows a reduction in the fatality rates per million tons for haulage accidents, for falls of roof and coal, and for electricity; an increase for explosions of gas and dust; and no change in the rate for explosives.

The fatality rates per million tons, by main causes of accidents, during the first eight months of 1922 and 1923 were as follows:

	1922	1923
Falls of roof and coal.....	2.057	1.800
Haulage	0.773	0.684
Gas and dust explosions.....	0.432	0.686
Explosives	0.173	0.179
Electricity	0.161	0.126

COAL-MINE FATALITIES DURING AUGUST, 1923, BY CAUSES AND STATES
(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground											Shaft				Surface						Total by States					
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	1	1	3										6												1	7	10
Alaska.....																										0	0
Arkansas.....																										0	0
Colorado.....	1		1					2					4													4	3
Illinois.....	6		6			1							13													13	8
Indiana.....	2		3	1									7			1								1	1	9	4
Iowa.....	2		1										3		1			1								4	2
Kansas.....																										0	0
Kentucky.....	3		2					1					6													6	11
Maryland.....																										0	0
Michigan.....																										0	1
Missouri.....	2						1						3	1				1								4	1
Montana.....																										0	3
New Mexico.....						2							2													2	2
North Dakota.....																										0	0
Ohio.....	5		2	2									9	1				1								10	5
Oklahoma.....	1																									1	1
Pennsylvania (bituminous).....	19	2	8			3	1	1					34						1		1				2	36	16
South Dakota.....																										0	1
Tennessee.....	1	1	1	1									4													4	0
Texas.....																										0	0
Utah.....	1												1													1	0
Virginia.....		3				1		2					7													7	0
Washington.....	1												2											1	1	3	3
West Virginia.....	18		11					1		1			31		1			1	3					1	5	41	30
Wyoming.....	1		1	99									101													101	0
Total (bituminous).....	65	7	39	103		8	2	7		2			1234	2	2	1		5	4		2		1	7	14	253	101
Pennsylvania (anthracite).....	14	3	9	1		2		1	1				7										4	4		42	2
Total, Aug. 1.....	79	10	48	104		10	2	8	1	2			8272	2	2	1		5	4		2		1	11	18	295	
Total, August, 1922.....	59	3	22	1		1		6					395						1	2	2		1	2	8		103

New York Coal Survey Shows Soaring Prices

Edwin J. O'Malley, Commissioner of Public Markets of New York City, issued a reply Oct. 5 to Governor Smith's series of questions relative to the coal situation in New York. In a detailed examination of coal supplies, prices and alleged profiteering in the city, Commissioner O'Malley says consumers have reached the limit of their patience in standing a continued increase in the cost of coal.

The prevailing price of anthracite in June, 1923, according to Mr. O'Malley, was \$13.50, which obtained until the suspension of operations in the mines, Aug. 31. At the present time, however, says the Market Commissioner, the price has been fixed at \$14.25 in Manhattan with 50c. for delivery and 25c. extra for trimming, making a ton of coal delivered to the cellar cost \$15. The dealers have thus shifted the cost of a part of the delivery upon the consumers."

Regarding profiteering the Commissioner says: "This question is difficult to answer. The question as to whether profiteering existed would depend wholly upon how much was paid for the coal. Books of dealers would have to be investigated to get this information.

"This office would view any price exceeding the price set by the old dealers, \$14.25 to \$14.50, as profiteering. The Brooklyn, Queens and Staten Island prices, ranging up to and exceeding \$17.50, are simply unanswerable. The standard dealers themselves realize that these prices are doing no good to the coal dealers. The dealers who are charging these prices claim they are having to pay independent coal operators higher prices. In connection with this, the situation extends to the mines and includes the old controversy of the higher prices charged by the 'wildcats' and the regular independents. The writer is of the opinion that the State of Pennsylvania could and should easily absorb the cost of the strike, that is, the 60c. a ton paid to the miners.

"In view of the fact that very little coal had been coming into the city previous to this investigation, and no deliveries being made, consumers were obliged to order without knowing the quantity or quality of coal they would get or what price they would have to pay. The situation was, to say the least, and still is, pregnant with opportunity on the part of dealers or operators inclined to profiteer."

Tillson's Resignation Greatly Regretted

At the Buffalo meeting of the National Safety Council, held at the Hotel Statler, Oct. 1-5, the Mining Section with much regret accepted the resignation of Benjamin F. Tillson, who for many years has been the chairman of that section. Mr. Tillson was reappointed a director to succeed himself.

In all its history the section has had only two chairmen—the late H. M. Wilson and B. F. Tillson. Mr. Tillson's work has been most fruitful of results. In consequence of it the Bureau of Mines has widened its statistical inquiry into the causes of accidents and their number and duration. The Bureau of Standards is undertaking an inquiry into a means of ascertaining the condition of the entire length of a wire rope without destroying any part of it. The National Safety Council has made an arrangement with C. Lorimer Colburn whereby Mr. Colburn has traveled the country in the joint interest of the Bureau of Mines and the Council, making possible the formation of three conferences, one at Butte, one at Globe and one at Duluth, and finally the American Institute of Mining and Metallurgical Engineers has formed a Committee on Safety to hold with the Mining Section of the National Safety Council a meeting to discuss safety at the annual New York session of the former body.

For the ensuing year R. Dawson Hall, engineering editor, *Coal Age*, was elected chairman; John L. Boardman, safety engineer, Anaconda Copper Mining Co., Butte, Mont., first vice-chairman; J. B. Warriner, Lansford, Va., general manager, Lehigh Coal & Navigation Co., second vice-chairman; George Martinson, Pickands Mather Co., Hibbing, Minn., third vice-chairman, and C. Lorimer Colburn, U. S. Bureau of Mines, Washington, D. C., secretary.

The general officers of the National Safety Council are: L. A. Du Bois, president; Henry A. Reninger, vice-president in charge of industrial safety, including the mining section; Homer E. Niesz, vice-president and treasurer; Marcus A. Dow, vice-president in charge of public safety; C. B. Auel, vice-president in charge of general activities; George T. Fonda, vice-president in charge of local councils; David Van Schaack, vice-president in charge of public relations, and W. H. Cameron, managing director and secretary.

Mr. Colburn, for the Bureau of Mines, is touring the country in behalf of the Joseph A. Holmes Safety Association. Though he is not now giving his full time to the work of the National Safety Council he is permitted to perform for it such services as may be accomplished without interference with his other duties, which, by the way, will shortly provide for visits to coal-mine regions.

Reds Receive Aid and Encouragement from Non-Union Operators, Says Searles

Replying to the recent statement of John C. Brydon, president of the National Coal Association, which ridiculed the recent exposé by the United Mine Workers of Communist activities in the coal fields, Ellis Searles, editor of the *United Mine Workers' Journal*, charged in a statement issued Oct. 7 that "Communists and other destructive Reds have received substantial encouragement and aid from non-union coal operators." At the same time Mr. Searles, in behalf of the union, proposed that a committee of the U. S. Senate make a thorough investigation of the subject and predicted that, if that were done, "there are persons in and out of the coal industry who probably will feel like running for cover."

"It is significant," said Mr. Searles, "that the only attack upon the revelations contained in those articles came from the non-union coal operators, who are managing and directing the National Coal Association. These non-union operators are as anxious as the Communists to wreck and destroy the United Mine Workers of America. Both are working to accomplish the same purpose, and the fact that these non-union operators, headed by John C. Brydon, have thus joined hands with the Communists and rushed to their defense has done much to confirm the well-grounded belief among the union miners that the Communists and other destructive Reds have received substantial encouragement and aid from non-union coal operators in their various activities."

Mr. Searles said that some newspapers in commenting on the union's exposé "criticized the United Mine Workers of America because this organization did not make public during, or before, the trials at Herrin, Ill., the fact that the Herrin massacre was fomented, instigated and engineered by Communists, instead of waiting until months afterward. The fact is, we were not aware of the Communist plot until after the Herrin trials. Therefore, it was impossible for the union to expose the matter at that time. The facts were given to the public as soon as it was possible to do so in definite form. The Herrin massacre occurred in June, 1922. We started our investigation of Communist activities in February, 1923, and the investigation was not completed until the last of August, 1923. We published the exposé in the week of Sept. 10."

THE U. S. SUPREME COURT has been asked to set for early argument the appeal of the Federal Trade Commission in the injunction suit instituted against it by the Claire Furnace Co., the Ella Furnace Co., the Reliance Coke Co., and others. This controversy, which involves the right of the Federal Trade Commission to require the filing of production, cost and sales reports of goods entering into interstate commerce, arose in the Supreme Court of the District of Columbia. The courts of the District of Columbia held that the Commission had no right to compel the production of this information and the government appealed. The government says the effect of the injunction is to hamper the Commission in its investigations.

Flood of Coal Legislation Expected to Feature Forthcoming Session of Congress

All Factions Likely to Introduce Proposals for Curb on the Industry
—Look to President to Ask Prompt Consideration of Commission's Findings—Speculation on Likelihood of Bituminous Strike

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

An avalanche of coal bills may be expected at the forthcoming session of Congress. The number of radical members has increased in each house. Almost every one of them is waiting impatiently for an opportunity to place drastic curbs on an industry so important and basic as is the production, distribution and marketing of coal. Administration members will be prompt to support the Coal Commission by introducing the numerous bills which would be necessary to cover the legislation requisite to carrying into effect the Commission's recommendations. In addition, there will be various legislative proposals from members outside the two groups mentioned who will put forward ideas of their own in view of the fact that coal legislation will be one of the matters likely to receive early attention.

The President is expected to ask Congress in his first message to give prompt attention to the report of the Coal Commission. While it is possible that Mr. Coolidge will suggest the specific legislation which he deems necessary to carry the Commission's ideas into effect, it is thought more likely that he will not undertake detailed recommendations. It is thought most probable that the President's first message will do no more than commend the report to the early and careful consideration of the legislative branch. There is reason to believe, however, that Mr. Coolidge will not be content to allow the matter to drift if he can prevent it. If Congress does not take hold of the problem vigorously, many expect the President to make specific requests for the legislation which he deems necessary to a better functioning of the coal industry.

TROUBLE LOOMS IN BITUMINOUS-COAL INDUSTRY

The new Congress will not have been in session long, however, before the black clouds of trouble in the bituminous industry will be much in evidence. Before the Congress is two months old there will be abundant indications that a great strike is likely. This in itself will hasten the consideration of coal legislation.

The fact that the anthracite mine workers have received an increase in their wage makes it absolutely certain that the bituminous workers will demand an equal if not a greater increase. It already is apparent that the operators in the union fields will be in no frame of mind by the first of the year to concede any wage advance. A deadlock is rather expected to occur early in the negotiations.

The predictions now being made that there will be no bituminous strike are based on the belief that the odds are sufficiently against the union to preclude the men going out if their demands are denied. It probably is true that the accumulation in the United Mine Workers' treasury is small. It is true that the railroad workers are not likely to assist them. It is true that they will not have the help of a simultaneous strike on the part of the anthracite workers. It is true that the non-union fields will be in a position to furnish more coals than ever before—probably enough to meet most of the requirements of the country. Those who are making these predictions, however, are underestimating the power and the determination of the United Mine Workers of America. Even with the odds against them, those best informed believe, they will not hesitate for a minute to call a strike if it should be decided that it is justified.

All admit that there will be great pressure from the public for legislation. It is not greatly concerned with the difficulties of the industry and there will be no particular

pressure to rid coal of needless competition or the thousand and one other internal difficulties from which it is suffering. What the public wants is relief from high prices and an assurance of continuity of coal supplies. The public's conception of price, in many parts of the country, is based on the prices demanded for anthracite. The fact that bituminous coal may be available to them at less than cost frequently is overlooked. The public evidently has reached a point where it wants some guarantee and it will not be surprising to see strong pressure behind bills proposing compulsory inspection of coal shipped in interstate commerce or a bill going even so far as to propose limitation of coal prices.

The suggestion of Representative J. J. Rogers, of Massachusetts, that an embargo be placed against exports of anthracite has not been given full consideration by President Coolidge, it was stated at the White House. It was said, however, that the President is inclined to believe that an embargo would be a matter "of considerable delicacy" which would require careful consideration both as to its advantages and disadvantages and as to the possible reaction in foreign countries which depend upon imports of anthracite from the United States.

I. C. C. Grants Virginian Ry. Rehearing

Thorough discussion of the proposal to withhold trackage from new coal mines, before final action is taken, is insured by a decision of the Interstate Commerce Commission Oct. 6 allowing a rehearing in the case. The rehearing will begin in Washington, Oct. 19, before Charles D. Mahaffie, director of the finance bureau of the Commission. Last June the Commission denied an application of the Virginian Ry. to extend its rail facilities to additional mines on the ground that the railroad company is not in a position to insure a constant car supply to the properties already having trackage connections. The case is regarded as one of the most important which has come before the Commission. The proponents of the principle of such control are actively supporting the Commission's position, which is certain to be assailed vigorously by those who do not want to see this obstacle raised against the opening of more coal mines.

DUE TO THE FACT that the Coal Commission was unable to go deeply into the study of intermittency in the operation of coal mines, the Department of Commerce expects to take up again its study of the subject. The department had made a good start on study of intermittency when the work was interrupted by the coal strike last year. With the information already at its disposal, the department will be able to complete the work in a comparatively short time, it is believed.

AN INDICATION of the regard in which F. R. Wadleigh is held by those concerned with coal is set forth in an analysis by a representative of the American Mining Congress of letters received by Mr. Wadleigh just prior to the termination of his duties as Federal Fuel Distributor. The communications are from representatives of the coal industry, railroads, national associations and state fuel administrators.

Pinchot Requests Coal Commission Data In Move to Reduce Fuel Prices

In a new move to reduce fuel prices to consumers Governor Pinchot of Pennsylvania, according to a press report, has made a formal request for the information gathered by the U. S. Coal Commission in its recent survey of the coal industry, now in possession of the U. S. Geological Survey. It is said, however, that his request will be refused.

According to word reaching the Department of the Interior, Mr. Pinchot believes that with certain data from the Coal Commission he could reduce the cost of fuel. He is anxious to get all data compiled in connection with the questionnaires sent out to the operators by the Coal Commission.

Governor Pinchot still holds to the opinion that the increase granted to the miners should be absorbed by the operators and not by the consumers. In his request to the Coal Commission for the data contained in the questionnaires it was said that he expressed the opinion that the information should be made public and not pigeonholed in the office of the U. S. Geological Survey. With this information in the hands of the public Governor Pinchot believes that his position in the matter would be clarified.

Officials of the Interior Department, however, declare that the operators gave the government the information of their production costs solely for governmental use and not for political-campaign purposes. Officials of the department believe they have no authority to make the information public. A suggestion was made that the Attorney General might be asked for a formal opinion as to the legality of the department retaining the information being sought by Mr. Pinchot.

Wadleigh Urges Industrial Co-operation In Helping Coal Industry

That the Department of Commerce and the Bureau of Mines may have the advantage of the viewpoint of industry in connection with their work on coal, F. R. Wadleigh, recently Federal Fuel Administrator and now coal specialist employed jointly by the Department of Commerce and the Bureau of Mines, has addressed the following letter to a number of leaders in the coal industry:

"Having resumed my former work as chief of the Coal Division, Bureau of Foreign and Domestic Commerce, Department of Commerce, I desire to make the work of the division of the greatest possible use to the coal industry, not only as regards foreign markets but also in the domestic trade. I have already arranged to continue the issue, monthly, of the survey of general conditions in the domestic trade, and of the statement relating to overseas coal markets, as both of these seem to have met with general approval and to be a distinct service to the trade, as well as to consumers.

"In order however, to broaden the activities of the division, I should like to have the views of leaders in the industry as to how the desired results can best be accomplished and will, therefore, appreciate an expression from you, at your early convenience, on the subject. I believe that the Coal Division can be of considerable service to the industry, provided it can obtain the co-operation and assistance of those engaged in it.

"Particularly, I should like to have your opinion on the advisability and value of the appointment of an advisory committee to be made up not only of operators but also of representatives of the wholesalers and of the retail dealers. It seems to me that such a committee, properly constituted, would be of considerable value to the industry and, through the wide ramifications of the Department of Commerce, together with the technical activities of the U. S. Bureau of Mines, with which I am also connected, could be made of great service, in the way of securing and making available a fund of information, both economic and technical, and could also formulate and put in effect plans for closer

relations with the railroads and the general public, as well as between the various branches of the industry itself.

"My unofficial position as connecting link between the American Railway Association, the individual railroads and the Department of Commerce should give the means of keeping the industry in closer contact with the railroads."

Electric Power Service to Mines Spreads Through Kentucky

Kentucky coal mining may be largely affected by power development just announced by the Insull public-utility interests. The plans of these organizations call for larger and better power developments in the state, with hook-up connections which will make it possible to supply current to the various mine districts even if one unit or power plant is shut down through accident.

A \$3,000,000 steam plant will be erected by the Indiana Public Service Co., at Jeffersonville, Ind., on the Ohio River, across from Louisville. This will be hooked up at Louisville to high-tension transmission wires which will run to Lexington, Ky., over to Dix River, where a large hydro-electric plant is to be installed, by the Kentucky Hydro-Electric Co., a subsidiary. From this plant there will be a hook up to southeastern Kentucky, where the Kentucky Utilities Co., another subsidiary, has big power plants at Varilla, Ky., and also at Pocket, Va., producing power at the mouth of the mines, from low cost fuel. A million-dollar power plant is also being started four miles from Pineville, on the Kentucky River.

The Insull interests also plan to carry high tension lines from Louisville south and west to the western Kentucky coal fields, where the Kentucky Utilities Co. operates over 200 miles of transmission lines serving a large number of mines, and a number of towns. The company has several plants in western Kentucky, and controls the power plants of the Duncan Coal Co. of Greenville, and St. Bernard Mining Co. of Earlington, each of 5,000 hp. or better, producing power on screenings direct from the mines to the boiler rooms. These plants are under lease to the utilities company, which in turn sells power to the companies owning the plants, and buys fuel from the owners.

In addition the Louisville Gas & Electric Co., is planning a big hydro-electric plant, at the Falls of the Ohio, at Louisville, which will have a capacity of 400,000 kw.-hr., more current than is now used by all the utilities in Louisville, and will be in service 70 per cent of the year. This plant will have surplus power for sale, some of which can be utilized by the Insull interests if needed.

"Giant Power Board" Organized

Pennsylvania's Giant Power Board recently was organized at Harrisburg, and its purpose will be to make a survey of the power resources of the state. Morris L. Cooke, formerly Director of Public Safety of Philadelphia, was elected director in charge of the survey. The board was provided by an act of 1923 and is a part of the plan of the Governor to develop the electric and water power of the Commonwealth so that cheap energy may be provided for its citizens. Governor Pinchot presided at the opening meeting and called attention to the probable far-reaching effect of giant power on the coal industry.

The Giant Power Survey Board consists of the Governor, the Attorney General, the Secretary of Forests and Waters, the Chairman of the Public Service Commission, the Secretary of Agriculture, the Secretary of Labor and Industry, the State Geologist, a Deputy Attorney General and an engineer. Deputy Attorney General Philip P. Wells and Robert H. Fernald, director of the department of mechanical engineering at the University of Pennsylvania, have been designated by the Governor to these two latter places.

ORAL ARGUMENT before the Interstate Commerce Commission of the case of the Victor-American Fuel Co. vs. the Denver & Salt Lake Railroad Co. will be conducted in Washington on Oct. 15 before the full Commission.

Denying Gouging, Warriner Blames Higher Anthracite Prices on Pinchot and Mines

Denying that anthracite operators have been gouging, Samuel D. Warriner, chairman of the Anthracite Operators' Policy Committee, places the entire blame for the high cost of coal directly at the feet of labor. Addressing 200 at a luncheon of the City Club, of Philadelphia, Oct. 5, Mr. Warriner said that "the last increase, the price of peace in the mine fields, was Governor Pinchot's method of assuring a winter's supply of coal, and he must shoulder the responsibility for it."

He declared that the operators were in accord with the Governor in his plan to settle the strike in order to prevent a coal famine, but the 10-per cent wage increase which the Governor had at that time declared necessary was not justified. The Governor had been warned that it would be paid by the consumer.

The drastic house cleaning that the Governor declared necessary in the industry in a recent address did not apply to the operators, in Mr. Warriner's opinion, but to the United Mine Workers of America.

Governor Pinchot's peace plan, according to Mr. Warriner, showed conclusively that to the Governor the important thing was to get the miners back to work, and that price was secondary.

Speaking specifically, Mr. Warriner said that the high cost of coal was due directly to the high wages of the miners, out of all proportion to other industries; to the reluctance of the men to do a full day's work; to the reduction in the number of hours to eight, without any similar wage reduction; to the increase in the cost of materials, and to the restrictions upon the men placed by the United Mine Workers of America.

"The operators," he declared and backed up his assertion by figures, "cannot absorb the last increase, and it is unfair for the Governor to blame it on the industry, when we have no jurisdiction whatever over transportation costs or distribution methods."

WAGES UP 170 PER CENT; COAL COST, 120 PER CENT

"Since the pre-war period the wages of anthracite miners have risen approximately 170 per cent," he declared, "while the cost of coal has only increased 120 per cent. The cost of living during the same time increased only 50 per cent. The annual wage bill for mining the 70,000,000 tons of anthracite was \$113,000,000 in 1913-14. In 1921, the last full year, it had jumped to \$285,000,000. Now, with the added 10 per cent increase, it will jump to about \$325,000,000. During the same period the cost of materials necessary in mining operations had increased in about the same proportion."

"Now as to the price of coal. In 1913-1914 a ton of nut coal cost \$7.25. Today, under the new schedule, it costs \$16; an increase of 120 per cent. There is no justification for such a price. It is economically unsound and will result in a discontinuance of the use of anthracite, and will have its effect on the prosperity of the operators and on the earnings of the men."

Mr. Warriner said "the men receive on an average \$1,800 a year. Skilled men receive as high as \$5,000 a year, and by reason of the last increase the average wage will be \$1,990."

"The operators want cheap coal, wide distribution and active marketing. That spells prosperity for us all. There is no autocracy in the industry. We have better schools in the mining sections than in most communities. The miners have good homes, garages, automobiles. The savings-bank deposits have trebled in our communities. Our employees gradually are becoming stockholders in our operating companies. There surely is no autocracy."

"Approximately 50 per cent of the coal mined is of the small buckwheat sizes, not used in homes. It must be sold in competition with bituminous. We are, therefore, unable to add the last wage increase to the cost of this coal. Necessarily, we pass it on the domestic sizes. If we can educate the public to use the buckwheat sizes in their

homes it will, naturally, reduce the demand for anthracite, and thus lower prices eventually will come about. We are now working on plans for bringing this to the attention of the public."

The City of Philadelphia, through the Girard Trust, is getting a share of the increased coal costs, according to Mr. Warriner. "The operators who lease the coal lands of the Girard Estate pay a royalty on a sliding scale basis. The higher the price, the greater the royalty. So you see your own city is profiteering."

U. S. Shipping Board Opens Coal Bids In New York and Norfolk

The U. S. Shipping Board opened bids at New York on Oct. 4 for furnishing and delivering alongside vessels New York harbor on Oct. 11, 2,300 gross tons of Pool 9 bituminous coal. The following proposals were received: Imperial Coal Corporation, \$4.87 per ton; Johnstown Coal & Coke Co., \$5.64; Penn Fuel Co., 4.97; Gormley Coal Co., \$5.39; Rhodes Fuel Corporation, \$4.88; Knickerbocker Fuel Corporation, \$5.04; Seiler Coal Co., \$4.88; Campbell, Peacock & Kinzer, \$5.20; W. A. Marshall & Co., \$4.98; Commercial Coal Co., \$5.39; Lee Coal Co., \$4.84; Hartmann Coal Co., \$5.28; Pattison & Bowns, Inc., \$5.40; Dexter & Carpenter, \$5.52, and H. B. W. Haff, \$5.15. The bids ranged on a basis of about \$1.65 to \$2.36 per net ton f.o.b. mine.

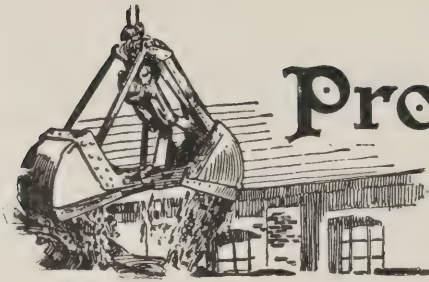
Bids opened by the U. S. Shipping Board at Norfolk, Va., for furnishing and delivering f.o.b. piers, Hampton Roads, 1,600 gross tons of Pool 1 and or Pool 2 (Pocahontas and New River) coals on Oct. 16 brought the following quotations: Hasler & Co., \$4; Brown Coal Co., \$4.19; Johns Bros., \$4.25, and Lake & Export Co., \$4.50, or on a basis of \$1.32 to \$1.76 per net tons f.o.b. mine.

Wadleigh Prepares Data on Coal Exchanges

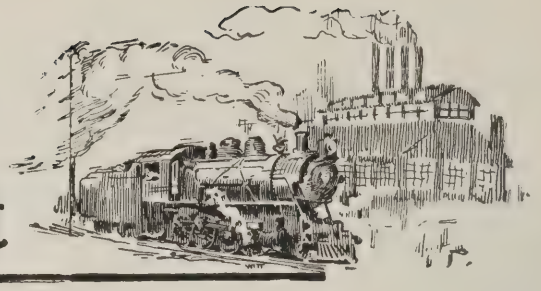
With the idea of calling the attention of the American coal industry to the advantages of maintaining various coal exchanges, F. R. Wadleigh, former Federal Fuel Distributor, acting in his capacity as chief of the Commerce Department's Fuel Division, is compiling information on the subject. In addition to soliciting the views of prominent men engaged in the coal trade here, he is securing authoritative statements from the managers of the coal exchanges in England. During his long residence in England as the representative of a large American coal exporting company, Mr. Wadleigh was much impressed with the benefits which were derived from the maintenance of the coal exchange.

A special report on export methods also is being prepared under Mr. Wadleigh's direction.

A SUPPLEMENTAL FOURTH SECTION ORDER issued Oct. 2 by the Interstate Commerce Commission suspended the effective date of certain tariffs ordered to be put into effect by the Commission in its decision in Docket 12698 in the Ohio-Michigan coal case. In Application No. 1952, filed by the Louisville & Nashville R.R., and No. 1764, filed by the Chesapeake & Ohio Ry., these carriers sought authority to continue to charge for the transportation of coal from mines in the Inner Crescent group to Detroit, Mich., rates which are lower than those contemporaneously in effect on like traffic to Tama, Ohio; Jackson, Mich., and other intermediate points, and the Kanawha & Michigan Ry., in Application No. 554, sought authority to continue to charge for the transportation of coal from the Kanawha district in West Virginia to Jackson, Mich., rates which are lower than those contemporaneously in effect to Pontiac, Mich., and other intermediate points in the Lansing group. These applications were denied by the Commission in its Fourth Section Order No. 8750, and rates corresponding with the Commission's order were to have been put into effect on Sept. 27, 1923. The supplemental order suspends the effective date of these tariffs until Nov. 26, 1923, which allows the railroads to continue the above-mentioned rates in effect until that date.



Production and the Market



Weekly Review

Prices for soft coal continue to slip downward, while production shows a slight drop, due to the resumption of anthracite mining. Production of soft coal reached 11,737,00 net tons in the last week in August whereas during the week ended Sept. 29 it declined to 11,308,000 tons, a drop of 429,000 tons. For the week ended Oct. 6 preliminary reports indicate a further decline. In spite of the reaction, however, the present rate of daily production, though below the record years 1918 and 1920, is well above 1919, 1921 and 1922. There were about 56,000,000 tons of soft coal in storage as of Sept. 1, according to the government stock report, an increase of about 4,000,000 tons over the revised figures for Aug. 1.

PRICE OF BITUMINOUS COAL DECLINES SHARPLY

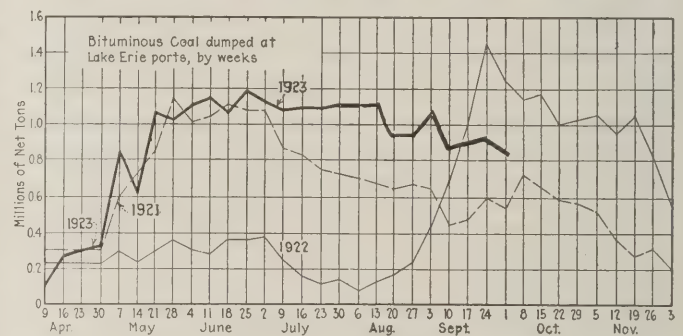
Soft-coal prices declined six points last week, *Coal Age* Index registering 190 on Oct. 8, while the average price was \$2.30 as compared with \$2.37 the previous week. Declines occurred in Springfield, eastern and western Kentucky, Hocking, Clearfield, Cambria and Somerset and Pocahontas coals, while Mt. Olive advanced.

Production of anthracite is climbing, 2,025,000 net tons having been produced during the week ended Sept. 29, the first full week of mining since the termination of the strike, with indications pointing to about the same output for last week.

Lack of demand has caused a reduction in the running of most soft-coal mines. Coal for screenings has relaxed, causing an accumulation in some districts together with a lowering of prices. Buyers continue on a hand-to-mouth basis, due to heavy reserve stocks and the prospect of lower prices. Car supply has improved in some sections, while lost time because of "no market" has increased, caused in part by the reaction against better demand in anticipation of the anthracite strike.

The sag in the Chicago market continues. A smaller

volume of screenings is coming forward because of the cut in mining, giving operators hope of a stiffening of prices. Domestic demand in most regions is firmer. In New England the market seems duller. There are no increases in inquiries and no indications of improvement. Spot buying has practically stopped and contractors are curtailing shipments. The Ohio market is dull and in some sections as bad as at any time during

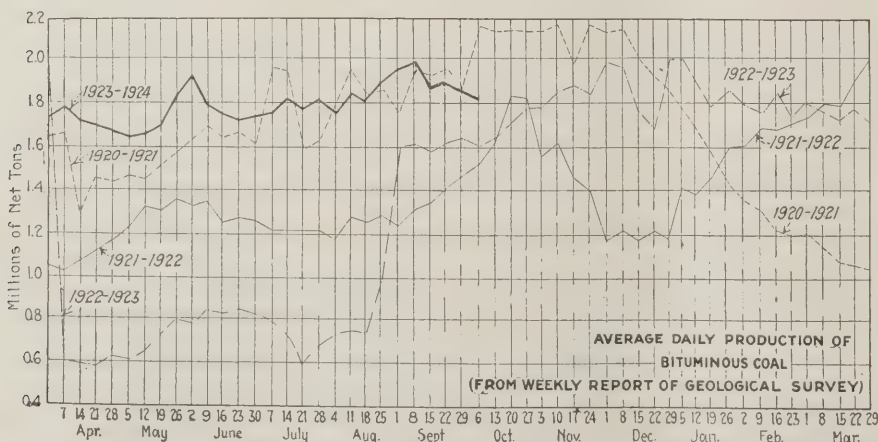


	Week Ended Oct. 1	Season to Oct. 1
Cargo	786,782	22,014,123
Fuel	50,008	1,192,258
Totals	836,790	23,206,651

the summer. The Pittsburgh market has declined from last week and consumers are showing no interest.

Lake shipments have declined during the past month, dumpings during the week ended Sept. 30 amounting to 836,790 net tons of cargo and bunker coals.

Export demand is quiet and there are no indications of improvement. Shipments from Baltimore during the first nine months of 1923 amounted to 1,426,767 tons of cargo and bunker coal and 175,723 tons of coke. Dumpings for all accounts at Hampton Roads during the week ended Oct. 4 totaled 324,093 net tons as compared with 256,730 tons in the previous week.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Sept. 15.....	9,737,000	11,378,000
Sept. 22 (a).....	9,747,000	11,454,000
Sept. 29 (b).....	9,822,000	11,308,000
Daily average.....	1,637,000	1,885,000
Calendar year.....	1,174,000	1,795,000
Daily av. cal. year.....	271,015,000	413,435,000

ANTHRACITE

Sept. 15.....	1,127,000	2,000
Sept. 22.....	1,897,000	877,000
Sept. 29.....	1,982,000	2,025,000

COKE

Sept. 22 (b).....	139,000	335,000
Sept. 29 (a).....	162,000	321,000
Calendar year.....	4,785,000	14,502,000

(a) Subject to revision. (b) Revised from last report.

Demand for bituminous screened coals and for coke as substitutes for anthracite has practically stopped, although there is a greater movement of coke than of the former. Inquiry for Welsh anthracite is slow and few new orders are reported as being booked.

Little Market Life at Chicago

The sag in coal continues in the Middle West, as reflected on the Chicago market. Demand for domestic sizes has not materially improved, so that prices on lump and egg Illinois and Indiana coals continue about the same as last week. The egg moves with difficulty. Lack of demand, however, has reduced the running time of most mines so that the volume of screenings has fallen off some. This encourages many sales agencies to hope that screenings will soon stiffen a little. Right now they remain at the bottom.

No interest worth mentioning has yet been shown in any coal reaching this market. Smokeless remains difficult to sell at \$3 for mine-run, and anthracite, now shipping here in some volume, remains a long time in storage yards. Real cold weather is essential and none is in prospect. The gen-

eral impression among the best-informed men in Chicago is that no important rise in the market can reasonably be expected for two or three weeks and that even then it will be a slow one, producing no price peaks during the entire winter—barring some powerful, and now unseen, influence.

In the Illinois fields there is not much activity. Everyone is saying the other fellow should shut down. The southern field is still a good deal clogged by no bills on egg and smaller sizes in spite of dumping screenings at almost any price. The DuQuoin field is running light except for one or two mines. Mt. Olive no-bills on steam sizes are holding up the production of almost everything else. Standard field conditions were fairly good until about Oct. 1, when the general slump slowed down every mine and no-bills piled up.

St. Louis Trade Dull

Mild weather in St. Louis has put an end to domestic deliveries and the dealers have no orders on hand. Their yards are full of coal and some of them are obligated to continue to take coal on contract with no place to put it. The demand has been for the middle-priced coal and the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern				Midwest			
Market Quoted	Oct. 9 1922	Sept. 24 1923	Oct. 1 1923	Market Quoted	Oct. 9 1922	Sept. 24 1923	Oct. 1 1923
Smokeless lump.....	Columbus....	\$6.75	\$5.95	\$6.10	\$6.00@ \$6.25		
Smokeless mine run.....	Columbus....	5.75	3.00	3.10	2.85@ 3.25		
Smokeless screenings.....	Columbus....	5.60	2.35	2.35	2.15@ 2.40		
Smokeless lump.....	Chicago....	6.25	6.10	6.10	6.00@ 6.25		
Smokeless mine run.....	Chicago....	5.60	2.85	2.85	2.75@ 3.00		
Smokeless lump.....	Cincinnati....	6.30	6.10	6.10	6.00@ 6.25		
Smokeless mine run.....	Cincinnati....	5.95	3.00	2.75	2.50@ 3.00		
Smokeless screenings.....	Cincinnati....	5.80	2.25	1.85	1.25@ 2.00		
*Smokeless mine run.....	Boston....	7.25	5.05	4.80	4.75@ 4.90		
Clearfield mine run.....	Boston....	4.25	2.15	2.20	1.85@ 2.50		
Cambria mine run.....	Boston....	4.50	2.85	2.85	2.25@ 3.25		
Somerset mine run.....	Boston....	4.30	2.35	2.35	2.00@ 2.75		
Pool 1 (Navy Standard)....	New York....	5.25	3.25	3.25	3.00@ 3.25		
Pool 1 (Navy Standard)....	Philadelphia....		3.25	3.25	3.00@ 3.40		
Pool 1 (Navy Standard)....	Baltimore....	5.50					
Pool 9 (Super. Low Vol.)....	New York....	4.65	2.55	2.50	2.25@ 2.50		
Pool 9 (Super. Low Vol.)....	Philadelphia....	4.35	2.55	2.60	2.40@ 2.70		
Pool 9 (Super. Low Vol.)....	Baltimore....	4.85	2.45	2.40	2.40		
Pool 10 (H. Gr. Low Vol.)....	New York....	4.10	2.15	2.10	1.90@ 2.25		
Pool 10 (H. Gr. Low Vol.)....	Philadelphia....	3.85	2.10	2.15	1.95@ 2.25		
Pool 10 (H. Gr. Low Vol.)....	Baltimore....	4.25	2.25	2.25	2.25		
Pool 11 (Low Vol.)....	New York....	3.60	1.85	1.85	1.75@ 1.95		
Pool 11 (Low Vol.)....	Philadelphia....	3.35	1.85	1.85	1.75@ 1.90		
Pool 11 (Low Vol.)....	Baltimore....	4.05	2.00	2.00	2.00		
High-Volatile, Eastern				South and Southwest			
Pool 54-64 (Gas and St.)....	New York....	4.05	1.75	1.75	1.50@ 1.85		
Pool 54-64 (Gas and St.)....	Philadelphia....	4.00		1.75	1.60@ 1.85		
Pool 54-64 (Gas and St.)....	Baltimore....	4.05	1.75	1.60	1.60		
Pittsburgh seed gas.....	Pittsburgh....	5.40	2.80	2.55	2.50@ 2.65		
Pittsburgh gas mine run.....	Pittsburgh....	3.60	2.40	2.25	2.15@ 2.25		
Pittsburgh mine run (St.)....	Pittsburgh....	3.60	2.15	2.05	1.75@ 2.00		
Pittsburgh slack (Gas)....	Pittsburgh....	4.00	1.40	1.25	1.15@ 1.25		
Kanawha lump.....	Columbus....	6.50	3.15	3.15	2.85@ 3.50		
Kanawha mine run.....	Columbus....	4.60	1.90	1.85	1.75@ 2.00		
Kanawha screenings.....	Columbus....	4.50	1.05	1.05	.90@ 1.00		
W. Va. lump.....	Cincinnati....	6.50	3.75	3.50	3.25@ 3.50		
W. Va. Gas mine run.....	Cincinnati....		1.75	1.75	1.25@ 1.50		
W. Va. Steam mine run.....	Cincinnati....		1.75	1.75	1.25@ 1.50		
W. Va. screenings.....	Cincinnati....	4.10	1.10	1.10	.75@ 1.00		
Hoeking lump.....	Columbus....	5.25	3.10	3.10	3.00@ 3.25		
Hoeking mine run.....	Columbus....	3.50	1.95	1.85	1.75@ 2.00		
Hoeking screenings.....	Columbus....	3.50	1.05	1.05	.90@ 1.00		
Pitts. No. 8 lump.....	Cleveland....	4.85	2.60	2.60	2.20@ 3.00		
Pitts. No. 8 mine run.....	Cleveland....	4.40	2.05	1.95	1.90@ 2.00		
Pitts. No. 8 screenings.....	Cleveland....	4.05	1.25	1.15	1.05@ 1.20		
Big Seam lump.....	Birmingham..	3.45	3.75	3.75	3.65@ 3.90		
Big Seam mine run.....	Birmingham..	2.60	1.95	1.95	1.75@ 2.15		
Big Seam (washed).....	Birmingham..	3.10	2.35	2.35	2.25@ 2.50		
S. E. Ky. lump.....	Chicago....	6.25	3.35	3.35	3.25@ 3.50		
S. E. Ky. mine run.....	Chicago....	4.75	2.25	2.25	2.00@ 2.50		
S. E. Ky. lump.....	Louisville....	7.00	3.10	3.25	3.00@ 3.50		
S. E. Ky. mine run.....	Louisville....	4.75	2.00	2.00	1.75@ 2.25		
S. E. Ky. screenings.....	Louisville....	4.10	1.05	1.05	.75@ 1.00		
S. E. Ky. lump.....	Cincinnati....	6.50	3.50	3.60	3.00@ 3.50		
S. E. Ky. mine run.....	Cincinnati....	4.75	1.60	1.60	1.25@ 1.50		
S. E. Ky. screenings.....	Cincinnati....	4.00	1.05	1.00	.75@ 1.00		
Kansas lump.....	Kansas City..	5.50	4.50	4.50	5.00		
Kansas mine run.....	Kansas City..	4.25	3.50	3.50	3.50		
Kansas screenings.....	Kansas City..	2.60	2.60	2.60	.25		

* Gross tons, f.o.b. vessel, Hampton Roads.

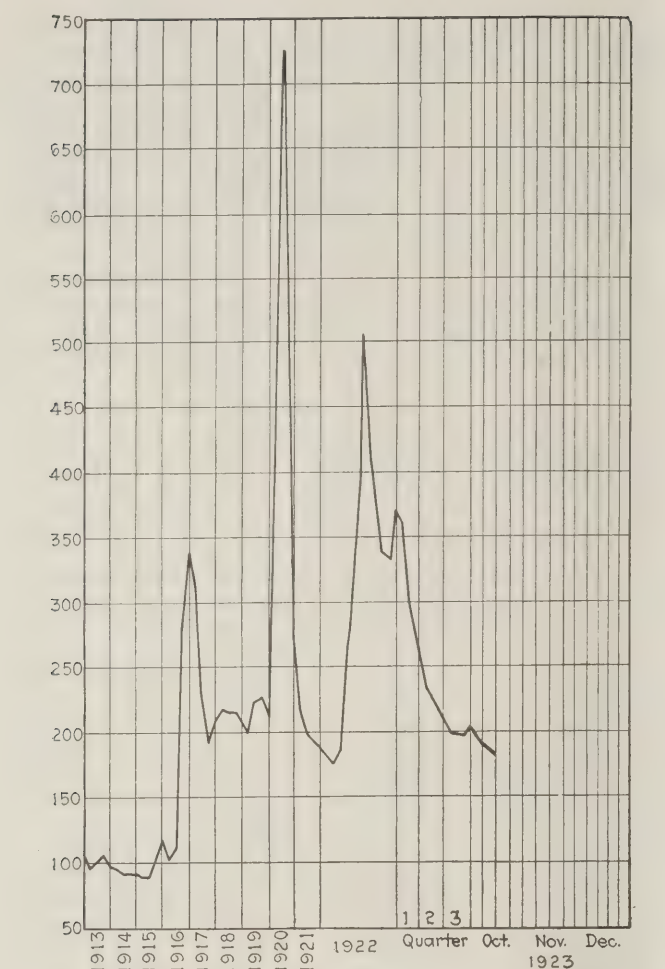
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Oct. 1, 1923		Oct. 8, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34	\$9.00	\$7.75@ \$8.25	\$9.60@ 12.25	\$8.00@ \$9.25	\$9.60@ 12.25	\$8.00@ \$9.25
Broken.....	Philadelphia....	2.39		7.90@ 8.10				
Egg.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Egg.....	Philadelphia....	2.39	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago*....	5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Philadelphia....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Stove.....	Chicago*....	5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Chestnut.....	Philadelphia....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Chestnut.....	Chicago*....	5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range.....	New York....	2.34		8.25		9.00		9.00
Pea.....	New York....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 7.50	6.15@ 6.65	6.75@ 8.00	6.15@ 6.65
Pea.....	Philadelphia....	2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea.....	Chicago*....	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York....	2.22	4.00@ 5.00	4.00@ 4.10	2.65@ 3.50	3.50	6.00@ 3.50	3.50
Buckwheat No. 1.....	Philadelphia....	2.14	5.00	4.00	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice.....	New York....	2.22	3.00@ 3.25	2.75@ 3.00	2.15@ 2.50	2.50	2.00@ 2.50	2.50
Rice.....	Philadelphia....	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley.....	New York....	2.22	1.75@ 2.00	1.50@ 2.00	1.15@ 2.50	1.50	1.15@ 1.50	1.50
Barley.....	Philadelphia....	2.14	1.00@ 1.75	2.00	1.50	1.50	1.50	1.50
Birdseye.....	New York....	2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
Index	Oct. 8	Oct. 1	Sept. 24	Oct. 9
Weighted average price	\$2.30	\$2.37	\$2.42	\$4.60

This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

situation in St. Louis is typical of that in all the surrounding territory in a retail way. Coke, anthracite and smokeless go begging. The number of oil burners put in this autumn has seriously affected the retail coal situation. Many householders are putting in gas heating plants.

All Kentucky Sizes Drag

It is admitted in Kentucky coal circles that demand is poor, and that a strike or severe car shortage or something like that would be necessary to start a buying movement or advance the price. All sizes in all fields of the state are reported as draggy. The retailers are contented to hold out and buy only for immediate needs.

The Lake movement continues heavy and this along with such general business as is in the hands of eastern Kentucky mines is resulting in overproduction of screenings, as industrial consumers appear to understand the situation fairly well and are refusing to buy screenings except at give-away prices. The very best grades of eastern Kentucky screenings are quoted at 75c. @ \$1 a ton at mine, while western Kentucky on pea and slack is quoting as low as 50c., and on nut and slack at around 90c. Mine-run also is draggy and runs from \$1.50 for off-grade stuff in eastern Kentucky to \$2.25 for the very finest gas coal, and from \$1.50 to \$2 in western Kentucky. Prepared sizes are being

held fairly firm in price. To reduce them with the screenings market as it now is would result in losses all along the line.

Northwest Idles Along

Coal demand throughout the Northwest was not much improved during the past week. No cold weather has struck in yet. The main interest in fuel in that general region centered on the increase in hard-coal prices, which varied from 65c. to 80c. on the standard domestic sizes and 10c. on pea.

New anthracite is coming into Duluth 75c. higher on egg, 70c. on stove and nut and 10c. on pea. Only two cargoes have been received during the week but sixteen more are reported on the way. Dock prices are: Egg, \$13.25; stove and nut, \$13.50; pea, \$11.10 and buckwheat, \$8.50.

Duluth prices on bituminous lump, run of pile and screenings, are:

Kentucky, \$7.50, \$7 and \$4.50; Youghiogheny, \$6.50, \$5.50 and \$4; Hocking, \$6.25, \$5.25 and \$3.75; splint, \$7, \$6 and \$4.25, and Pocahontas, \$10, \$6.50 and \$6.

All Milwaukee dealers are selling larger sizes of hard coal at advances ranging from 65c. to 80c. Stove is \$16.80; nut, \$16.65 and egg, \$16.40. Pea is up 10c. to \$14.30 and buckwheat is unchanged at \$11.50. These prices went into effect Oct. 4. Trade had been a bit unsteady before the advance because of doubt as to whether stocks on hand would advance too. They did. Demand for hard coal in Milwaukee is only fair and steam coal call has been light indeed. There has been considerable yield in price in competition between Western and Eastern coals.

Milwaukee wholesale prices on lump, pile run and screenings effective Oct. 4 are: Pittsburgh, Hocking and Youghiogheny, \$7.75, \$7 and \$6.25; West Virginia, \$8, \$7.25 and \$6; Pocahontas, \$12.50, \$8.50 and \$7.50, smithing, \$8.75; Kanawha gas mine-run, \$7; Illinois and Indiana, \$7.75, \$7 and \$6.25; coke, large sizes, \$14.90; pea and nut, \$11.90.

Western Trade Picks Up

Domestic demand throughout most regions of the West has been enough during the past week to justify an increase of 50c. in price. This applies to Kansas lump and Utah lump principally. Steam demand continues slow, however, and everywhere there are no bills in profusion. New Kansas prices drop screenings from \$2.50 to \$2.25 in a move to reduce the "no bills." There are no changes in Colorado prices. About 43 per cent of the production of the state was shipped out of the state during September.

Dullness Pervades Ohio Markets

Dullness characterizes the coal market around Columbus and as householders are not buying, retail business is quiet. Steam trade also is dull and the market on the whole is in as bad shape as at any time during the summer. Users are asking for the fancy grades such as smokeless and splints, and Kentucky grades also are being sold to a certain extent. Reserves are sufficient for from forty-five to sixty days. Railroads continue to take a fair tonnage and utilities are good buyers. The Southern Ohio Coal Exchange reports that for the week ended Sept. 22, 442 mines reported a production of 188,452 tons out of a total capacity of 695,630 tons.

Demand is generally dull in the eastern Ohio market, while steam buyers have at least thirty days' supply on hand. Retail yards report that domestic business is not as active as it was several weeks ago, but apartment houses and business buildings are stocking up to meet their obligations to furnish heat early this month.

Reports received at Cincinnati show that the efforts of the Logan County (W. Va.) producers to cut their wage scales has met with failure, but that some operators in Bell and Clay Counties, Kentucky, were more successful, although the cut was not large. A large amount of coal has been rejected during the past week or ten days. Bituminous and smokeless domestic coals are holding firm, while steam grades are weak. West Virginia 2-in. lump was quoted at \$2.25 @ \$2.50 on the Cincinnati market, with southeastern Kentucky 2-in. lump at \$2.25 @ \$2.75.

Further Slump at Pittsburgh

The market at Pittsburgh has slumped further and prices have gone below last July's level. It is difficult to sell coal, consumers showing no interest, the most conspicuous class being the steel mills and the shops that use steel. Steel interests are inclined to decrease their stocks of coal at by-product coking plants rather than increase them. The central Pennsylvania market is dull and there has been a noticeable drop in production, the total output for September having been 67,790 cars, as compared with 80,361 cars in August. Buffalo reports a quiet market. There is no demand and no indications of improvement.

New England Market Slow

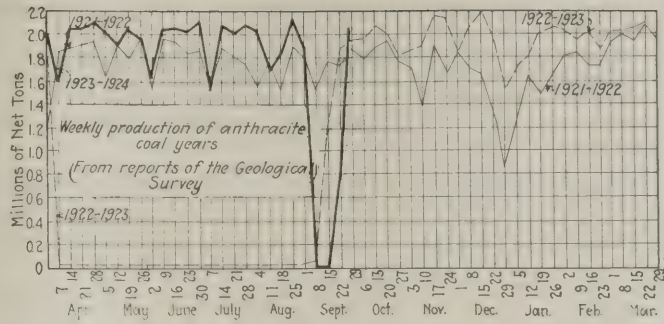
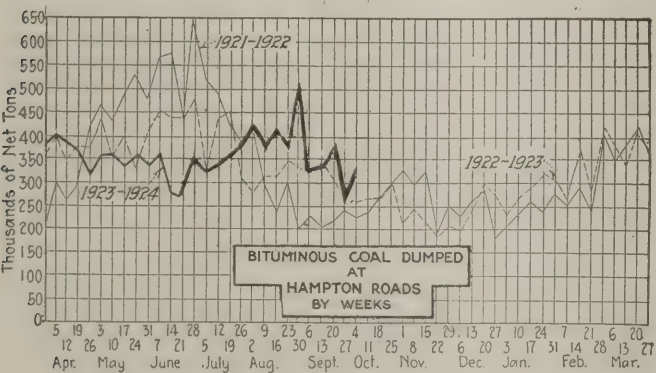
In New England the steam-coal trade might be considered even duller than in July if that were possible. Inquiry is of the most fugitive and elusive kind, and there are no indications of improvement. Not only is spot buying practically stopped but contractors are curtailing their receipts to correspond with reduced consumption. The largest textile mill of the world, for instance, at Manchester, N. H., has announced a shutdown in its cotton department, to continue for an indefinite period, and it is likely that this move will be followed by other manufacturers in the same line. Mill owners now see no prospect of anything like full-time production for a long way ahead.

Neither all-rail nor by water is there any volume of steam coal moving. Efforts to force coal on reluctant buyers have resulted disastrously to the shipper and few contractors have the hardihood now to send coal forward in advance of sale. Prices are depressed as low as the operators feel they can possibly go and pay their charges. In every direction the market is being combed over in the hope of developing enough business to warrant keeping the mines open at least a day or two a week. We are in the midst of the fall season with possible transportation troubles ahead, but consumers show no interest, largely because they have reserves on hand for three to four months.

There are rumors of prices f.o.b. Norfolk and Newport News of No. 1 Navy standard grades at less than \$4.75 per gross ton, but they are not substantiated. Accumulations at the piers are as heavy as can be allowed under the conditions and several of the smokeless agencies are following an extremely close-hauled policy of restricting shipments from the mines to replacements of coal actually dumped at the piers. At this end Pocahontas and New River have sold at less than \$6 per gross ton on cars at Boston and at Providence. These quotations are confined for the most part to wholesale dealers who have storage of their own and are not obliged to move tonnage in order to save car service or vessel demurrage.

Atlantic Seaboard Markets Inactive

There is little activity in the New York soft-coal market. Spot demand is slow and contractors are asking that their deliveries be reduced. It was reported that some operators had voluntarily reduced their contract prices in order to keep the coal moving. Many operators do not look for any considerable improvement before the new year, when consumers are expected to begin to build up reserve stocks before negotiations for a new wage agreement in the bituminous regions begin. There was some interest taken



in the opening of bids by the U. S. Shipping Board on Oct. 4 for 2,300 gross tons of Pool 9 coal, at which the prices submitted ranged on a basis of \$1.65@2.36 per net ton, f.o.b. mines. The Philadelphia market is quiet, the only activity being efforts to keep the stop tonnage on the move. There are numerous inquiries for protection on blocks of tonnage, and while some are willing to give protection to the end of March, the disposition is to sell blocks for about three months ahead.

At Baltimore there is some inquiry from industries which store large tonnages for the winter months. With car supply liberal, the movement of coal is in excess of any urgent demand. The activity in West Virginia is spotty, although production has not been affected materially. Due to the weakness of smokeless coals at tidewater, shipments are being made to Western markets whenever it is possible, owing to better prices prevailing and stronger demand. The market at Birmingham is quiet, with a restricted demand and sharp competition.

Dumpings for Lake movement during the week ended Sept. 30 amounted to 836,790 tons of cargo and fuel coals as compared with 878,058 tons the previous week. Although two months of open navigation still remain, dumpings of cargo coal have declined perceptibly in the past month, but this is not surprising, says the Geological Survey, as on Sept. 30 the cargo coal dumped the present season amounted to 22,061,001 tons, 1 per cent greater than the shipments in 1918, in which year the maximum Lake shipments occurred. During the same week 33,757 tons of anthracite was dumped at Buffalo for lake shipment, bringing the total for the year up to 2,168,576 tons.

Domestic Anthracite Moving Well

Movement of anthracite domestic sizes continues in good volume although dealers along the Atlantic seaboard could use large shipments. Not much of the high-priced coals come to the New York market, retail dealers there depending mostly on company product. Light shipments are complained of also in the Philadelphia market. Stove and chestnut sizes are mostly wanted, while the demand for egg and pea coals is on the increase. Baltimore complains of small shipments. The steam sizes move slowly. Buckwheat is being quoted by independent producers at prices below the company schedule of \$3.50. The strongest of the three coals is barley, but even this is being let go at less than company schedules.

It is hard to sell coke either for heating purposes, for blast furnace use or for foundry use, and prices show a further decline from last week. Standard prices coke is quotable around \$5.50, while heating coke is being quoted in the Connellsville district at around \$3.75. Production of beehive coke during the week ended Sept. 29 is estimated by the Geological Survey to have been 321,000 net tons a decline of 14,000 tons from the previous week.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended Sept. 22, 1923.	1,060,436	182,524		
Previous week.	1,060,580	171,830		
Same week in 1922.	961,138	187,204		
			All Cars	Coal Cars
Sept. 22, 1923.	59,008	16,840	13,515	5,482
Same date in 1922.	11,292	7,018		
Sept. 15, 1923.	69,080	19,790	12,245	6,478

Foreign Market And Export News

Great Britain's Coal Output Decreases Slightly; Welsh Market Unsettled

Production of coal by Great Britain's mines during the week ended Sept. 22 was 5,005,000 tons, says a cable to *Coal Age*. This compares with 5,245,000 tons the previous week, a decrease of 240,000 tons.

The Welsh market continues unsettled. The tone has been disappointing to the operators, who expected some increased demand from the United States. In addition, the European buyers have adopted a waiting policy and orders for the remainder of the year are anything but heavy. Belgium and Holland continue to buy steadily but not in large quantity, while the business with South America is very quiet.

Owing to the accumulation of stocks operators in many districts are finding great difficulty in getting their railway trucks cleared, and some mine stoppages have resulted. A few mines are favorably placed and have not reduced their prices, but there is such keen competition for business that buyers have been able to force concessions.

Operators are looking forward to the placing of the British Admiralty contracts, which is expected soon.

The Newcastle market is distinctly quieter, though operators are able to clear their outputs, and there is not much accumulation. The European demand is very slack, particularly that from Germany.

French Market Firm; Inquiry Drops

The French coal market is still firm. Due to the new turn in events in the Ruhr, inquiry for industrial coal has slightly declined. However, the market probably will become more active owing to the usual last-minute rush of retailers to take advantage of the summer prices. In spite of the difference in prices between the French collieries' rates and their foreign competitors it is asserted that no adjustment in prices will be made in the near future.

Belgian producers are considering the Paris market with more interest since their government intends to curb the

overexportation of fuels to other countries, especially to Holland and Switzerland.

Union Enters Retail Market at Norfolk

The Brotherhood of Locomotive Engineers, through their representatives at Norfolk, are offering Pocahontas coal at \$7.50 a ton, delivered in the homes. The coal is being sold at \$6 a ton at the car. It is of a somewhat lower grade than the coal being sold by local dealers for \$12 a ton, having been screened finer than the usual commercial product.

Business at Hampton Roads was slack last week in the face of a declining market, prices weakening and movement of coal showed a decline. Dumpings at all piers were below normal, and movement of coal in all directions was without feature.

Coastwise trade was the strongest, though somewhat below normal for this period of the year. Foreign business was holding its own, and showing no indication of an immediate improvement. Bunkers dropped somewhat, due to a temporary slump in general shipping. The tone of the market was dull, and a spirit of comparative inactivity was manifest in the trade.

United States August Coal and Coke Exports

	1922	1923
Anthracite.....	28,704	442,475
Bituminous.....	425,530	2,117,084
Exported to:		
France.....		85,543
Italy.....		46,857
Netherlands.....		76,128
Other Europe.....		40,225
Canada.....	373,589	1,753,972
Panama.....	9,595	
Mexico.....	6,052	6,357
Br. W. Indies.....	15,730	12,571
Cuba.....	10,629	46,807
Other W. Indies.....	7,899	6,707
Argentina.....	7,730	
Brazil.....		7,411
Egypt.....		4,000
Fr. Africa.....		13,123
Other countries.....	2,036	9,653
Coke.....	26,121	99,237

United States August Coal and Coke Imports

	1922	1923
Anthracite.....	31,574	588
Bituminous.....	770,332	58,344
Totals.....	770,332	58,344
Imp. from:		
United Kingdom.....	506,050	
Canada.....	228,044	58,344
Japan.....	50	
Australia.....	35,519	
Other countries.....	669	
Coke.....	5,240	3,162

Export Clearances, Week Ended Oct. 6, 1923

FROM BALTIMORE

For France:	Tons
Fr. SS. Capitaine Boudouin.....	6,028
Fr. SS. Hudson.....	473
For Canada:	
Belg. SS. Caledonier.....	6,170
For Dutch Guiana:	
Am. Sch. Esther K.....	1,177
For West Coast Ports:	
Am. SS. Mount Carrol.....	2,000

COKE	
For Chile:	
Jap. SS. Atlantic Maru.....	3,518

FROM PHILADELPHIA

For Cuba:	
Am. Schr. Wm. H. Harriman, for Cienfuegos.....	

FROM HAMPTON ROADS

For Canada:	
Belg. SS. Menapier, for Montreal.....	6,905
Dan. SS. Bornholm, for Bathurst.....	1,207
Br. Schr. Peter McIntyre, for St. John.....	793
For Cuba:	
Nor. SS. Almora, for Havana.....	3,544
For West Indies:	
Dan. SS. Nordkap, for Fort de France.....	4,995
Dan. SS. Norden, for Barbados.....	4,097
For Italy:	
Ital. SS. Nomentum, for Porto Ferrajo.....	6,094
For Brazil:	
Br. SS. Eastern City, for Pernambuco.....	7,681
For Porto Rico:	
Amer. SS. Jean.....	4,009

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Sept. 27	Oct. 4
Cars on hand.....	1,282	1,350
Tons on hand.....	69,763	77,111
Tons dumped for week.....	68,333	86,709
Tonnage waiting.....	7,400	22,800
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,762	1,890
Tons on hand.....	106,150	112,050
Tons dumped for week.....	97,720	84,158
Tonnage waiting.....	7,110	10,958

C. & O. piers, Newport News:		
Cars on hand.....	2,240	1,899
Tons on hand.....	118,675	99,975
Tons dumped for week.....	63,170	118,502
Tonnage waiting.....	2,750	6,800

Pier and Bunker Prices, Gross Tons

	Sept. 29	Oct. 6†
Pool 9, New York.....	\$5.15@ \$5.50	\$4.95@ \$5.35
Pool 10, New York.....	4.75@ 5.00	4.50@ 5.00
Pool 11, New York.....	4.35@ 4.75	4.35@ 4.75
Pool 9, Philadelphia.....	5.30@ 5.60	5.30@ 5.65
Pool 10, Philadelphia.....	4.65@ 5.20	4.55@ 5.10
Pool 11, Philadelphia.....	4.35@ 4.70	4.30@ 4.65
Pool 1, Hamp. Roads.....	4.99@ 5.00	4.60@ 4.75
Pools 5-6-7 Hamp. Rds.	4.50	4.40
Pool 2, Hamp. Roads.....	4.60@ 4.70	4.40

BUNKERS

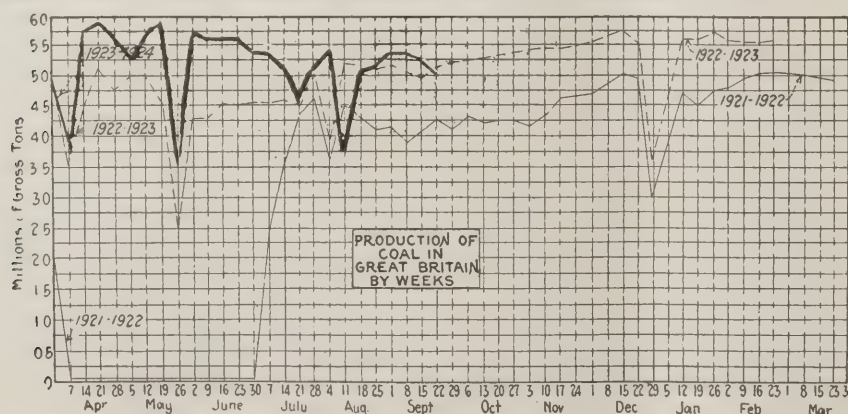
Pool 9, New York.....	5.45@ 5.80	5.25@ 5.65
Pool 10, New York.....	5.05@ 5.30	4.80@ 5.30
Pool 11, New York.....	4.65@ 5.05	4.65@ 5.05
Pool 9, Philadelphia.....	5.60@ 6.00	5.55@ 5.95
Pool 10, Philadelphia.....	5.10@ 5.50	5.00@ 5.40
Pool 11, Philadelphia.....	4.65@ 5.00	4.60@ 4.90
Pool 1, Hamp. Roads.....	4.90@ 5.00	4.75
Pool 2, Hamp. Roads.....	4.60@ 4.70	4.40

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Sept. 29	Oct. 6†
Admiralty, large.....	28s.	27s.6d.@ 28s.6d.
Steam smalls.....	20s.	17s.6d.@ 18s.6d.
Newcastle:		
Best steams.....	24s.	24s.
Best gas.....	24s.@ 24s.6d.	24s.@ 24s.6d.
Best bunkers.....	21s.6d.@ 22s.	23s.@ 24s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

The sale of the federal government's interests in the Gorgas steam plant, the initial units of which were constructed by the Alabama Power Co. and turned over to the Government under contract for use during the world war, the plant being greatly enlarged and expanded by the War Department, has made public a claim of H. E. McCormick, a prominent coal operator of the Birmingham district, to one-half ownership in the lands on which the plant is located, which promises to bring the legality of the contract under which the government's interest in the property was transferred to the power company for a sum approximating \$3,500,000, into question with a probability that the transaction will be aired in Congress at its next session or taken into the courts for adjudication. The McCormick interests claim that their half interest in the property was never acquired by the power company while the latter claims a perfect title to the property involved. The matter is of much interest in view of the fight of Henry Ford for the Muscle Shoals plant, in which Mr. Ford has persistently declined to eliminate the Gorgas steam plant from his bid for the government properties. The Gorgas plant is located in Walker County on the Black Warrior River and is supplied with coal from the mine of the Winona Coal Co. The lands carry the Pratt and America coal seams and are valuable holdings.

J. E. Creel, operating the Town Creek mine in Walker County, near Empire has sold the operation to Elmer Faucett, of Dora, for a consideration said to approximate \$10,000. Mr. Faucett will continue the mine in operation.

The Legislature of Alabama has passed an act increasing the salary of the chief mine inspector and his five assistants \$1,000 each and carrying an appropriation of \$50,000 per annum for the work of the mining department of the state, which practically doubles the fund formerly available and will enable the department to render more extended and effective service in the coal mining industry. The bill will doubtless receive the approval of the governor.

Announcement is made of an increase in the capital stock of the Rushton Coal Corporation of \$374,000 and a change in the name of the corporation to the Rushton Corporation. J. Frank Rushton is president; R. H. Woodrow, vice-president and general manager; William J. Rushton, secretary, and J. S. White, treasurer, all of Birmingham. The Rushton interests are now operating the Franklin Mining Co., at Powhattan, in the western section of Jefferson County, and the Piedmont Coal Co., in Walker County, near Dora. Although no official announcement has been made of the plans of the corporation the large increase in capital will more than likely be used for extensive development work.

The McLaughlin Coal Co. has purchased the retail coal business of the Empire Fuel Co. in Birmingham.

ILLINOIS

Considerable publicity is given in the St. Louis press to the suggestion of William D. Pratt, an engineer of Kansas City, that the economical method of conveying coal to St. Louis for steam plants is to reduce it to a small size and pump or flush it from a central mining point a few miles from St. Louis to the city, utilizing the Free Bridge to cross the river. A right of way across East St. Louis would be necessary, but this is solved by a new ordinance of the St. Louis board of aldermen passed over the mayor's veto and in opposition to the combined interests of the St. Louis railroad monopoly with its 29c. per ton "arbitrary" on coal, appropriating several thousand dollars for condemnation of a right of way for the north-east approach for the Free Bridge elevated over the city of East St. Louis, as the first step to free St. Louis from the "arbitrary." This approach could be used for coal from the mines in Madison, Macoupin and adjoining counties and the northern section of St. Clair County. Practical engineers discussing it agree that conditions at St. Louis are better for this than elsewhere at this time for this first step in the economic delivery of steam sizes, which are losing

out to oil and electricity on account of high producing costs, coupled with high freight rates and the river "arbitrary."

The leasing of 1,500 acres of coal land within a few miles radius of Elkville has been announced, John Fox being the promoter, acting for a large Eastern company, according to statements published. It is further stated that this company owns and operates 17 large mines in Virginia and that they will soon commence drilling operations on the land near Elkville. The vein at that point averages from 8 to 12 ft. thick and at a depth of about 300 ft.

The Illinois Central R.R. is contemplating the reconstruction of its coal chutes at the mine of the Jackson Coal Co. at Haildayboro, which were destroyed by fire some time back.

The two mines at Buckner and Weaver will again operate according to announcements by owners. The two plants have been idle for several months.

Final surveys and plans have about been completed at the proposed site of the new strip mine to be opened by the Equitable Coal & Coke Co., at Du Quoin. Engineers of the company have been working on the location for some time and it is expected that work will be started on the switch soon. Strip mining in this particular district has gained much popularity, this being the third operation to be opened within five years. The other two are the Harts horn Coal & Mining Co., at Elkville, and the Scott, Smith Coal Co., at Du Quoin.

INDIANA

Joseph T. Kingsley, district manager of the Binkley Coal Co., was appointed receiver for the Active Coal Co. by Superior Judge T. J. Moll, Indianapolis, recently. The proceedings were filed by the Union Fuel Co. on alleged failure to redeem a promissory note. Liabilities were listed at \$7,000. The company will not be sold until contracts now on the books are filed, it was said.

Gray Brothers, who are leasing coal land in Monroe and Lockhart townships, Pike County, the last week recorded fifty options on coal lands covering nearly 2,000 acres. Most of the land is optioned at \$100 to \$125 an acre. The Gray Brothers are rushing work on their railroad, being built from the Big Four R.R., just south of Oakland City. As soon as the road is completed three big strippers will be shipped into southern Monroe townships, where the Gray Brothers own one of the largest stripping coal fields in the Middle West.

A suit against the state, said to be the forerunner of a series of suits to recover more than \$150,000 in tonnage and license fees levied against Indiana coal operators by the State Coal and Food Commission during the 1920 fuel famine, was filed in the Indianapolis Superior Court recently by the Spring Valley Coal Co., of Greene County. The return of \$854 is sought. The commission was created by special act of the General Assembly, while James P. Goodrich was Governor, to expedite coal deliveries and regulate prices. It was composed of Mr. Goodrich, Jesse Eschbach, ex-chief examiner of the State Board of Accounts, and Otto L. Klauss, ex-Auditor of State. Expressing the opinion that the act was for "revenue producing purposes," the complaint avers the measure was in conflict with interstate commerce regulations and violated sections of the state and national constitutions. A hearing likely will be given in December before Judge Clinton H. Givan.

The property of the Domestic Coal Co., located a few miles southwest of Washington, on the Maysville road, was sold recently by the owners, Hugh L. Cox and Sheriff Hugh G. Faith, to William T. Enley and James Duese, both of Edwardsport, and Dr. Ernest Hollingsworth, of Washington. Title to a 238-acre farm east of Washington on the state highway No. 5, passed to Cox and Faith by the terms of the transaction. The land belonged to Enley. The Domestic Coal Co.'s mine has been in operation for three years. The new owners were given immediate possession.

At an approximate investment of \$25,000 the Bloomington Coal Co., Bloomington, has erected a new elevator, conveyor and

overhead pocket system for the handling of coal. The building is 105 ft. long, 24 ft. wide and 50 ft. high. A driveway in the center runs the entire length and is so arranged that loading wagons or trucks can drive in at one end and out at the other.

The Hoosier Coal Mining Co. has been incorporated at Dugger, with a capital of \$30,000 to carry on the business of mining. Roy E. Price, of Indianapolis, and Harry T. West, Irwin Coffey, Everett King, James Reeves and B. P. Tison, of Dugger, are the incorporators.

KANSAS

The Southwestern Interstate Coal Operators' Association and the United Mine Workers of District 14 after long negotiations, which apparently broke off in a disagreement, resumed conference and made a machine mining scale for the Pleasanton field, Linn County, which provides a 10c. differential from the pick scale. William Bogartz, district union president, on Sept. 24, a week after the agreement was made, gave a signed statement to Pittsburg newspapers that he was continuing to publish in the newspapers of that city, the center of the Kansas coal field, a warning to union miners to stay away from Pleasanton. He said only four Pleasanton companies have signed up and many miners living there are unable to get employment. No effort has been reported recently to resume negotiations for a machine scale for all of District 14 since the conference handling that matter adjourned many weeks ago without reaching an agreement.

Charging that fifteen years ago the Mackie Fuel Co. removed coal from under 3.49 acres of land belonging to the Western Coal & Mining Co. in the Cherokee County (Kansas) field, the latter company has brought suit for \$100,260.87 against the former directors of the now extinct firm in Federal District Court at Fort Scott. George K. Mackie, Flora Mackie, Eva Bush and Mrs. J. W. Mackie are named as former directors of the company and as statutory trustees for the stockholders since the dissolution of the corporation. In its petition the complainant says the alleged trespass was not discovered until recently, when men in its mine No. 21 cut through into the old workings of the Mackie mine. The total amount of coal removed is estimated at 11,242 tons, valued at \$14,400. The Western company is demanding \$43,200 for this coal, under the rule that treble value may be collected for coal removed by encroachment. To the \$43,200 is added \$38,000, accumulated interest. The remainder of the \$100,260.87 is demanded on the ground that the Mackie workings created a danger zone for Western mine No. 21, making it impossible for that concern to obtain men to work 16.39 acres of its holdings.

KENTUCKY

New methods of arriving at an equitable assessment of Kentucky coal properties went into effect July 1. Heretofore coal operators have lumped their assessments in many instances, but under the new system an itemized report will be made of all mining equipment and houses, tipples, buildings, etc., owned by the mining companies. This system is expected to bring to light much hitherto unlisted property and it will require the operators to pay the tax on separate items rather than in a lump valuation.

At least three mines near Madisonville, in Western Kentucky are still on strike following the failure, last summer, of the men to sign the two-year contract which the balance of the field made. About \$6,000 a week in strike benefits is now being paid to these strikers by the union.

David R. Ogden, of Louisville, formerly in the coal jobbing and operating business, has arranged to become local representative of the Crown Coal Co., Inc., selling agents for mines at Centertown and also the Rockport Coal Co., at Rockport, the Crown having mines on both the Louisville & Nashville and Illinois Central railroads.

The Bell Dean Coal Co., Louisville, has filed amended articles increasing its capital stock from \$11,000 to \$25,000, the amendment being filed on June 25.

Amended articles have been filed by the Delaware Coal Co., of Davies County, increasing its capital stock from \$60,000 to \$150,000.

The Drakesboro Coal Co., of Drakesboro, in western Kentucky, has been incorporated with a capital of \$40,000, by Claude Nichols, of Mogg, Edgar Nichols, of Central City, and A. J. Mercer, of Martwick.

The Falls City Coal Co., of Louisville, capital and liability limit each placed at \$10,000, has been chartered by Charles

Baumeister, Wilson H. Harcourt and John Herdt.

The E. T. Slider Co., handlers of river coal, sand and gravel, at Louisville and New Albany, have installed three new steel barges in their river service, and have three more coming, the equipment having been built at the Howard Shipyards plant, at Jeffersonville, Ind.

The United Mine Workers of District 23 have been denied an injunction to prevent the Dever Coal Co., of Webster County, from leasing its property to another concern, not a signer of last summer's two-year contact with the miners. Chief Justice Sampson in the Kentucky Court of Appeals said the court had no jurisdiction in such a matter.

The Louisville & Nashville R.R. reports that it has virtually completed work on additional yards at Strawberry, adjoining the South Louisville yards, which will give it capacity for several hundred additional cars at Louisville and improve facilities for switching and handling. Ten acres of land are taken up by the new yards, which cost over a quarter of a million dollars. A half million dollars also is to be expended in reducing grade and curves over Coal Hill, forty miles south of Louisville, on the main line to the western Kentucky coal fields, and to Nashville and the South.

The Inland Waterways Co., Louisville, has just purchased an additional steam towboat from the Ayer & Lord Tie Co., at Paducah, and has announced plans for maintaining regular schedules in handling tows of coal, oil and steel products between Louisville and upper river points, as far as Pittsburgh.

The Liggitt Mining Co., Cincinnati, with mines at Dakota, near Whitesburg, has resumed operations after being down for several months.

Operations have been started to put the New Castle mine of the New Castle Coal Co., at Edwardsville, which has been idle since last March, in condition to resume work soon. The pumps have been started.

The Eagle Coal Mining Co. has been incorporated in Oliver Springs, Minn., with a capital of \$25,000, by J. E. Wood, J. H. Hodges and W. A. Montgomery.

The Enterprise Coal & Mining Co., of Sullivan, has filed a preliminary certificate of dissolution.

MINNESOTA

Governor Preus, of Minnesota, has returned a pointed response to Governor Pinchot's letter urging an investigation of the possibilities of profiteering in the Minnesota coal trade. This was investigated a year ago by Colonel Ivan Bowen, of the State Railroad and Warehouse Commission. His conclusions are that with one or two minor exceptions, there was no profiteering in the Minnesota coal trade. So Governor Preus invites Governor Pinchot to the situation at home, suggesting that it is unfortunate that there should be permitted connivance in Pennsylvania by the operators, railroads and miners of anthracite whereby the price of anthracite is forced up. He declares that "certain classes of people" of Pennsylvania are now taking unfair advantage of the consumers of anthracite throughout the United States and Canada.

A new screening plant has been installed at Two Harbors. It will be used by the Duluth and Iron Range Ry. and will handle 150 tons an hour and cost \$90,000. It is electrically operated.

MISSOURI

In the U. S. District Court at St. Louis recently Judge Paris rendered a decision in favor of the Burton Coal Co., of Chicago, formerly known as the Wickham & Burton Coal Co., for \$19,330.80, against the Boehmer Coal Co., of St. Louis. The plaintiff sued for damages on a contract for 100 cars of coal made on April 19, 1920, and on which 22 cars were shipped. The defendant refused to ship any more, claiming car shortage. The plaintiff showed that the cars were delivered and the market price increased, and the Court sustained that view.

The Centerville Coal Co., of Centerville, Iowa, have taken over the property of the Mosby Coal Co., of Mosby, where, it is understood, the shaft enters a 32-ft. seam of coal, but it has not been worked successfully on account of quick sand.

NEW YORK

Raymond A. Walter and Walter M. Dake, former members of the staff of the U. S. Coal Commission, will establish an office as

consulting engineers in New York. As a representative of Chairman Hammond, Mr. Walter made investigations of mining communities while Dr. Dake was an assistant to C. E. Leshner in engineering studies made under direction of the Commission.

A fuel dictator, with full powers, was urged by the Flatbush Civic Association, members of which held their first full meeting at Public School 119, Avenue K and East Thirty-ninth Street, Brooklyn, Oct. 3. A resolution was passed asking Governor Smith to appoint a coal commission to regulate prices and distribution. Members declared the coal situation in Brooklyn was "disgraceful," and argued that it had been clearly shown fuel administrators heretofore have not had sufficient power to stop profiteering or regulate supplies.

Michael Tuohs, president of the Titan Fuel Corporation, New York City, has returned from a two months' tour of Europe.

F. B. Layton Coal Co., of Boston, will hereafter represent the Steamship Fuel Corporation, of New York, in New England.

OHIO

In order to finance extension plans the Muskingum Coal Co., of Zanesville, has increased its capital to \$300,000. The company has obtained a contract to furnish coal to the new \$10,000,000 power plant being erected at Philo, on the Muskingum River, which runs for about 10 years and which will eventually call for 50 cars daily. New mines will be opened and new leases have been obtained to increase its holdings.

The Gilt Edge Coal Co. has been chartered with an authorized capital of 600 shares, no par value, for the purpose of mining coal and for selling both coal and coke. Incorporators are John H. Smith, B. D. Smith, Charles A. McLaughlin, C. W. Arnold and Roy J. Stern.

Eleven mines of the Sunday Creek Coal Co., the George M. Jones Co., the Ohio Collieries Co. and the Caledonia Coal Co. have resumed operations near Corning after being practically shut down for the last three months. Fifteen hundred men are given employment.

Toledo's City Council has voted to make an investigation of the price of both anthracite and bituminous coal, the spread between wholesale and retail prices and whether there are any speculators in that city. The investigation, to be conducted by a committee of three, is to be concluded and findings reported not later than Dec. 1. The resolution recites that the report of the Hammond fact-finding commission found Toledo wholesalers were paying between \$12 and \$13 for a gross ton of anthracite, and that the retail price is between \$16 and \$17 a net ton. It also sets forth that the rail rates from the anthracite fields are lower to Toledo than to any other city in Ohio, although the retail price there is reported to be higher than in other cities.

The Maple Grove Coal Co., Columbus, will soon open a mine at Adena. Acreage has been obtained and it is proposed to open an electrically operated mine with an initial production of 400 tons daily. Walter Mulby, of Columbus, is at the head of the company, and E. C. Riley is general manager.

The Moore Fuel Co., of Columbus, is in the hands of a receiver. This caused the closing of their branch office which had been maintained for a few months in Cincinnati.

OKLAHOMA

The Wise-Buchanan Coal Co.'s mine immediately south of Henryetta was recently opened. This mine is one of the largest in the Henryetta district and affords employment for 100 miners. Its output is more than 800 tons a day. The mine has not been operated at capacity since it was opened, on account of lack of demand for coal. The company has held most of its miners, however, and expects to operate at capacity as soon as cold weather increases the demand for fuel.

PENNSYLVANIA

The anthracite tax cases reached the state Supreme Court at Pittsburgh on Sept. 26, when arguments were heard upon an appeal from the decision of the Dauphin County Court which had upheld the constitutionality of the Act of Assembly of May, 1921, fixing a tax upon anthracite. The Commonwealth of Pennsylvania is the plaintiff in the case with the Philadelphia & Reading Coal & Iron Co., Alliance Coal Mining Co., Cranberry Creek Coal Co. and the Lehigh Coal & Navigation Co. were

listed as defendants. Arguments of counsel centered upon the following points: Can a tax be assessed in accordance with the act of May, 1921, unless the tonnage and value is accurately ascertainable on the day it is prepared for shipment? Was it lawful to assess the tax after the coal had been delivered to the carrier? Was it lawful to assess the tax when the coal had no market value on the day the statute required the assessment to be made? Does the assessment of the tax violate the uniformity clause of the state Constitution and the commerce clause and the fourteenth amendment of the federal Constitution?

Approximately 750 miners employed at the Delaware Colliery of the Hudson Coal Company at Plains went out on strike Oct. 1 because a laborer refused to pay a fine of \$25 imposed upon him by the officials of the local to which he belonged for a violation of a union ruling. The offender had agreed to pay the fine at a recent meeting of the local, but upon paying the money at the colliery he demanded a receipt, which was refused him. The company then was asked to take a hand in the matter, and upon refusing to do so the men went out, throwing the colliery idle.

Announcement has been made by the National Mining Co. that it will build the largest coal tippie in the world at the Ginger Hill Mine near Monongahela.

The fourth annual banquet and dance of the Bertha-Consumers Co. of Pittsburgh, held Sept. 29 in the Fort Pitt Hotel, was attended by nearly two hundred persons representing the operating, sales and city office personnel. John H. Jones, president of the company, made a brief address, following the dinner, in which he discussed efficiency, operation and salesmanship.

Evans, Sprague & Sturges, Inc., Pittsburgh, having been refused registration by Deputy Barford of the State Securities Commission, after a personal conference, are not satisfied with the decision and are exercising their privilege of appealing to the Common Pleas Court of Dauphin County to reverse the decision of the deputy. D. J. Evans, of the firm, says the company "are not stock jobbers of the 'get-rich-quick' order, as might have been inferred by the news item given out by Mr. Barford. It is a firm of repute, and has had numerous requests from business firms to assist them in new financing, but according to the ruling handed down are not in a position to contemplate entering into negotiations with any of these firms until they are registered."

The George B. Newton Coal Co., of Philadelphia, has declared a semi-annual dividend of 3½ per cent on the first preferred stock, payable Nov. 1 to stock of record Oct. 15. This is the first dividend on the stock since 1915.

A state charter has been issued to the Sesler Coal Co., Uniontown, for mining coal and manufacturing coke; capital, \$30,000; treasurer, James T. Sesler, Uniontown. Incorporators: Philip Sesler, Uniontown; William H. Trader, Uniontown, and James Jeffrey, Oliphant Furnace.

The Kimberly Crest Coal Co., Somerset, has been incorporated, for mining and marketing coal and other minerals and its capital stock is \$50,000. Thomas Donohoe, Edgewood, is treasurer and the incorporators are the treasurer, T. M. Donohoe, Edgewood, and George W. Howell, Pittsburgh.

A charter has been issued to the Windber Standard Coal Co., Johnstown; mining, quarrying and producing fireclay; capital, \$151,500; treasurer, J. E. Graham, Johnstown. Incorporators: J. C. Congrove and H. J. Meehan, Johnstown, and John M. Miller, Indiana.

Governor Pinchot upon his return to Harrisburg from two weeks' seclusion at his Milford home announced that he intends to vigorously carry out his purpose to prevent gouging of anthracite coal consumers. The Governor emphasized that he is following the lines laid down at the conclusion of the anthracite settlement to regulate coal prices by supervision over freight rates and coordination of the state functions to check soaring prices. This was to be followed by concerted action of governors in anthracite-consuming states. He intimated that many of the governors addressed were sympathetic toward his proposition. Governor Pinchot called in Secretary Walsh of the Mines Department, Chairman Ainey of the Public Service Commission and Attorney General Woodruff as soon as he arrived. He said they presented to him results of their investigations as to the effects of the coal-strike settlement.

The George B. Newton Coal Co. pockets at 53d St. and Thomas Ave., Philadelphia, were badly damaged by fire recently.

Charles A. Johnson, president of the company, said that much of the hoisting machinery in the coal pockets, which cost \$125,000 to construct, probably would have to be replaced. Twenty thousand tons of coal in concrete bunkers was untouched by the flames.

In court in Somerset, Sept. 29, Michael Viscosky, Clement Acitelli, Michael Kulchek, John Lapata and Alfred Ramsell, all of Jerome, charged with having dynamited a bridge on the Jerome Branch of the E. & O. R.R., with the intent of preventing the shipment of coal from the mines of the Hillman Coal & Coke Co. mines to the main line of the railroad, were found guilty, after a trial lasting four days. William Gregory and Annuncio Pacifico, charged with complicity in the same affair, were discharged. John Goodisky, the other member of the gang alleged to have placed the charge of dynamite that threw the entire structure into the river, made a confession soon after his arrest and turned state's evidence. Judge Berkey has not indicated what action he will take with Goodisky. All the men charged with the dynamiting are miners who went on strike at Jerome in April of last year.

TEXAS

The State Board of Control has awarded contracts for the state's fuel supply for the next fiscal year, ending Sept. 30, 1924. The state will consume something like 25,000 tons of coal. Twelve months supply of lignite, which is used for fuel in many of the steam plants of the state, will be furnished by M. B. Shannon & Co., Dallas. Contracts for supplying most of the coal were awarded to the Southwestern Coal Co. of Dallas, and contracts for the rest of the coal supply were awarded to the Southern Coal Company, also of Dallas.

UTAH

The State Security Commission has permitted the Black Diamond Fuel Co., which has a government lease on 880 acres of coal land close to Clear Creek to sell 50,000 shares of its stock in Utah and 350,000 outside of Utah at par, \$1 a share, with the commission not to exceed 20 per cent and other costs not to exceed 5 per cent additional. The property, according to the engineers who investigated for the company, can be developed to a production of 500 tons a day at about 75 per cent of the average cost of such development. The commission throws special safeguards around the proposition in the way of escrowing the proceeds of the stock sales and retaining control until sufficient funds have been assembled to develop the mine properly. The coal is said to be a coking coal, low in sulphur content, and to rank in heat value with the very best of the Carbon County coals.

WEST VIRGINIA

Two new coal companies have been launched by H. P. Jones and others, one of them to be a coal agency and the other a mining concern. The first named known as the Harry P. Jones Sons Coal Co., was organized with a capital stock of \$50,000, with its main office to be at Huntington and the incorporators in addition to Mr. Jones were James R. Jones, W. U. Phillips, of Logans Ferry, Pa.; H. P. Jones, Jr., Ida M. Jones, of Huntington. The other concern is to be known as the Menniti Elkhorn Coal Co., also with headquarters at Huntington. Interested in this company are Samuel Menniti, George Vevacana, Samuel V. Suppa, Frank Alasci, of Charleston; H. P. Jones, of Huntington.

The Eccles and Sun mines in the New River field are now being operated by the Daniel B. Wentz interests, of Philadelphia, which acquired these mines late in July. Major W. P. Tams, one of the leading operators of the Winding Gulf region, also is interested. These mines were formerly owned and operated by the New River Collieries Co., controlled by the Guggenheim group.

One of the largest coal companies launched in northern West Virginia in some time is the Continental, capitalized at \$700,000. The incorporators are Howard W. Showalter, Samuel R. Hite, J. W. Mason, Brock Showalter and A. D. Showalter, all of Fairmont. Howard W. Showalter is president and A. D. Showalter is treasurer and purchasing agent. The company is purchasing about 1,000 acres of Sewickley coal near Cassville, in Monongalia County, and in the Scott's Run field. The company plans to install a large plant, including a modern tipples. Coal will be

mined through a shaft which is to be sunk to a depth of about 200 ft. and work on which, it is understood, will be started in the near future. It is planned to produce coal at the rate of between 3,000 and 4,000 tons a day.

The Elgasco Fuel Co. has just been organized by Bluefield capitalists to operate in the Pocahontas region, being capitalized at \$50,000. Bluefield is to be the general headquarters of the company, in which the following people are interested: E. S. Crockett, H. W. Crockett, R. F. Smith and Thomas H. Scott, all of Bluefield, and R. A. Crockett, of Graham.

The New England Fuel & Transportation Co. is doing work preliminary to the installation of a new plant near Arnettville in the Monongalia County field, to be known as No. 4. Excavating is now being done by a force of about 20 men in preparation for the sinking of a shaft. In the Arnettville section, the company has about 3,000 acres of low-sulphur Pittsburgh coal available for development.

At the invitation of E. E. White, president of the Winding Gulf Coal Operators' Association, the delegates attending the National Tax Association at White Sulphur Springs, made a tour of the Winding Gulf district. A special train on the Chesapeake & Ohio railroad was provided.

Chief R. M. Lambie of the Department of Mines was in Wheeling and Benwood recently inquiring into the recent mine explosion at the Benwood mine of the Wheeling Steel Corporation, which resulted in the death of three men. Holding of an inquest was deferred until the head of the Department of Mines could be present.

During August eleven companies were organized to engage in the coal business. The aggregate capitalization of new resident and non-resident coal companies formed was \$2,620,000. In the list of resident corporations organized were: Shenandoah Coal Co., Logan, \$75,000; Coolidge Coal Co., Fairmont, \$50,000; Jennings Coal Co., Monongah, \$25,000; Tildesley Collieries Co., Charleston, \$100,000; Prestonia Coal & Lumber Co., Sutton, \$200,000; Old Furnace Coal & Iron Co., Kingwood, \$1,000,000; Hayzelett Coal Co., Mullens, \$10,000; Mudd Creek Coal Co., Kingwood, \$200,000; Batelle Colliery Co., Charleston, \$200,000; Unity Coal Co., Wheeling, \$10,000; Roaring Creek Coal Co., Elkins, \$50,000. New non-resident coal corporations organized were: Charleston Coal Corporation, with chief works in Tennessee, \$50,000; Index Mines Corporation, of Parkersburg, with chief works in Colorado, \$100,000; The Crane Fuel Co., of Cincinnati, \$200,000; Peerless Coal Mining Co., of Baltimore, Md., \$250,000; Randazzo Elkhorn Coal Co., of Huntington, W. Va., \$100,000. The Lambert Run Coal Co. has increased its capital stock from \$25,000 to \$500,000. C. D. Robinson and others are interested in this company, which operates in northern West Virginia. The Cardiff Pocahontas Coal Co. has increased its capital stock from \$75,000 to \$100,000, and the Robinson & Hardesty Coal Co. has increased its capital stock from \$25,000 to \$50,000.

WISCONSIN

Milwaukee or any other city in the state has the power to distribute coal in the event that dealers charge exorbitant prices, says a ruling of the Wisconsin Department of Markets. A margin of 20 per cent profit is held as a fair compensation to coal dealers. The department quotes the law, which says "any city may by a vote of three-fourths of all the members of the council establish and operate equipment for the purchase, sale and supply of fuel to its citizens, under regulation of the council."

WASHINGTON, D. C.

The publicity committee of the National Coal Association for the coming year is as follows: G. H. Barker, vice-president, Maynard Coal Co., Hayden-Clinton Bldg., Columbus, O.; C. E. Bockus (chairman), president, Clinchfield Coal Corp., New York; A. W. Calloway, president, Davis Coal & Coke Co., Philadelphia; W. H. Cunningham, president, Cunningham, Miller & Einslow, Huntington, W. Va.; C. C. Dickson, president, Dry Branch Coal Co., Charleston, W. Va.; G. M. Gillette, manager, Consolidation Coal Co., Frostburg, Md.; T. W. Guthrie, president, Hillman Coal & Coke Co., Pittsburgh, Pa.; M. B. Lanier, president, Empire Coal Co., Birmingham, Ala.; F. S. Love, general manager, Union Collieries Co., E. W. Lukins, president, Farmers' Fuel Co., Kansas City, Mo.; W. E. Maltby, manager, Washington Coal Producers' Association, Seattle, Wash.; P. H. Penna, secre-

tary, Indiana Bituminous Coal Operators' Association, Terre Haute; R. M. Randall, general manager, Consolidated Coal Co., of Saginaw, Saginaw, Mich.; S. H. Robbins, president, Youghiogheny & Ohio Coal Co., Cleveland; Edward Soppitt, president, Erie Coal Mining Co., Butler, Pa.; C. W. Taylor, vice-president, W. G. Duncan Coal Co., Greenville, Ky.; C. M. Watt, general manager, Loyal Hanna Coal & Coke Co., Philadelphia; E. E. White, president, E. E. White Coal Co., Glen White, W. Va.

CANADA

The Dominion Government is urged to extend the scope of the Royal Commission which has been appointed to investigate working and living conditions which resulted in the steel workers' strike of July last, to include an inquiry into the difficulties which have confronted the coal miners in their dealings with the British Empire Steel Corporation in a resolution drawn up at the regular meeting of the Town Council of Glace Bay, copies of which have been sent to the Prime Minister and the Minister of Labor.

The Grand Lake Coal & Railway Co. has been engaged in moving equipment and miners' cottages from the South Minto soft-coal mines to the newly developed areas at North Minto, a distance of three miles. The South Minto mines will be continued in operation, on a smaller scale.

The Canadian National Railways will construct an extension to their branch line, connecting the Grand Lake soft-coal fields with the main line of the transcontinental system. The line will be built from Chipman to Minto, a distance of seventeen miles. It is expected that a number of independent mines will be opened in consequence of this extension.

J. B. McLashlan and Dan Livingstone, former U.M.W. officials for the eastern Canada district, who were deposed by President Lewis, have been denied a change of venue in their trial for seditious libel.

The Alberta Carbon Coal Co., Ltd., has been formed for the exploitation of 2,640 acres of coal lands in the Carbon District, twenty miles west of Drumheller. The seam to be developed is reported to be 5 ft. thick and to be capable of producing some 10,000,000 tons of coal. The company is capitalized with a share capital of \$500,000 and \$100,000 first mortgage 8 per cent gold bonds. H. Ransford is the president and W. P. Hinton, former general manager of the G. T. P., is a director.

The Dominion Fuel Board, which has been conducting an inquiry into the feasibility of establishing byproduct recovery coke ovens in some of the large cities, has nearly finished its work. Charles Stewart states that the survey has shown the demand to warrant the establishment of plants at several points in eastern Canada. Financial circles in Montreal and Toronto are awaiting with keen interest the final report of the Fuel Board. In conjunction with the Mines branch the board is investigating the coking qualities of the Nova Scotia and New Brunswick coals and arranging for commercial tests on a large scale in addition to the laboratory investigation.

Output of coal from Canadian mines during June amounted to 1,304,000 net tons, an increase of 4 per cent over the previous month, according to the Dominion Bureau of Statistics. This was 29 per cent over the average for the corresponding month of the three preceding years. The output for the month showed increases of 63,000 tons in Nova Scotia, 53,000 tons in British Columbia and 3,000 tons in New Brunswick. In Alberta there was a decrease of 69,000 tons. For the first half of 1923 the cumulative output from all mines amounted to 8,722,000 tons, an increase of 25 per cent over the preceding three-year average for the same period. Importation of coal during June was 2,562,000 tons, as compared with 1,684,000 tons in May. Of this tonnage 79,400 tons came from Great Britain. Anthracite imported during the month totaled 505,900 tons, 17 per cent greater than in May and 47 per cent higher than the three-year average for the month. The United States furnished 479,200 tons of this amount, 26,700 tons coming from Great Britain. Exports during June were 101,400 tons, as compared with 99,100 tons in May, a decrease of 43 per cent when compared with the June exports of the preceding three-year average. The tonnage available for consumption in Canada during the month was 3,765,400 tons, or 33 per cent more than in the preceding month. Men employed in the coal mines during June totaled 27,669, of whom 20,615 worked underground and 7,054 were surface men. The production per man was 47 tons for June as against 45 tons per man in May.

Obituary

Kuper Hood, vice-president and manager of sales for the Houston Coal Co., of Cincinnati, died Sept. 28 of a throat affection. Mr. Hood, who was born in Stanton, Va., on Nov. 23, 1874, had been sales manager first for the Big Hill Coal Co. and later was associated with the Kentucky Fuel Co. at Atlanta, Ga. In 1910 he joined the sales force of the Houston Coal Co. as assistant general sales manager, succeeding to the



KUPER HOOD

direction of that department in 1912. In May, 1923, he was elected vice president of the company in charge of sales. He also was a member of the foreign trade committee of the National Coal Association.

Benjamin Crosby Davidson, former Mayor of Uniontown, Ky., owner of the Davidson Mines and later general manager of the Uniontown Coal Co., until it was sold, died at his home in that city on Sept. 18. He is survived by his wife, two children, a brother and two sisters.

C. D. Robertson, for the past six years fuel inspector for the Seaboard Air Line Ry., died at his residence at Birmingham, Sept. 20, after a short illness. Mr. Robertson was 53 years of age.

Trade Literature

The Timken Roller Bearing Co. of Canton, Ohio, has issued an attractive 6x8-in. booklet entitled **Better Mine Cars with Timken Tapered Roller Bearings**, containing 32 pages. The booklet contains seven chapters and numerous illustrations showing Timken equipment at coal mines.

The Ohio Brass Co., Mansfield, Ohio, has published its 1924-1925 No. 19 catalog, covering high-tension insulators, trolley-line materials, rail bonds and tools and car-equipment specialties. The book has 770 pages, 6x9 in. It is well illustrated and indexed for ready reference.

The Industrial Works, Bay City, Mich., has issued a golden anniversary catalog commemorating 50 years' service. It describes cranes for all purposes; their use in coal handling and storage is covered, together with power wheel buckets, dragline buckets, etc. Book 115. Pp. 161; 8x11 in.; illustrated.

Single-Line Buckets, Blaw-Knox Co., Pittsburgh, Pa. Bulletin 812. Pp. 18, 8x11 in.; illustrated. This bucket uses the same hoisting line for closing and for supporting it during opening, and can be hooked on or direct reeved to hoist. Single-rope cableway requiring only one hoisting drum is described.

Electric Industrial Trucks and Tractors, Crescent Truck Co., Lebanon, Pa. Pp. 47; 8x11 in.; illustrated. Among the trucks described are the side-dump and end-dump types. Specifications of the different trucks and trailers are given.

"**Large Polyphase Induction Motors**" are covered in Bulletin No. 1087, just published by the Allis-Chalmers Manufacturing Co. The more general application of large hoists, fans and compressors around the coal mines

is greatly increasing. This bulletin covers many points of design and operating characteristics of large induction motors.

Association Activities

A coal shortage in Texas and throughout the Southwest was predicted by C. R. Goldman, secretary of the **Texas Retail Coal Dealers' Association**, before a conference of coal operators, wholesale and retail coal dealers and railway officials held in Dallas recently. Mr. Goldman declared that many miners formerly employed in the mines of the Southwest had gone to other parts of the country on account of the lack of work during the summer. Individuals and many factories, apparently lulled into inactivity by the memories of mild winters for the last two years, have failed to consider the question of fuel for a possibly severe winter. Mr. Goldman said, and the result is that practically no coal has been stored by home owners and factories against the winter needs. Railroad men of the Southwest who attended the conference pointed out the gravity of the situation that will result when cold weather comes and the public rushes in to buy coal.

The **Baltimore Coal Exchange** held its annual meeting Sept. 25, and elected Hugh C. Hill, president; Benson Blake, Jr., vice-president; L. C. Wilcox, second vice-president; J. E. Waesche, treasurer, and Julius Hellweg, secretary.

After Oct. 1 the offices of the **National Retail Coal Merchants' Association** will be located in the Transportation Building, Rooms 705 to 710, inclusive, Washington, D. C.

Publications Received

Internal Combustion Engines, by Robert L. Streeter. Second edition. Pp. 443; 6x9 in.; illustrated. Price, \$4. A thorough revision of this standard textbook on the fundamental principles of the theory and design of gas and oil engines. The book is especially adapted for class and drafting-room instruction; it includes a collection of useful problems. McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York City.

Principles of Direct-Current Machines, by Alexander S. Langsdorf. Third edition. Pp. 455; 5x8 in.; illustrated. Price, \$4. A reasonably complete treatment of the fundamental principles that underlie design and operation. It concentrates attention upon certain important features that ordinarily are dismissed with a little more than passing mention. Among these are the material on armature windings, operating characteristics of generators and motors, and commutation. McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

The Work of the Pennsylvania Survey, 1919-1922, by George H. Ashley, State Geologist, Harrisburg, Pa. Pp. 18; 8x10 1/2 in. Describes the organization, administration, information service, publications and surveys. Charts showing progress in topographic and geologic mapping are included.

Traffic News

John Morris, regional director of the American Railway Association and the Cincinnati Terminals, has called a meeting in Cincinnati of the prominent shippers of the coal and other commodities to go over the situation as it appertains to the empty-car requirements and the movement of the heavier classes of freights. Coal men of prominence from all the fields within the territory under the jurisdiction of Mr. Morris have been invited to attend the meeting and to offer their suggestions as the best means of keeping the freights moving.

The I. C. C. has directed the anthracite carrying railroads to file a brief before Oct. 22 showing why railroad rates on anthracite should not be reduced, as asked by the U. S. Coal Commission. A committee of general solicitors of this group of carriers, of which H. A. Taylor of the Erie is chairman, is now preparing this brief. The call for the brief was made by the Interstate Commerce Commission following the hearing held in Pittsburgh before Attorney Examiner William A. Disque on Sept. 24-25. Mr. Disque, after studying the brief of the railroads against a rate reduction, will make a report to the full commission, which

will be studied by the latter, together with the actual brief of the carriers. The commission will then hand down its decision. In addition to the general brief being prepared by the committee, separate briefs may be filed by any other road which chooses to do so. The Erie has definitely decided to file no separate brief. Separate testimony has been prepared and submitted to Examiner Disque by the Delaware & Hudson and the Boston & Maine. The original plan to send out a questionnaire to the different hard-coal carriers has been canceled.

The Interstate Commerce Commission hearing in the case of the **United Collieries, Inc., vs. the Southern Ry.**, which was assigned for Oct. 11 at Big Stone Gap, Va., before Examiner McGrath, has been postponed indefinitely. The commission also has cancelled the hearing in the case of the **Pioneer Coal and Coke Co. vs. Pennsylvania Railroad**, which was assigned for Oct. 23 at St. Louis, Mo.

Oral argument will be heard Nov. 8 by the full Interstate Commerce Commission in the following important cases: Cancellation of rates on coal from Kentucky, Tennessee and Virginia to Minnesota points via the Chicago, Rock Island & Pacific Ry.; Cedar Rapids vs. Chicago, Rock Island & Pacific Ry.; United Light & Railways Co. vs. Chicago, Rock Island & Pacific Ry.; coal from Kentucky, Tennessee and Virginia points to Northern and Northwestern destinations. On Nov. 15 the commission will hear arguments in the case of the Northwestern Coal Dock Operators' Association vs. the Chicago & Alton R.R., and in the case of the Illinois Coal Traffic Bureau vs. the Chicago & Northwestern Ry. On Nov. 19, Division 3 of the commission will hear the case of the Colorado & Utah Coal Co. vs. the Denver & Salt Lake R.R. On the day following, Division 4 will listen to oral arguments in the case of the Lincoln Gas Coal Co. versus the Baltimore & Ohio R.R.

The car service division of the American Railway Association announces that the railroads on Sept. 15 had **165,284 freight cars in need of repair**, or 7.3 per cent. of the total number on line. This was a decrease of 10,043 compared with Sept. 1, at which time there were 175,327, or 7.7 per cent.

The railroads on Sept. 15 had **10,792 locomotives in need of repair**, or 16.8 per cent of the total number on line, according to reports filed with the car service division of the American Railway Association. This was an increase of 275 over the number on Sept. 1, at which time there were 10,517, or 16.3 per cent. The railroads on Sept. 15 had 2,914 serviceable locomotives in storage, where they are to remain until traffic conditions warrant their use.

That **Henry Ford has purchased \$1,807,000 worth of coal cars** is revealed in his objection filed against the Interstate Commerce Commission's assigned-car decision.

An application for permission to build six miles of new line from Oakland City, Ind., into Pike County has been filed with the Interstate Commerce Commission by the Evansville, Indianapolis & Terre Haute Ry. The petition says the line would serve a large area underlaid with high-grade coal which could be mined cheaply by stripping off surface soil with steam shovels. The Commission had previously in the case of the Virginian Ry. of West Virginia refused to allow such an extension on the ground that there already are enough coal mines in the United States. The latter case is up for a reconsideration on the petition of the railroad company.

Coming Meetings

American Gas Association, annual meeting Oct. 15-19, Atlantic City, N. J. Secretary-Manager, Oscar H. Fogg, 342 Madison Ave., New York City.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

American Welding Society, Oct. 24-26, Pittsburgh, Pa. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Harlan County Coal Operators' Association, Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, OCTOBER 18, 1923

Number 15

Is Betelgeuse Drawing Nigh?

THE old maxim about the strength of union has never yet impressed coal operators. Apparently it has been all right for labor to unite and strengthen to a point of dictatorship in the industry, but unity of policy and opinion among mine owners has long appeared as distant at Betelgeuse. Its greatest distance may have been attained in Illinois, especially in 1910, when the old single operators' association of that state was shattered by the withdrawal of Southwestern operators who were tired of holding out against striking miners, and made peace—and an association of their own. But today that distance appears to have been reduced to some extent.

There has been no consolidation of the three existing operators' associations in Illinois, but a single policy committee for the three has been set up and endowed with some authority. It will speak for the state. It will deal as one body with the union both outside of Illinois and within. That is, it will perform these important functions unless something happens to cut the sod from beneath its feet. There is no point in claiming that every operator in the state firmly believes this new committee plan is 100 per cent right. Of course there is some skepticism regarding the service the committee can perform, and the plan could be upset in an emergency. But the hopeful thing about it is that a definite step has been taken in Illinois toward consolidation.

Operators in that state should convince themselves of the importance of the step they have now taken. They should review at a glance the costly history of disunion which the coal operators of the whole country have written. They have already reviewed, in certain measure, that cost in their own state and resolved, after a fashion, to avoid repetition. It remains to be seen whether they will cling to that sound policy when a situation arises—as it surely will—calling once more for the well-known but little-used "solid front."

Electrification

SINCE the early nineties we have introduced electric haulage equipment into the coal mines of this country. The electrification of mining machines, pumps and fans came later, and still later hoists and screening equipment operated electrically. Electricity has stolen in on us like a thief in the night, and consequently we have been slow to put it, as it should be put, into the hands of specialists.

Today we are just beginning to organize for effective operation of mines by electricity. We have at last electrical engineers in charge of equipment supported by staffs of varying adequacy. But most electrical engineers still are compelled to put expensive and complicated machinery in the hands of men of little training and even of restricted ability, education and

opportunity. Furthermore, the electrical engineer at the mines is not supported adequately by any national society. He needs the help of an electrical organization if he is to obtain the benefit of the experience of others. Rapid progress in any art is attained only by the co-ordinated effort of individuals.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers is a little broader in its scope than its name suggests, but it should be made national, with a section meeting at various points in West Virginia or in Huntington. Such services as it is already performing would justify the association in becoming the core of a national organization, for its meetings are well attended, its members are hard-working and enthusiastic and the character of its articles and discussions are of a high order. The society with advantage might invite prominent mine electrical engineers to address it, thus benefiting its membership while at the same time spreading a knowledge of the meritorious work it is doing, which is as yet none too generally recognized.

Many general managers and superintendents do not know a good electrical engineer when they have one at their plants. They regard him as a man too often who is making altogether too many demands on the rest of the personnel. He must furnish the electricity for others to use as wastefully as they please, yet he is held responsible for the electrical cost per ton of coal.

To such a man, hedged in by advocates of old traditions, an electrical association national in scope furnishes an opportunity not only to learn new ideas and methods and to see new machinery but to get the honors to which his talents and efforts have entitled him. It is strange that up to the present only West Virginia, Virginia and Kentucky have risen to the point of expression. In other places the electrical engineers are joining omnibus societies, making their addresses before mixed audiences or combining humbly with iron-and-steel men or triennially, quadrennially or whenever occasion serves getting into session as an appanage of the American Institute of Electrical Engineers. Such associations too general in their scope can never afford the technical pabulum and the helpful inspiration which every electrical engineer should enjoy.

IF CONGRESS, in its wisdom, decides to limit the amount of coal produced by limiting the number of mines, how is it going to prevent tremendous expansion of haulage and hoisting at each mine that inevitably will increase the country's volume of coal at the slightest market provocation? This problem of stopping coal-mine expansion is a nice, simple little one. Settling it by act of Congress is comparable to the famous resistance which King Canute set up against the tide of the sea.

Excuses Not Reasons

DRAMATIC and interesting are the references to Herrin in the Coal Commission report to Congress on civil liberties in the coal industry. It would seem an offense against good literature to wish that they had been less dramatic, less interesting and more true to conditions. The arguments advanced as explanation for the recent murders are mere dalliance with criminality.

The Commission recites that back at a date not named "Profit was the sole object" in mining. That is an indictment of nearly all enterprise today and of nearly all labor also. Few indeed are the mines and few the factories that are opened without profit as a motive. Also few are the workers who work for service and not hire. The report adds, "The life and health of the employees was of no moment."

Perhaps there was a degree of indifference then in the mines of Williamson County, but there is every reason to believe that the attitude as to life and health was not greatly different from that in other industries in that generation. We do not recall any care for these matters till recent years. As Ida Tarbell well says, accidents and sickness were then believed to be the "will of God" or were dismissed with a shrug of the shoulders and the words, "His turn had to come."

The declaration that "men worked in water half way up to their knees" probably is, in the main, hyperbole. It is true doubtless that working places were wet and probably in traveling along roadways water thus deep might be found and have to be traversed, but a miner could not conceivably undercut his place in such deep water. A pumper might often have to wade water even deeper, often did in other places than Herrin. It did not, however, in other regions move him to murder defenseless men.

Gas-filled rooms and bad ventilation, as the Commission says, also existed and not in Herrin alone. But they do not palliate murder. To argue that they do would be in an officer of law almost equivalent to compounding a felony.

The Commission adds, "There was no workmen's compensation law; accidents were frequent and there was no common ground upon which employer and employees could meet." These conditions do not define either the mines or Herrin. They were universal.

The last complaint is naively written: "The average wage of the miner was from \$1.25 to \$2." If so, they were better paid than the average run of men at that date. In 1892 tannery employees in Pennsylvania were making \$1 a day, building houses and saving money. In 1893 a big employer of mine labor was offered the services of Italian laborers for railroad construction at 80c. per day. He refused to take them, arguing that nothing less than \$1 was a living wage.

In the early nineties wages were extremely low everywhere, viewed from our standpoint, and the wages in Williamson County—a farming region with wretched farms—must have been low also. The miner had no special grievance. The cost of living and the low scale of comfort excused the low wage and in no sense justify the criminal actions at Herrin thirty years later. Their fathers had, in the matter of wage at least, not eaten sour grapes, so why should their children's teeth be set on edge.

As the Commissioner says, wages are higher today and the union gets the credit. "The workmen believe in the union, for they think it brought them out of a

land of bondage into the promised land when their government had been careless or indifferent to their needs."

It is needless to show that all wages, union and non-union, in mining and out of it, in unionized trades and in trades with no union of any kind, have risen considerably since the early nineties. In fact the big increases have come in many cases from a bidding for labor, union men being paid at times more than union rates.

This practice of raising wages would go further if employers did not fear that the union would insist that the special employer or district giving the increase shall continue to pay that increase when business declines and competition becomes sharp. One instance may be recalled where an increase of 3c. per ton given to obtain men has persisted as a differential for over twenty years, making mine operation in that district frequently unremunerative.

Wages are rising partly because money is declining in value and will buy less and partly because the output of the country as a whole per workman employed has increased and the workmen has profited inevitably thereby. Competition for labor, in so far as it has not been restricted by labor trusts—and indeed industrial trusts—has caused wage increases. Where, however, as in the mining industry, a group of workmen has profited for long periods more than others it has been because a union, or labor trust, has caused workmen to pay more for the work of its members than other workmen are paid for their work by the union's members.

The union men, as the Commission says, approve of the union, but we cannot forget that they delight in it and appreciate it because it is their means of overriding other workmen. Capitalists have been known to like a trust because it enabled them to override other capitalists and the consuming public. Still that liking hitherto has not been held a good and substantial excuse for murder by any reputable body of citizens. Certainly no commission of staid and respectable men would ever be found to exalt devotion to a capitalistic trust to a level with patriotism.

On the whole we get more satisfaction from what the union says about the Herrin massacre than can be obtained from the remarks of the Commission. The union says the Herrin murders were not committed by it, for it or for love of it but by Bolsheviks who sought to discredit it. Evidently it takes issue with the Commission on two points: First, it says the murders were inexcusable and, second, they were not the work of the union. Obviously the Commission is badly informed. Both operators and the union condemn the murders, and the miners deny that it was done for the union and so remove the one excuse which the Commission generously advances in their favor.

What troubles the observer is, if the men who did the act were enemies of the union "boring from within," why did the union pay for their defense and work for their release, seeing that the stern hand of the law could be depended upon to remove these borers, if convicted, to places where they would bore no more?

Alas, these dastardly villains who murdered men captured under a flag of truce, it is as useless as it is childish to defend!

THE HARASSED HOUSEKEEPER is inclined to think that the finest sight in the world is anthracite.—*Providence Journal*.

WHEN FRANCE GETS OUT of Germany depends on what she gets out of it.—*Washington Post*.

Selecting Equipment for Vertical Shaft Hoisting*

Greater Necessity for Shaft Hoisting Due to Mining of Deeper Seams—Selecting the Drum Shape and the Type of Electric Drive
—Description of Various Types of Hoist Control Equipment

BY M. A. MAXWELL

Island Creek Coal & Coke Co., Huntington, W. Va.

GREATER demands for larger tonnages of coal together with the working out and consequent abandonment of the old, easier developed mining sections increases the necessity for mining seams at lower levels in both old and new fields. As a result hoisting from shafts becomes more extensive.

All hoisting problems vary with each installation, shaft hoist calculations being highly specific and mathematically more involved than those for slopes.

Whenever the depth from which the coal must be raised is beyond the practical limit for conveyor systems or raising a train of cars by the usual slope methods, it becomes necessary to resort to vertical shaft hoisting. In this event balanced shaft hoisting obviously is preferable. This method of hoisting requires a shaft with two compartments, each containing a cage or skip operated from a common drum or two drums clutched together, so that one cage or skip ascends as the other descends. The old standard size of such a shaft was 11 x 26 ft., but many of the latest shafts are much larger, one recently put down in Wyoming County, West Virginia, being 18 x 36 ft. In addition an air and supply compartment often is provided. An economical and much-used arrangement is a double compartment for the main hoist, a single compartment for a man-and-material-hoisting cage, which usually is balanced by suitable cast-iron counterweights, and a space for air supply.

Usually such a shaft will cost from \$200 to \$400 per foot of depth, the wide variation in cost being mostly due to the great variation in the amount of water encountered, as well as to the character of the rock.

After determining the location, depth, size and character of shaft, also the number of tons of coal required per shift, the next problem for consideration is the type of hoist to be used. Since steam hoists, used so commonly in the past, have been superseded almost entirely by electrically driven hoists, we will consider only the latter type of drive. We then have two important hoist and electrical details to consider, namely: (1) Type of drum, and (2) type of electric drive and control.

Drums may be of three types: (a) Plain cylindrical, (b) conical, (c) cylindro-conical. On the plain cylindrical type of drum the rope speed increases from zero to maximum and is continued at its maximum until retardation begins, all on the same radius. On the conical type the acceleration begins on the smallest diameter, and continues as the rope winds up to the largest diameter. On the cylindro-conical type, acceleration usually is accomplished while the rope is on the small diameter of the drum, which is long enough to carry the requisite number of turns to complete the acceleration; the climbing of the cone being

accomplished in the fewest practicable number of turns, and the balance of the rope being wound on the large cylindrical part of the drum. On this type of drum the acceleration and retardation periods usually are made the same for the sake of convenience.

The proper and most economical type of drum is readily determinable by calculation from the known data for each specific installation, and hoist specialists are available for the prospective purchaser in the organizations of the electrical and mechanical manufacturers of hoist and control equipment. The selection of the proper drum shape is very important, as it greatly influences the load diagram.

DECIDING THE METHOD OF HOISTING

Before the drum shape and several other details can be definitely decided upon a decision must be made whether the "skip" or the "car-and-cage" system is to be used. In the former, the coal is dumped in storage bins at the bottom of the shaft, and skips holding usually between 8 and 16 tons are hoisted in balance. In the latter, cages holding from one to four cars have been used in this country, the single car cage being by far most common. The arguments in favor of the skip are that on account of large capacity, slower-moving and less expensive hoisting equipment may be used, and that consequently there is less wear and tear, and less repair expense. Advocates of the car-and-cage system assert that the extra dumping at shaft bottom breaks the coal, reducing the amount of lump available for the market, and that the extra cost of underground work, for skips and bins more than balances the extra cost in hoist equipment for the car-and-cage system.

The next important decision is the type of electric drive and control. If conditions demand the use of the skip, or even the car-and-cage system up to a certain rate of hoisting, the geared induction motor drive is feasible. If a rapid hoisting cycle is necessary, the direct-current Ward-Leonard control becomes necessary. The different systems of electric drive are as follows:

- (1) Induction motor with:
 - (a) Master controller, contactors and secondary grid resistance.
 - (b) Primary contactors, and secondary grid resistance.
 - (c) Drum controllers and secondary grid resistance.
- (2) Ilgner-Ward-Leonard system.

Direct-current shunt-wound motor operated from motor-generator set, with flywheel, by Ward-Leonard control.
- (3) Ward-Leonard System.

Direct-current shunt-wound motor operated from motor generator set, without flywheel, by Ward-Leonard control.

*Paper to be presented at meeting of West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, at Huntington, W. Va., Oct. 19 and 20.

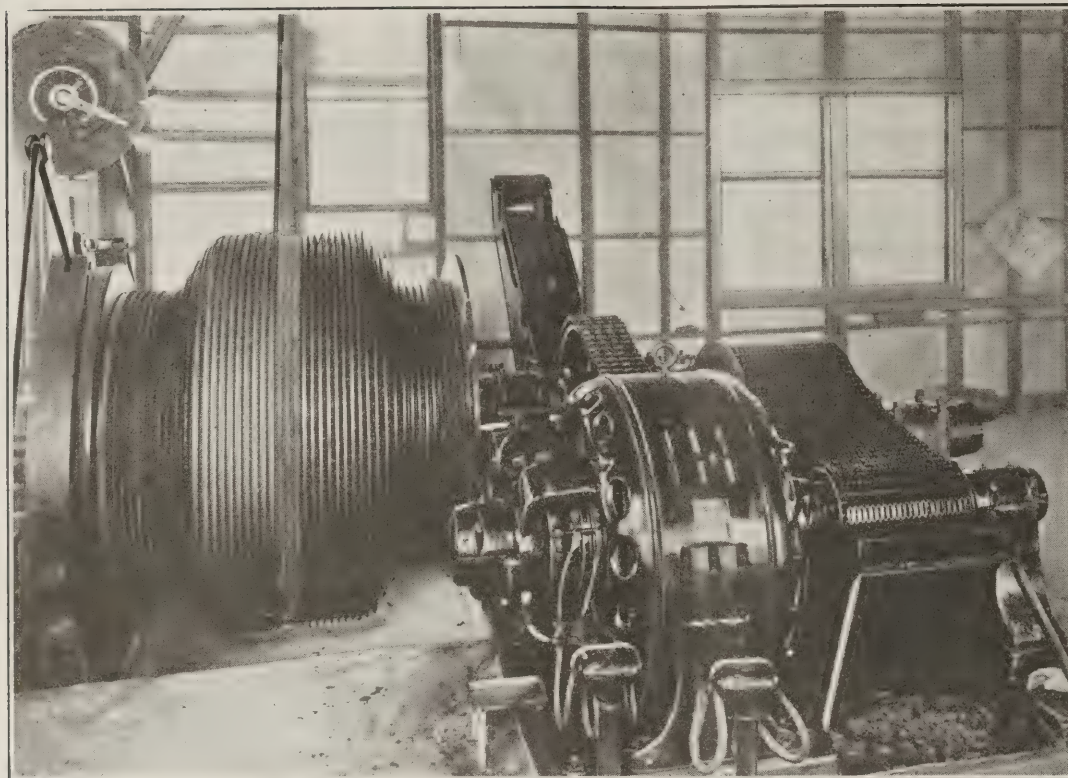


FIG. 1
Cylindro-Conical Drum

This installation shows a cylindro-conical drum driven by a large induction motor. Note the chain drives between the motor and drum.

By far the greater number of installations in this country are of the first class, and run as high as 1,800 hp. in motor capacity. They are simple in construction, comparatively inexpensive, and the availability of alternating-current energy at reasonable rates in almost all coal-mining localities favor its selection.

The disadvantages are inherent, as in secondary resistance control the speed varies greatly with the load for any given resistance value. This prohibits great accuracy of control, and in the case of high-speed hoists, which require great precision and accurate control at the ends of trips, its use is subject to restrictions. Up to 100-hp. it usually is possible to use drum controllers for both primary and secondary circuits, handling reversing primary and secondary currents directly on the segments.

The larger sizes demand magnetic control—that is, contactors are used for both primary and secondary circuits in connection with grid resistance. For the largest sizes, primary reversing contactors are used with a “liquid rheostat,” the resistance being in the form of a liquid, usually sodium carbonate, and its value is changed by varying the level of the liquid in a chamber in which are placed electrodes connected in the secondary circuit. Standard voltages for the above equipment are 440 and 2,200, the latter being recommended for 300 hp. and upward.

In the Ward-Leonard system of control the voltage applied to the direct-current hoist motor, and therefore its speed is varied by changing the field strength of the direct-current generator of the motor-generator set which furnishes power to the hoist motor. By reversing the field connections of the generator its polarity is reversed and consequently the direction of rotation of the hoist motor, which latter operates constantly at full field strength.

The excitation for both the hoist motor and the generator fields is furnished by an exciter with voltage regulator control, this exciter usually being direct connected to the motor-generator set. Since only the

generator field current is manipulated in controlling the hoist motor speed the currents are small, and a large number of steps easily may be provided.

The principal factors which justify the selection of the Ward-Leonard control are as follows:

- (a) Accuracy of control; desirable for high speed hoisting or frequent shifting.
- (b) Increased safety in operation.
- (c) Higher efficiency at certain duty cycles.
- (d) Practicability of limiting the maximum power demand.
- (e) Possibility of elimination of gears.

In contrast to the induction motor the speed-torque curves show a comparatively slight change in motor speed over the entire load range on any particular controller point. It is in this respect that its superiority over the induction motor is most valuable. Complete control from standstill to maximum is provided for all values of load. It is rarely necessary to use mechanical braking at all, for in retarding, as the control lever is moved back toward neutral, on account of the inertia of the moving parts, the functions of the machines automatically invert. The hoist motor counter e.m.f. overcomes the applied generator voltage, and becomes a generator, the generator of the motor-generator set becomes a motor, and as such delivers energy into the set until its speed rises slightly above synchronism, when the alternating-current driving motor begins to pump energy back into the supply lines and carries some of the line load. This action brings the hoist drums gently to rest at the stopping point.

If an unbalanced load be lowered down the shaft, it is still unnecessary to use the mechanical brakes, as the descending load acts as a prime mover and sends its energy in to the power lines, falling at a speed determined by equilibrium between its own force and that delivered to the lines. This manner of retardation and the handling of negative loads relieves the hoist mechanism of shock and strain, prolongs its life,

and eliminates brake wear, the brakes being used only for special stops.

When power is purchased under contract carrying penalties for excessive "peaks" or "demands" or generated by the coal company itself under conditions which will not permit the high acceleration peak loads of the hoist, some method of limiting these peak loads may become economically necessary and highly desirable. This may be accomplished by the use of a flywheel direct-connected to the motor-generator set, with a device for automatically varying the speed of the flywheel motor-generator set through secondary rheostatic control of the slip-ring induction-type driving motor. This is the Ilgner-Ward-Leonard system. By its use it is possible to limit the "maximum demand" from the supply circuit to a definite predetermined value for any given hoisting cycle. Whatever energy is required by the hoist in excess of a predetermined maximum limit is taken from the flywheel which gives up a part of its energy as its speed reduces. During periods of lighter power demand the speed of the set automatically increases and energy is thereby stored up in the flywheel and other rotating elements of the set, ready to carry the next peak load.

This peak-limiting control usually is accomplished by the use of liquid rheostatic control of the secondary alternating-current motor currents. Primary current coils are inserted in the main stator leads of the

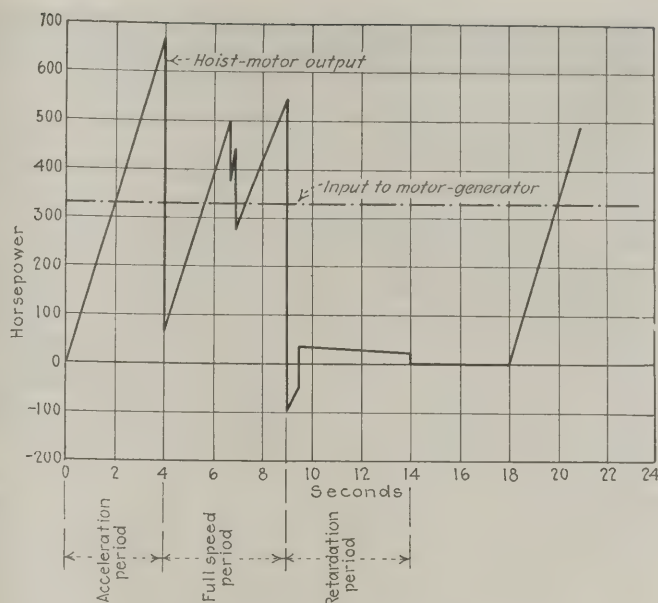


FIG. 3—HOISTING CYCLE OF HOIST AT MINE NO. 21.

The hoisting equipment for this hoist is quite similar to that used at Mine No. 20. The ratio between the hoist motor output peaks and the input to the motor generator set is not so great as that for the hoist at Mine No. 20 because of the slower hoisting speeds and smaller drum.

motor of the flywheel motor-generator set. Secondary coils from the primary current coils connect to the windings of a small "torque motor," which has a long lever arm attached to its rotor, with rheostat electrodes at one end and counterweights on the other. Whenever the input to the main driving motor tends to exceed a certain predetermined maximum value, the torque of this small regulating motor overcomes the counterweights of the moving parts of a slip regulator and pulls its electrodes apart, thereby inserting more resistance into the rotor circuit of the induction motor of the flywheel set.

Since increasing the resistance in the rotor circuit of a slip-ring induction motor reduces its speed, it follows that the flywheel must give up part of its stored-up energy, because its sustaining force has in a manner of speaking slipped out from under it, and this energy thus released by the flywheel carries the direct-current generator over its maximum output peak, which of course is during the acceleration period of the hoist.

Immediately this extraordinary demand has ceased, the driving motor, having been relieved of its load and consequently taking less current from the lines, is speeded up again through the action of the torque motor in bringing the electrodes nearer together, which through weakened torque now permits the weights to overcome it. This speeding up of the main driving motor restores energy to the flywheel. In this it is assisted by the action of the generator during the retardation period because the hoist in effect acts as a motor and drives the flywheel.

This control is so positive and accurate in its operation that when operating on the cycle for which the hoist is designed, and for which the control is adjusted, it is possible to maintain practically constant input to the flywheel set. Five per cent either way from average is guaranteed by the manufacturers. This control also functions when starting the set, thus holding its starting peak within the limit.

In this system it will be observed that the torque required for acceleration is built up gradually from

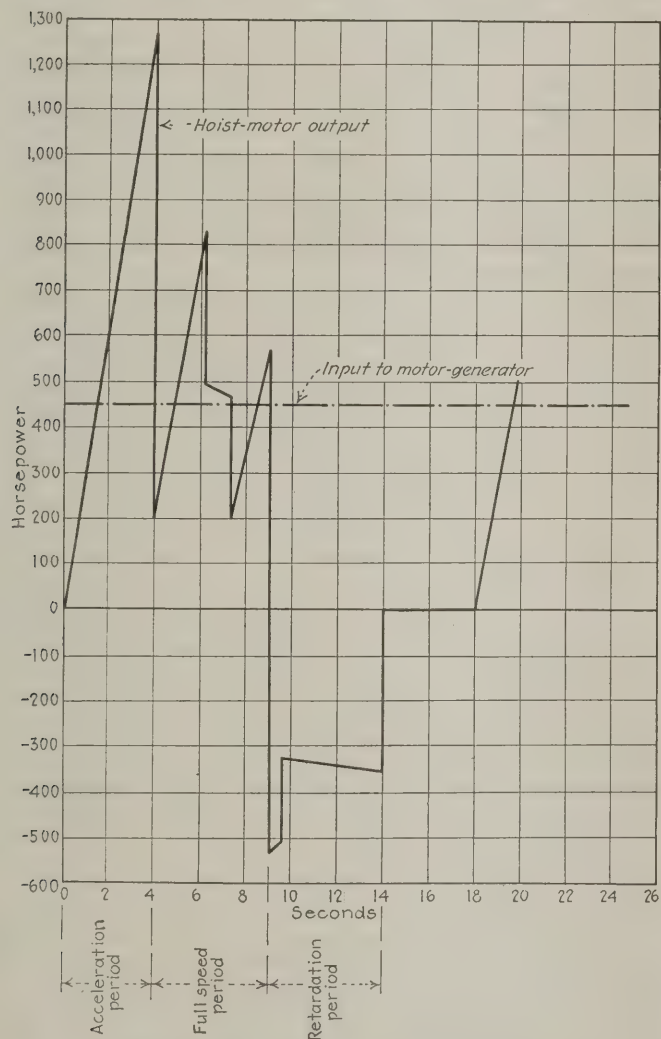


FIG. 2—HOISTING CYCLE OF LARGE MINE HOIST AT MINE NO. 20, ISLAND CREEK COAL AND COKE CO.

Note how the power drawn from the power line does not vary with the peaks on the hoist motor.

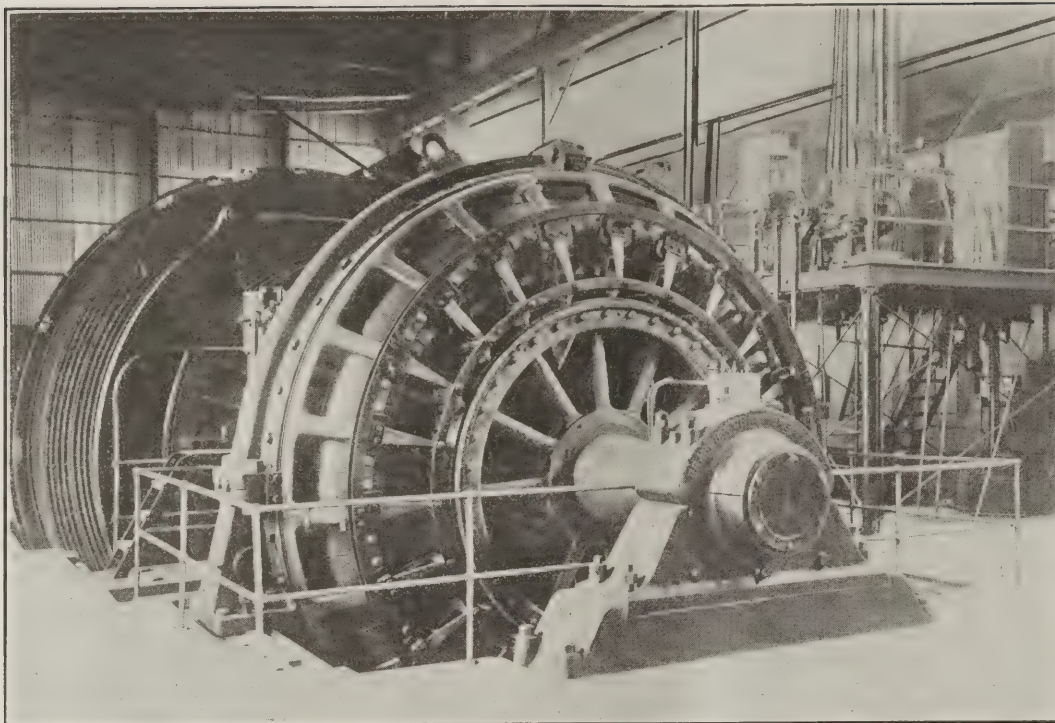


FIG. 4

4,000-H. P. Hoist

On heavy vertical shaft duty. Frequently we think that all large motors are made for operation on alternating current, but here is one that operates on a large direct-current hoist.

zero to normal by varying the voltage so that the required power for acceleration is much less than in the case of the direct-connected or geared induction motor drive, where the power is thrown on in full force and remains so during the entire acceleration period. This characteristic permits the operation of a large hoist from a small power station, which must supply a steady voltage for other loads.

In ordinary practice, by the installation of suitable apparatus, the "maximum demand" can be held to less than one-half the hoist motor's acceleration peak. Aside from a financial saving thus effected, in the power bill, an important result of this leveling out of the hoist load upon the power lines is the elimination of violent fluctuating voltage surges upon the supply lines. If, as is often the case, the mine developments are located at some distance from the power company's step-down substation and the same power lines carry rotary-converter loads, such fluctuations seriously affect the conversion, causing severe variation in the direct-current mine voltage.

All the above systems are equipped with safety devices of the most positive action. Due to the cooperation between hoist and electrical manufacturers the complete hoisting equipment may be made practically "foolproof," even to the cages or skips, which stop instantly by gripping the guides in case of cable breakage.

Ward-Leonard systems, which do not include the use of flywheels, are driven either by synchronous or squirrel-cage induction motors, choice being based on considerations of first cost, power-factor regulation desired, pull-out torque, etc. The general scheme of control is similar to that of the Ilgner-Ward-Leonard system, excepting that, no flywheel being used, the slip regulator is unnecessary.

The Island Creek Coal Co., with mines at Holden, Logan County, W. Va., has installed during the past year a total of four shaft hoists, two for coal and two for men and materials. A brief description of them may prove interesting.

The famous Island Creek seam lies in a huge syn-

cline on a part of the property. Above creek level on the adjacent lease to the south it dips several hundred feet, appearing again above creek level part way across the Island Creek property, where it has been worked for years. Since the low portion of the seam is from eight to ten thousand acres in area and is from $6\frac{1}{2}$ to $7\frac{1}{2}$ ft. thick, the company desired to work it over its entire area. Borings indicated two very favorable points for development, one toward the head of Whiteman's Creek, at an approximate depth of 300 ft., the other toward the head of Trace Fork at a depth of approximately 200 ft.

Since the proven areas showed somewhere between eighty and one hundred millions of tons of minable coal, plans for a large ultimate capacity were considered desirable. Hoisting equipment capable of raising at least 500 tons per hour was required. At each location two shafts were sunk. The main shafts are $12 \times 27\frac{1}{2}$ ft. with circular ends, and the supply shafts are $12 \times 29\frac{1}{2}$ ft. The former have two compartments for balanced hoisting, the latter a single compartment for a supply cage, a narrow space for counterweights, and the balance of the area for air supply.

On account of the special quality of Island Creek coal for domestic use, it was decided to avoid as much breakage as possible, so the car and cage system of hoisting was chosen, each compartment of the main shaft carrying a cage equipped to hold one mine car of two and a half tons' capacity. The cage is arranged to tip automatically at the top, so as to dump the car without its removal, thus saving time in unloading and wear and tear on the cars.

For the man-and-material hoists, herringbone-gear plain cylindrical drums of a diameter of $6\frac{1}{2}$ ft., driven by 200-hp. induction motors were found suitable, and the control equipment is full magnetic with primary contactors and secondary grid resistances. Since the Trace Fork man hoist was put in operation it has raised approximately 10,000 tons of coal per month, pending the completion of the main hoist installation, in addition to handling an immense amount of material used for development, including the removal of slate and lowering

of masonry material for the finishing of the main archways at the bottom of the main shaft.

The selection of the main hoists called for thorough investigation during which it developed that we could not hope to attain the rapid hoisting cycle necessary for the required output through the use of alternating-current control. Another serious disadvantage with this type of drive and control would have been the impossibility of limiting our maximum demand, which with its cost of \$1.80 per kilowatt per month based on the five-minute integrated peak, would have been expensive and would have had a bad effect on our rotary installations.

The final hoist calculations showed that the duties required the use of the Ilgner-Ward-Leonard system, with the use of cylindro-conical drums of 7 ft. at the small diameter and 10 ft. at the large diameter driven by direct-current motors, direct-connected to the drum shafts. The following duty cycles were calculated, and the tabulation will show the conditions to be met at each location. System of hoisting: Balanced, double compartment, car and cage.

DUTY CYCLES	Mine 20	Mine 21
	Whitman's	Trace
Total vertical lift.....	370 ft.	280 ft.
Weight of cage.....	12,000 lb.	12,000 lb.
Weight of car.....	3,400 lb.	3,400 lb.
Weight of coal per trip.....	5,000 lb.	5,000 lb.
Rope diameter.....	1½ in.	1½ in.
Weight of rope per side.....	1,110 lb.	840 lb.
Maximum speed of drums.....	82.5 r.p.m.	63 r.p.m.
Time to accelerate.....	4 sec.	4 sec.
Time at full speed.....	5 sec.	5 sec.
Time to retard.....	5 sec.	5 sec.
Time to dump and load.....	4 sec.	4 sec.
Maximum number trips per hour.....	200	200
Short tons per hour.....	500	500
Assumed WR^2 of drums.....	500,000 lb.	400,000 lb.
Turns on small diameter of drum.....	2.75	2.1
Turns on cone.....	3	3
Assumed mechanical eff. hoist part.....	80 per cent	80 per cent

The complete hoisting cycle is 18 seconds, including the rest period, which fulfills the capacity requirements. WR^2 represents the inertia of the moving parts of the hoist, sheaves, etc., and is expressed in foot pounds, and must naturally be taken into consideration in figuring the required power for acceleration.

In the accompanying load diagrams, Hoist A, located at Mine No. 20, represents that at Whitman's Creek; and Hoist C, located at No. 21, represents that at Trace Fork. They afford an excellent illustration of the great difference in power requirements for the same capacity in coal taken from different levels.

Though the total lift at Mine No. 20 is only 90 ft. greater than that at Mine No. 21, the distance being 370 ft. and 280 ft. respectively, it will be observed that the momentary acceleration peak at Mine No. 20 is 1,270 hp., while at Mine No. 21 it is only 670 hp. This is on account of the fact that in order to obtain the same time for the hoisting cycle it is necessary at Mine No. 20 to accelerate from rest to a rope speed of approximately 2,600 ft. per minute, in exactly the same number of seconds that a rope speed only 1,900 ft. per minute is reached at Mine No. 21, these figures being the maximum rope speeds respectively on the two hoists.

It may be of interest to know that the selection of the hoist and control was influenced by considerations of economy in electrical energy, there being a saving of approximately 20 per cent in the kw.-hr. required for hoisting one ton of coal, the power consumption being 0.49 kw.-hr. at Mine No. 21, and 0.60 kw.-hr. at Mine No. 20.

The distribution voltage of the power supply over the Holden property being 6,600 volts, 3 phase, 60 cycle, the

motors of the motor-generator set operate at line voltage, the final capacities of the motor and generator for the main hoist being as follows:

	Mine No. 20	Mine No. 21
Capacity 6,600-volt driving motor.....	450 hp.	350 hp.
Capacity D.C. shunt wound generator.....	700 kw.	400 kw.
Weight of steel plate flywheel.....	13,000 lb.	9,500 lb.
Capacity 250-volt exciter.....	19 kw.	19 kw.
Voltage of D.C. generator.....	400	260
Capacity D.C. hoist motor.....	900 hp.	475 hp.
Synchronous speed of set.....	900 r.p.m.	900 r.p.m.

Commutating poles insure sparkless commutation on both generator and motor at all loads. Since the sole work of the generator is to drive the hoist motor or to be driven by it, any voltage may be chosen provided the amperage is held within reason. It was possible to use standard frames for both generators by using 400 volts at Mine No. 20 and 260 volts at Mine No. 21.

The supply hoists and rotary substation equipments are in separate rooms in one building, while the motor generator sets and main hoists are in separate rooms in another building.

The power circuit supplying the two developments is in the form of a closed loop about eight miles in length, and of No. 00 copper from a step-down substation at Whitman's Creek Junction. Switching towers at each mine permit feeding from either end of the loop. Separate circuits are taken off the towers through separate disconnecting switches to the main hoist, supply hoist, and a local substation. The towers also are equipped with choke coils and surge lightning arresters.

Germany Has Limited Reserves of Lignite

THE German publication *Braunkohle*, in the issue of May 26, gives the following record of the reserves of lignite in Germany, basing it on the Geologic Service of Prussia, which finished its labors on this survey in December, 1922. That survey reports the reserves, actual and probable, not exceeding 1,000 m. or 3,281 ft. in depth, to be as in Table I.

TABLE I—PROBABLE RESERVES OF COAL NOT EXCEEDING 1,000 M. IN DEPTH IN THOUSANDS OF TONS

Districts	Operable by Open Cut	Operable by Underground Mining	Total
Lower Rhine.....	2,315	1,382	3,697
Westerwald.....	.....	105	105
Upper Hesse.....	1	7	8
Lower Hesse.....	37	124	161
Brunswick-Magdeburg.....	299	1,311	1,610
Thuringia-Saxony.....	2,733	1,704	4,437
Lower Lausitz.....	568	4,656	5,224
Upper Lausitz.....	875	947	1,822
Oder.....	40	431	471
Totals.....	6,868	10,667	17,535

In determining the list of the beds operable by striping, all those beds are included the thickness of the overburden above which lies between one and two and a half times the thickness of the utilizable part of the coal bed. An allowance for loss in mining of 30 per cent for work above ground and of 50 per cent for work below ground has been made.

If to the figures are added those from other states than Prussia, the total reserve will be nearly 21,900,000 tons. It is well to add that this reserve represents only 2.8 per cent of the total combustible mineral reserves of Germany when taking into consideration the calorific power of the respective minerals.

IN THE EVENT that Governor Pinchot would like to take another conciliation job or two, the world was never in position to offer him a larger assortment.—*New York Evening Post*.

How Permanent Records of Mechanical and Electrical Equipment May Be Kept*

Advantages of Equipment Records and the Co-operation Needed to Maintain Them — How Different Types of Machinery Are Classified — Permanent Inventory Made Possible — Records as a Guide for Purchasing New Equipment

By J. H. EDWARDS

Electrical Engineer, Elkhorn Piney Coal Mining Co.
Huntington, W. Va.

THE necessity of having complete descriptive records of all machinery and equipment in use and held as spares at every coal mine is obvious. However, it may be interesting to enumerate some of the advantages of such records.

When a new man, such as a superintendent, mine foreman, mine electrician or chief electrician is employed, these records will afford him an easy and quick method of learning with just what equipment he will have to deal. When, as often happens, the manufacturer's nameplate is lost, that valuable information is preserved by the record.

When repair parts are ordered the records save the time and energy of making a trip to the machine to get a copy of the nameplate information and eliminate mistakes, for guesses are not made and no errors arise such as are to be expected when an attempt is made to read dirty or battered nameplates.

The records afford a place to note important changes to parts of a machine, which affect the proper ordering

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

(No name plate on boiler)

Equipped with Foster Superheater No. S4344
Built by Power Specialty Co.

Superheater is made up of 23 sections or units
Boiler tubes arranged 13 rows high, 7 rows of 15 each and 6 rows of 14 each.
The 22 extra tubes on hand 11/29/19 are 18' 11-3/4" long and measure 3.97" OD and 3.65 ID.

Note: Fire brick arch replaced 2-18-21, used fire brick which were left over from original power house construction; cost Material \$200.00; labor carpenter \$8.37; brick mason 16 hours \$20.00; common labor \$12.20; miscellaneous \$4.92; Total \$245.49.

Note: Detrick arch installed 7-20-22. P. O. 17190, dated 5/31/22. Arch \$274.00, freight on arch \$13.36, 1000 fire brick \$48.00. Other material including 400 lbs. of J-M No. 31 high-temperature cement \$25.69, labor \$62.98, total \$424.03

FIG. 1—BOILER REPAIR DATA

Costs of maintenance and record of materials and labor are easily kept on each piece of equipment.

*Abstract of paper prepared for meeting of West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, to be held Oct. 19 and 20, at Huntington, W. Va.

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

The Jeffrey Mfg. Co.,
Columbus, Ohio.
"Arcwall"
Coal Mining Machine
Class 29 Form B
No. 12202 Date 7-23-20

(Controller for main motor)

The Jeffrey Mfg. Co.
Columbus, Ohio.
Starting Box
Class 21 Form A
Volts 250
Cat. No. 91909

(Controller for small auxiliary motor)

The Jeffrey Mfg. Co.,
Columbus, Ohio.
Starting Box
Class 11 Form 934-J
Volts 250
Ohms

When ordering parts for this machine, always give this number, 12202
The Jeffrey Mfg. Co.,
Columbus, Ohio.

FIG. 2—CLASS "C" RECORD

Complete nameplate data are quickly available for ordering any part for this coal-cutting machine.

of repair parts. They also afford a place to record the date when the equipment was purchased, the order number, the name of the company from whom it was purchased, and its original cost.

In case of a breakdown records enable those in charge to make a quick and sure survey of the situation and to determine the possibility of transferring other equipment so as to relieve the situation. The records, if properly maintained, are a perpetual inventory of the mechanical and electrical equipment.

Where a company operates several mining plants from a central office the equipment records reduce the time and expense of traveling which would otherwise be expended in obtaining information such as a good record should provide. The records also prevent the loss of equipment lent to neighboring mines.

The system of records used by the Elkhorn Piney Coal Mining Co. was devised to suit the location of the mines with respect to the district and general offices, also upon the method of management of the company.

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

DIRECT CURRENT MOTORS

Comp. Wound

Type MC

Volts 230

Form A 40

HP 5

General Electric Co.

No. 1229309

Speed 1150

Amp. 19.5

Caution: Use no lubricant on the commutator

PART NUMBERS

Brush

Com. End. Brg. Ing.

Pulley "

Armature Coil

Main Field Coil

Com. "

Cat. 1331763

" 1330169

" 1330169

Spec. 59479A

" 185907.1

" 185897.1

When ordering other parts always give serial number of machine.

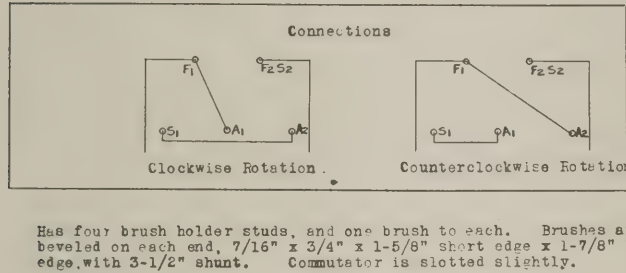


FIG. 3—D. C. MOTOR DIAGRAM

Aside from nameplate data this record shows the important motor connections.

In consequence, a brief outline of these conditions may be necessary. The various mines are grouped into several divisions situated in eastern Kentucky and southern West Virginia; the offices of the manager and also the electrical engineer are located at Huntington, W. Va. The main offices, including that of the purchasing agent, auditor and vice-president in charge of operations, are at Milwaukee, Wis. Each of the larger operations has a man whose duties include those of chief electrician and master mechanic of that division. This arrangement calls for three complete copies of each set of records, one for the chief electrician at the mines, one for the electrical engineer at Huntington and one for use in the main offices at Milwaukee, Wis.

The electrical engineer is in charge of the equipment records and therefore is responsible for the proper recording of all new equipment purchased and also for making any alterations or additions to the record sheets of old equipment. The permanent copies of record sheets of all new equipment are prepared in his office, which also sends out all instructions regarding any changes to be made on the records.

This arrangement requires the co-operation of the chief electrician at the mines, who must keep the electrical engineer advised of any changes which are otherwise unknown to him. This method makes it possible to have a uniform system of records at each operation, also to maintain the three copies of each record for the three respective offices.

The record sheets measure 8½x11 in., that is, of letter size. They are punched for filing in standard loose-leaf binders. This overcomes the common objection to the card system, where it is so often found that for certain items of equipment the cards do not afford sufficient space to hold all the desired data. Also, the

fact that the sheets are filed in ring binders makes it more likely that the records will be kept in proper index order. A further advantage of the large sheet over the card is that several copies of a record can be made at one typing.

On the front of each sheet is a form suited to the equipment being recorded, and on the back are spaces for nameplate information. By thus providing for a complete copy of the nameplate data the record sheet will afford information which a fixed form cannot always provide. The front upper right-hand corner has a space headed "Equipment," in which is inserted in one or two words the type of equipment: for example, "DC Motor" or "Transformer." This makes it much easier to locate the record sheet of any particular class of machine.

Near the top of the form is a space headed "Descriptive Name," opposite which is inserted in a few words a description making it possible to quickly identify a certain piece of equipment from others of about the same type. Space is allowed for purchase order number, date and cost. This information often is required by the operating department, and is invaluable to the auditing department as a perpetual inventory. Several spaces are allowed for recording transfers from one operation to another. At the bottom is a space headed "Out of service or destroyed." Notations are made in this space whenever machinery is sold, destroyed or scrapped.

These forms divide into eight different classes, namely B, C, E, F, L, M, P, and S. The principal items of equipment which are recorded in each class are as follows:

Class B—Steam boilers (all types except those on steam-railway locomotives), feed water heaters, steam separators, feed water meters.

Class C—Coal-cutting machines.

Class E—Alternating- and direct-current motors, transformers (not including instrument transformers), generators (not including direct-connected units), converters, motor-generator sets, switchboard panels, large automatic reclosing circuit breakers, automatic

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

Sirocco

American Blower Co.

General Offices

Detroit, Mich. U.S.A.

Works at

Detroit, Mich. & Troy, N. Y.

Fan No. O-27243

Note: Feb. 1, 1921, the fan motor is now running with resistance all in, or at slowest speed and the input is 17.25 KW with the fan producing 59,500 Cu. Ft. of air at the intake. Water gauge 0.7 inch.

Fan house is equipped with steel reversing doors for changing direction of air current through mine.

Following are manufacturer's specifications:

157 RPM	75,000 cu. ft.	1½" water gauge.	28 BHP
212 "	150,000 "	2" "	" 74 "
272 "	150,000 "	4½" "	" 142 "

FIG. 4—HOW THE FAN PERFORMS

Manufacturer's rating and test data give valuable information on the capacity and limitations of the fan and anyone can determine without difficulty when the fan has become too small for its work.

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

The Deming Company,
Manufacturers
Salem, Ohio
Fig. 70 Size 5½ x 8"
Pump No. 15888

Note: Gear reduction motor to pump crank shaft is 20.013 to 1.
Motor pinion 20 teeth, 3-1/4" face, 1-5/8" bore, 3/8"
x 3/16" keyway, 3 pitch.
Intermediate gear 79 teeth, 3-1/4" face, 2" bore, 1/2"
x 1/4" keyway, 3 pitch. Intermediate pinion 15 teeth,
3½" face 2" bore, ½" x ½" keyway, 2½" pitch.
Crankshaft gear 76 teeth, 3½" face, 2½" pitch, has a large
bore and is bolted to crank disc of crank shaft.

FIG. 7—BACK OF PUMP SHEET

Important gear data are shown complete. In consequence there is no likelihood that a gear will be purchased that is either too small or too big. Incorrect pitch is a frequent cause of broken shafts.

the manufacturer's guaranteed performance of a mine fan. By being on the record sheet, this data will be preserved where it will be most convenient to locate.

Fig. 5 shows the record sheet of a pipe-threading machine which was sold; a notation to that effect has been added to the bottom of the sheet on the line headed "Out of service or destroyed." The mine pump, Fig. 6, was transferred to another operation. This transfer is indicated in one of the spaces below the heading "Transferred to." Fig. 7, which is the back of the record sheet of this same pump, indicates how information regarding the gears and pinions has been included.

No matter how complete a set of equipment records may be they will not be used to the best advantage unless they are properly indexed. The index for the above record system was given particular attention. A regular printed form, of the same dimensions as the

record sheet, is used. Fig. 8 is a sample of the index of Class C equipment at operation No. 4. Opposite Record No. C-3 will be seen notes indicating that this mining machine has been transferred to another operation. Opposite Record No. C-12 are notes showing that this mining machine has been scrapped. The items C-36 and C-59 were originally recorded at another operation and then later transferred to operation No. 4.

These last items are spaced so as to allow room for any other numbers which might be transferred to this operation in the future. It was formerly mentioned that each operation was assigned a certain range of numbers in each class in order that there might be no duplicate numbers. This is illustrated by the items C-36 and C-59, which were transferred from operations where the ranges allotted included these numbers.

KEEPING TRANSFER RECORDS

Fig. 9 illustrates the form of record sheet used for each mine locomotive battery. Although the battery record serves as an inventory of the types of batteries

Location

Trade Name of Battery.....Type.....

In Use on Locomotive: Record No.....Serial No.....Make.....

In Use on Locomotive: Type.....

Serial No.....

No. Cells.....No. Plates.....

Capacity in Ampere-Hours.....

Capacity in Kilowatt-Hours.....

Guaranteed Life.....

Efficiency

Connectors

Jars

Ribs in Jar.....

Date Left Factory.....

Date Received at Mine.....

Date Put Into Service.....

Original Cost Delivered.....

Date Taken Out of Service.....

Months Life at Mines.....

Months Actual Working Life.....

Credit Received:

For Return of Scrap Battery.....

For Failure to Meet Guarantee.....

Net Cost After Credit Deducted.....

Net Cost Per Year Life at Mines.....

Net Cost Per Year Actual Working Life.....

Replaced By

Dates, beginning and ending, of continuous periods of one week or more when out of service:

FIG. 9—STORAGE-BATTERY SERVICE RECORD

From this sheet the life of the battery can easily be determined and future purchases economically guided.

in use, its main purpose is to afford a means of determining the actual service cost per year of the various makes and sizes of batteries. This experience serves as a valuable guide in the purchase of renewal batteries. These battery records are not kept as a part of the regularly indexed equipment record because, unlike other equipment, batteries have a life averaging only one to four years and consequently must be renewed much more frequently than the other mechanical and electrical equipment.

INDEX TO MACHINERY EQUIPMENT RECORD, No. 4					DIVISION CLASS C PAGE 1	
RECORD NO.	DESCRIPTION	MAKE	SIZE	SERIAL NO.	REMARKS, TRANSFERRED TO, ETC.	
* C-1	Mining Machine, Shortwell	Goodman	12AA	2185	To Operation #1, June '19	
C-2	Mining Machine, Shortwell	Goodman	12AA	2184		
C-3	Mining Machine, Shortwell	Goodman	12AA	2235		
C-4	Mining Machine, Shortwell	Morg-Gard	SA 600	4414		
C-5	Mining Machine, Shortwell	Goodman	12AA	2507		
C-6	Mining Machine, Shortwell	Goodman	12AA	2241		
C-7	Mining Machine, Shortwell	Goodman	12AA	2490		
C-8	Mining Machine, Shortwell	Goodman	12AA	2236		
C-9	Mining Machine, Shortwell	Morg-Gard	SA 600	4427		
C-10	Mining Machine, Shortwell	Goodman	12AA	2361		
** C-11	Mining Machine, Shortwell	Goodman	12AA	2459	Scrapped, Nov., 1919	
C-12	Mining Machine, Brest	Jeffrey	17A	7070		
C-13	Mining Machine, Shortwell	Goodman	12AA	2297		
C-36	Mining Machine, Shortwell	Morg-Gard	SA 600	3955		
C-59	Mining Machine, Brest	Jeffrey	16 A	2900		
* - TRANSFERRED TO ANOTHER DIVISION ** - PURCHASED, BUILT, ETC.						
					CLASS C PAGE 1	

FIG. 8—INDEX SHEET FOR CLASS "C" EQUIPMENT

Proper filing is highly necessary, otherwise a perfectly recorded piece of equipment may be overlooked when making use of the records.

What the Exhibitors Had to Show at American Mining Congress and National Safety Council

Electric Safety Cap Lamps of High Candlepower—Means for Self-Rescue—Steel Car for Anthracite Region—Mechanical Loading—Safety in the Presence of High-Voltage Electric Current

NOTABLE both as to the number of its exhibits and their scope was the Annual Exposition of Mines and Mining Equipment at Milwaukee, Wis., in connection with the annual convention of the American Mining Congress, Sept. 24-29. Much of the equipment and many of the devices were not by any means new to the industry. Only the newer ones have been selected for description in this article. The Mine Safety Appliances Co. exhibited its new Edison safety cap lamp in which the electrolyte is kept from escaping by valves which are closed by the shutting of the battery-box cover. This provision prevents the escape of the electrolyte, so that even with the lamp reversed and shaken none of the fluid escapes. This new lamp gives three times the light of the older model of the same lamp, and the bulb is so mounted that the rays of light are entirely unobstructed.

The lamp weighs 5 lb. 3 oz. and gives an average light flux of 9.67 lumens, or a total of 116 lumen-hours during a period of 12 hours burning. The mean candlepower of the light stream from the headpiece over a period of 12 hours is 2.67. The average current consumption of the bulb for the same period is 1.06 amperes.

HAVE OVER TWICE PREVIOUS POWER CAPACITY

The cells have $2\frac{1}{2}$ times the ampere-hour capacity of those they replace and yet occupy approximately the same size of casing. The headpiece is sealed so that the miner cannot open it and is so designed that bulb replacements may be made without disturbing or touching the reflector or removing the lens. The bulb has

a concentrated filament and consumes a relatively high current. The lens is laminated, being made up of two thin pieces of glass with celluloid between them. The cord is of the spiral type protected by a heavy rubber coating.

The voltage of the battery at starting is 2.81 and after ten hours is still 2.28. The candlepower at the center of the light stream is 5.12 and at an angle of $32\frac{1}{2}$ deg. 4.10.

Another exhibit by the same company was a self-rescuer. In earlier

days it was thought necessary to give the mine worker an apparatus that would supply him with oxygen. The new self-rescuer does not afford him anything but merely intercepts all the many poisonous gases and fumes with which the baleful afterdamp is filled, except carbon monoxide. This latter gas it combats by converting it into carbon dioxide, which is harmless. This self-rescuer, which may have to be kept or carried for long periods of time without its bearer having any use for it, is placed in a box having a cover which is provided with a seal of soft lead of such a character that the cover readily can be torn off by the mine worker and the self-rescuer taken from the box.

It is necessary thus to protect the apparatus, as the entrance of moisture, if long continued, would destroy the power of the Hopcalite, by which the monoxide is converted to dioxide. All the mine worker has to do after he has opened the box in the manner already described is to adjust the nosepiece and put his mouth over the rubber connection provided for that purpose. The self-rescuer weighs 13 oz. including the box and can be carried in the pocket or on the belt, for it measures only 4x8 in. over all.

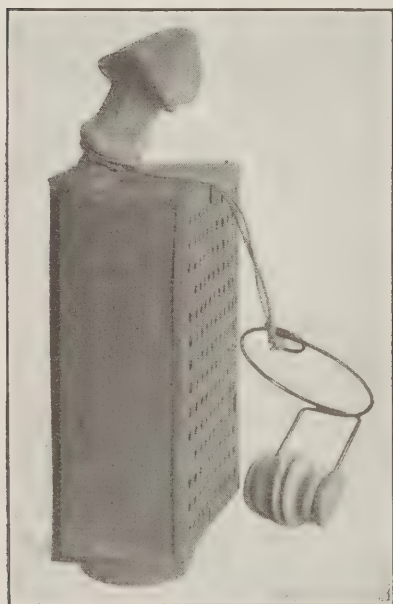
A shotfirer in Mine No. 49 of the Central Coal & Coke Co., Pittsburg, Kan., recently became involved in an explosion resulting from a blown-out shot. He had a self-rescuer with him, fortunately, and with its aid found his way to the surface.

At its booth in the exposition the Mine Safety Appliances Co. also showed a timber jack with a screw stand. This stand supports a Y which is used for holding up a cross timber till it can be secured in place. The device is said to save labor and reduce accidents.

The Lorain Steel Co. exhibited the Lehigh Coal & Navigation Co.'s new car, all of steel, with spring draft gear, single springs over journal boxes and intended for rotary dumping. In general it is of the pattern usually associated with the anthracite region. Thus it is 5 ft. $\frac{3}{4}$ in. high; and why not, seeing it is to be loaded by chutes? Its over-all width is 5 ft. $6\frac{7}{8}$ in. and over-all length 9 ft. $4\frac{1}{2}$ in. It weighs 5,600 lb. when empty and it holds 116 cu.ft.

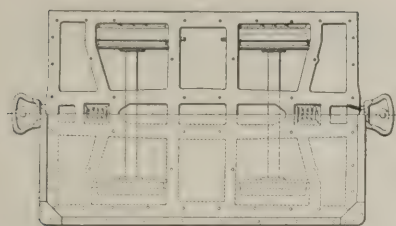
On the stage thundered a Joy loading machine, now equipped for use with both caterpillars and wheels for use as the operator may wish. The caterpillar runs between the tracks. Should you desire to put on wheels, put two ties between the tracks behind or in front of the caterpillars and move toward them. The caterpillar will climb on them and lift the machine so far above the rails that wheels can be slid on the axles. As soon as the caterpillars have passed the inserted ties, the wheels, if put on, will engage the track so that the loading machine will travel on the wheels instead of on the caterpillars and can be taken in this manner to the next working place, provided that is the preferred way of traveling.

Gages of 42 in. and upward are equipped with de-



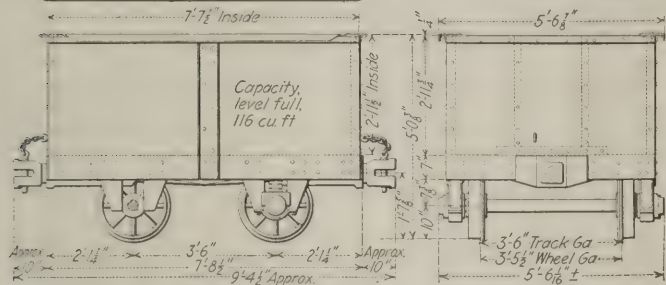
SELF RESCUER FOR MINES

Experiments during the war led to the invention of this self-rescuer, which if devised earlier might have saved many lives.



Steel Car for Anthracite

This car is intended for loading from chutes and for discharge by a rotary dump. It will be noted that it has springs over the journal boxes and spring draft rigging.



tachable track wheels for transporting the machine from one working place to another. On narrow gages the caterpillars are set to the track gage to permit the calks provided in the tractor treads to function as wheel flanges restraining the machine so that it is compelled to travel along the mine track rails.

Where the cross-sectional area of roadways is restricted it becomes necessary to use on storage-battery locomotives smaller batteries than are well suited for a day's work, and in other cases where the work is particularly heavy the cells do not retain enough of their strength to keep the locomotive traveling at speed the day long. At such times the batteries have to be boosted or charged. The change as usually performed is an operation involving time and labor, and the Mancha Storage Battery Locomotive Co. has devised a way, which was exhibited at the company's booth in the Exposition, whereby the change can be made in three minutes.

A pedestal track is placed at such a level that when the locomotive strikes it the battery in its case is lifted from the chassis of the locomotive and supported so that the latter can be backed out of position. The raising of the battery is performed by an inclined plane, the track on which the battery runs during the first part of its travel being inclined uphill. From another similar track the locomotive thus stripped can obtain another battery and go again to its work with all the vigor of a fresh charge.

The battery left on the pedestal track can be charged without removal and will be ready to be loaded on the chassis as soon as the locomotive has demounted the other battery. It is urged that this ability to transfer

the battery promptly adds 100 per cent to the work that the locomotive may be expected to perform.

At the booth of the Falk Corporation was shown a flexible coupling invented by James Bibby, of England, and first manufactured in that country. It is known here as the Falk-Bibby coupling. With any shaft it is important that the bearings be all in line. When a shaft has only two bearings good workmanship should provide that need, but with more bearings than two the alignment may not be so perfect. Even though that alignment may have been exact when the shaft was installed the supports under the bearings may settle and as a result the shaft may be subjected to additional stresses and the bearings to increased friction, thus causing a continuous loss of power and undue wear.

For this reason alone a flexible coupling is desirable, but it has the further advantage that any shocks received by the operating parts are not transmitted to the motor. A coupling should not transmit torsional oscillations, and between shafts there should be no end thrust.

The Falk-Bibby coupling consists of two flanged steel disks, one keyed to each shaft, and a tempered steel spring encircling both and forming a continuous cylindrical grid and a shell. On the outsides of the flanges are pitched cross grooves. In these the spring is placed, connecting the two disks but in an elastic manner. The grooves in the disk widen inward toward each other, so that the spring fits closely in them only at their outer ends. This widening is in the form of an arc of definite radius. It is made by machines specially designed for that purpose and the radius of the arc is such that each bar of the spring can be bent around this radius without exceeding a fixed safe stress.

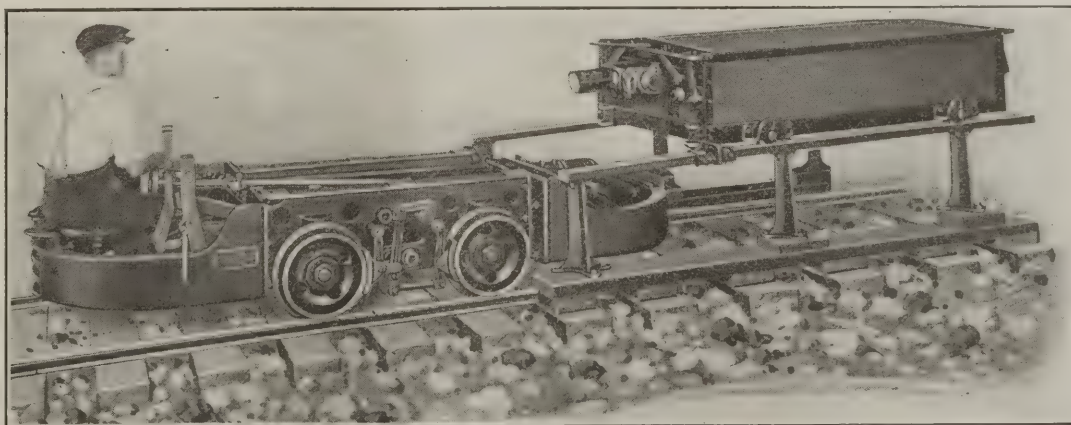
Consequently under heavy loads the spring members become supported along the sides of the grooves, thereby automatically shortening the spring without increasing the stress. Under extreme overloads the springs are in shear and can resist many times the load for which the coupling is designed.

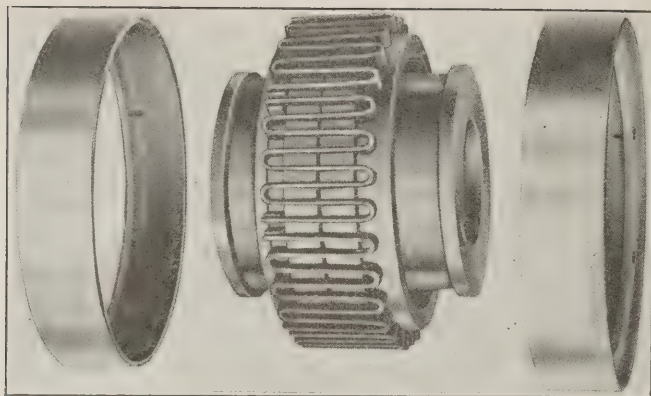
One of the most active pieces of machinery in the exposition was a Hoar "Baby" shovel for underground loading. In the hands of an operator it went through the motions of dipping, crowding, hoisting, swinging and dumping with astonishing agility and much sputtering of compressed air. This machine, well known for years in hard-rock regions, is entering the coal field as a serious contender wherever a mine is equipped with compressed air. It is exceedingly compact.

A medium sized type—shovel No. 2—needs but 7 ft. of clearance, top and sides, can clean up an area 14 to 16 ft. wide and is said to be able to load 200 tons of

Taking on a Live Battery

A locomotive may be good for the day's work even when the battery is entirely outclassed. This is why means have been provided, as shown here, to remove the battery with minimum loss of time and replace it with one having a full charge.





FLEXIBLE COUPLING REDUCES STRAIN AND FRICTION

The two shafts to be connected have disks which are slotted and in the slots are laid a spring which connects the disks. As the slots do not fit tightly over the full depth of the spring, the attachment is elastic and shocks are not transmitted from the machinery to the motor.

coal in an 8-hour shift with a good turn of cars. The machine can be motor equipped, but more headroom would be necessary for its operation.

The Hoar Shovel Co., of Duluth, makes the shovel in a larger and a smaller size than the one displayed. The smaller one is a marvel of compactness, operating in a space measuring but 5 ft. 6 in. but with a breast capacity of 12 ft. The total weight of all three types is small—6,300 lb., 6,000 lb. and 5,700 lb. and any one of them can quickly be disassembled to be lowered or hoisted through a 42x42-in. shaft.

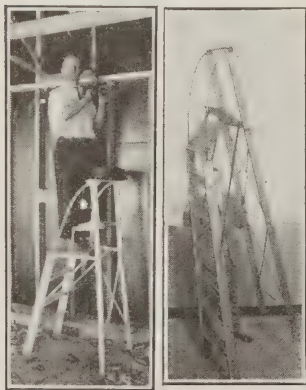
A spring reel for power or light cable was shown by the Appleton Electric Co. In the smaller sizes this device has its best coal application in the mine-repair shops. By its use a lamp, drill, or any portable tool can be carried around the work, only the length of cable necessary being paid out by a ratchet arrangement inside the housing of the cable reel, which latter is fastened at the electrical outlet. This device is expected to reduce the wear on cables and keep troublesome lengths of it out of the way.

At the Twelfth Annual Safety Congress, held in the Statler Hotel, Buffalo, N. Y., Oct. 1-5, a small exhibit was provided. W. H. Salisbury & Co., Inc., presented an extremely satisfactory line hose to take the place of the rubber blanket in protecting the lineman. This hose requires no clamps and the far end can be run out on the line beyond the reach of the lineman; a patented locking device keeps the hose everywhere

around the electric conductor. It is as easy to detach as to apply.

Linemen's rubber gloves also were exhibited. They were made with a pure-gum center, the whole glove being 95 per cent pure rubber. Seamless and pliable, they meet the need of the lineman when working in difficult places and handling many tools.

The Dayton Safety Ladder Co. presented a line of ladders unusually light and readily collapsible but also more than usually stiff when erected. There are



SAFETY LADDER

Ladder accidents are not specific to the coal industry, but they cause accidents nevertheless.

said to be 20,000 stepladder accidents in industry yearly, so the need for safer ladders is obvious. A large, safe-working platform is provided and even this has side rails, which not only add security but stiffen the ladder. In working about power houses and electrical equipment a safe, stiff ladder is one of the greatest of needs.

The Foamite Firefoam Co. ran a film of its method of fighting fire. Foamite can be used on electric arcs but the company is not pressing its use for that purpose. The first discharge from foamite firefoam fighting equipment is likely to be little other than water. In a few seconds the character of the discharge changes. In consequence if the first discharge is not directed on the arc but on the floor, the results with even 8,000 to 10,000 volts will not be dangerous provided the operator has the usual protection.

However, the Foamite firm is still advocating carbon tetrachloride for that purpose, that gas being a powerful dielectric. The value of foamite for putting out fires in oil tanks is unequalled. In a heavy wind the foamite, depending on a froth that cannot be blown away, works better than any mere gas, however heavy.

Another fire-fighting and fire-preventing medium is carbon dioxide. It is being used for playing on electric fires and experiments are being made to use it in transformers in place of air, as it is a protection against fire not only directly but indirectly also because the oil in the presence of dioxide will not oxidize and lose its dielectric qualities.

Mills Beat Mines at Bethlehem Steel Meet

As the result of a series of spirited first-aid contests in which for a while it looked as if the coal miners would be victors, the Saucon mechanical department of the Bethlehem Steel plant took first place, and Bethlehem was hailed as the winner Oct. 5 at the Broadway Auditorium, Buffalo, N. Y., on the closing day of the National Safety Council's meeting. Earlier, however, four teams of the Marion division had held an elimination contest at Barrackville, W. Va.; the Preston division's ten teams had met at Oak Park, W. Va., and eliminated all but one team; the Ellsworth teams, thirty six in number, had assembled at Ellsworth and by trial had selected two teams; the five Slickville teams had similarly met and ascertained which was the best. Johnstown, which had eleven teams; Wehrum, which had five, and Heilwood, which had twelve, had each selected by contest its crack team. In consequence there were eight representative mining teams which were all sent to Buffalo for the final and semi-finals.

The judges in the final round placed the Bethlehem plant first, Ellsworth No. 1 second, Lebanon (mechanical department) third, and Wehrum fourth. The averages attained by the various teams in the final contest were not published. One coal-mine team in pulling a patient off a live wire let him fall back on it twice, and one of the men in the first-aid team then trod on it in his anxiety to perform his part. One of the doctors present remarked, however, that the work of rescuing the man from the wire was done with much skill, and he could not understand how the patient slipped from the loop.

The patient certainly did his part under the rules and made no resistance to falling back onto the wire. To what extent this accident affected the averages of the team is not known. In the finals a layman and a doctor judged each event.

The winning team gets \$400 and holds the Bethlehem trophy for one year; the second team gets \$200; the third, \$80; the fourth, \$40. Each team contains eight men. The mine corps were trained by J. V. Berry, chief of the safety and first-aid department. J. O. Durkee is chief inspector of mines. At the intermission between the finals and semi-finals a mine-rescue group of ten men gave an exhibition of apparatus work.

Technical Discussions Elicit Deep Interest at Milwaukee Convention of American Mining Congress

Churn Drilling in Strip Pits—What Can Be Done to Get Larger Coal
—Saving Effected in Spare Parts—Battle Between Alternating- and
Direct-Current—Standardization—Fire Doors vs. Reversible Fans

EXCELLENT attendance marked the meetings of the Open Forum of the convention of the American Mining Congress at Milwaukee, Sept. 24-29, especially in view of the fact that every section exceeded its time, and arrangements had to be made to continue in another room the holding of one section during the session of the one that succeeded it.

D. E. A. Charlton, assistant business manager, *Engineering and Mining Journal-Press*, presided over the discussion on "Churn Drills vs. Air Drills for Strip-Pit Work." Mr. O'Connor said in this discussion that churn drills making 6-in. diameter holes and driven by one man were and had been for some time displacing jackhammer drills in the Mesabi region. It was not necessary to shoot a preliminary shot so as to chamber the hole made by the churn drill for it was always of ample size and that was well because chambering made an initial shattering that could not fail to have a deleterious effect when the final shot was made.

Mr. Gardner, of the Sanderson Cyclone Drill Co., said that while six years ago the Mesabi region had but 5 or 6 churn drills, it now has 150, evidencing the inevitable displacement of percussive by churn drills wherever soft material had to be shot. Mr. Rhodes added that the large hole was, as Mr. O'Connor said, the great desideratum as it enabled a large charge to be inserted without chambering and thus shattering the ground.

SHOOTING SO AS TO OBTAIN LUMP COAL

Notable among the discussions was one on "Means of Securing Co-operation from the Miner in Using Explosives That Will Produce a Maximum Quantity of Lump Coal," which was introduced by H. C. Adams, president, Peerless Coal Co. This was the principal feature of the session under the chairmanship of N. S. Greensfelder, editor, *Explosives Engineer*. Mr. Adams is operating in the No. 5 seam in central Illinois. The coal is not undercut by machine but is blown from the solid.

Mr. Adams stated that the men at the mines were no longer miners of experience but mere diggers. They had no desire, what is more, to produce large coal. Fine coal shoveled more easily than large. On the other hand the operators were entitled by contract to have the miners use due care in mining so as to provide a large percentage of lump. That was set forth in the agreements as a duty, the union having inserted that clause at the demand of the operators at the time when payment was made on a run-of-mine basis instead of on a lump basis, removing thereby the anxiety of the miner to produce large coal.

Mr. Adams said that he had believed that he could obtain instructors in mining who could induce his men to abandon their evil practices, which he believed were due to lack of training as much as to indifference, and in many cases resulted in loss to the miner, for the shots did not do what he desired of them and at the

same time used an excess of powder, for which the miner had to pay. His superintendents, however, advised him that any such attempt to modify the miners' methods would be ineffectual. The miners insisted that C.C. powder was too slow. The company contended that even C. powder was too fast.

Mr. Adams said he had sought help from the Department of Mines and Minerals of the State of Illinois and had been advised that two companies, the Silver Creek Coal Co. being one of them, had reduced screenings 10 per cent by instructing its miners. The department did not see itself able to do anything to prevent improper shooting of coal but urged on Mr. Adams that



LEADERS OF AMERICAN MINING CONGRESS FOR 1924

J. F. Callbreath, left, is the veteran secretary, re-elected at the Milwaukee convention to continue his service. H. W. Seaman, right, whose home is in Clinton, Iowa, but whose business interests are everywhere, centering especially at Deadwood, S. D., in the Trojan Mining Co., a successful gold enterprise, was chosen to succeed Sidney J. Jennings, of New York, as president of the Congress. During recent discussions about the possibility of choosing a "dictator" for the coal industry, a thing similar to the "dictatorship" of Judge Landis over baseball, Mr. Seaman was mentioned as a likely man for the big job.

the law made it a duty of the management to supervise the placing of holes—a contention that had not occurred to him and which he had not yet investigated. Mr. Adams said that his company had been producing coal that would have given, if all screened, about 40 per cent of screenings.

A. J. Moorshead, president of the Madison Coal Corporation, said that the question of the proper use of

powder was most important both as concerning profit from the enterprise and conservation of life. At his mines a supervisor of explosives has been appointed. He sees that no wires are installed in magazines and no open lights are allowed to enter, only storage-battery lamps being permitted in such places, that sparkproof powder cars are employed for the transference of powder, that the cars are loaded at points where no circuits could ignite and explode the powder, that powder cars are properly closed when powder is being transported, that the electricity is not only switched off at two switches but locked off also with two keys, each held by a different official.

Shift bosses are employed to see that the drillholes are properly placed, and if not to give advice. Conditions are not getting better, however, but rather worse. Time was when \$2.25 a ton was paid for the loading of pyrite and much of it was loaded, but today with the higher wages paid no one cares to load pyrite. A big enough earning can be made without it. Everyone is in a hurry to load up enough to get a pay that will suffice for a day and then go home.

IMPORTANCE OF "BEATING THE MINER TO IT"

Mr. Moorshead spoke quite forcibly on the ability to deal with the miner as being even a larger element of success than technique. He said the trouble with most managers was that they let the miner form his conclusions without due consideration of all the facts of a proposition. When the miner had once made up his mind and passed his resolution in union meeting it took months of negotiation to change his attitude, whereas five minutes of protest prior to the meeting would be likely to have the desired effect. He advised the management to "beat the miner to his decisions" by foreseeing what the miner is going to do and putting in his word first. If the local has pronounced on the subject, months of parleying are likely to follow, as likely as not without result.

Joe Harris, a miner, brought to the congress by Mr. Adams, said that the miners were not altogether to blame. The powder frequently is badly graded, and the quickness of the shot and the force was hard to determine. Holes of too big a diameter frequently were drilled, and such holes were dangerous.

Adam Borton, another miner, complained also of the lack of uniformity in powder, making standardization difficult. He declared that no shotfirer should shoot a hole that is too deep or of too great a diameter. He said that when he made his rounds he found some of the holes only partly completed. How deep the men intended to make these holes he never knew. He could only tell them how deep they should be. With such holes there might well be trouble. Those that were completed could be measured and if found of right length could be charged and fired safely. James Creighton and other miners followed along similar lines.

At the Mine Transportation meeting, at which R. Dawson Hall acted as chairman, J. H. Edwards, electrical engineer, Elkhorn Piney Coal Mining Co., Huntington, W. Va., read a short discussion on the advantages of standardized track gages, especially having regard to the experience of his company. His written statement follows:

"The Elkhorn Piney Coal Mining Co., which has been operating six properties in southern West Virginia and eastern Kentucky, has found that the greatest obstacle encountered during its efforts toward standardization

of equipment has been the difficulty introduced by the different track gages. All except one of the six operations were acquired as producing mines and among those taken over were to be found the following track gages: 36, 40, 42, 44 and 48 in.

"An effort was made to eliminate from each operation any type of equipment of which only one or a few units were in use, and yet for which it was necessary to carry a full line of repair parts. Four types of mine locomotives were eliminated, resulting in a reduction of \$6,000 in the stock of locomotive repair parts normally kept on hand at the mines. Nine types of mining machines were discarded, resulting in a reduction of \$11,000 in the stock of that class of repair parts. Most of the standardization was effected by transferring equipment from one operation to another, but certain items, in most cases those which had become partly obsolete, were disposed of by sale.

"The standardization of locomotives, mining machines and other mechanical and electrical equipment made possible a reduction of more than \$45,000 in the stock of repair and spare parts carried. In addition to the above specific illustrations of gain by reductions in stock of spare parts kept on hand, it should be mentioned that still greater advantages of standardization were evident in a more economical operation of equipment owing to the fact that the machine operators, motormen, repairmen and foremen became much more proficient through the continual use or supervision of only one type of machine for each kind of job."

Mr. Edwards, on being asked, stated that the management had favored a 42-in. gage as standard. Frank Haas, consulting engineer, Consolidation Coal Co., Fairmont, W. Va., declared that they probably always would have more than one gage, as narrow gages were needed in mines having bad roof. However, the Consolidation Coal Co., which had inherited a 42-in. gage had at its new mines, switched over to 48 in. He said that with cars having a 42-in. gage the track should be $\frac{3}{4}$ in. wider where the curve is on a radius of $24\frac{1}{2}$ ft, and the wheelbase is 36 in. As regards bottom-dump cars, he believed that they could hardly be constructed safely in excess of $1\frac{1}{2}$ or 2 tons capacity.

VIRTUAL WHEELBASE LONGER THAN ACTUAL

Mr. Illsley, electrical engineer of the Bureau of Mines, said that the U. S. Bureau of Mines was making a careful study of the friction of mine cars in relation to track curvatures, wheel diameters, wheelbases and bearings. Mr. Hall called attention to the great length of the virtual wheelbase on curves due to the impingement of the flange on the rails and also referred to a statement by William Griffith, of Scranton, that the weight of the wheels had a greater effect in resisting traction than an equivalent weight in the body of the car. Mr. Hall said that Mr. Griffith had proved this to his own satisfaction and that figures on the resistance of railroad cars obtained by Mr. Griffith sustained him in that opinion. Mr. Griffith believed that the rolling parts of mine cars and railroad cars were being made too heavy.

On the question "When and Where to Use Gasoline, Trolley and Electric Storage-Battery Locomotives," J. H. Edwards advocated the more extended use of the combination locomotive, stating that when this was done and the trolley was extended as fast as new work was opened unusual grades could be negotiated satisfactorily by the storage-battery locomotive from one

end of the day to the other. Mr. Benedict stated that in discussing the grade on which storage-battery locomotives can be used the frequency with which such grades must be encountered must be considered. With many grades of 10 per cent the storage battery would soon be bereft of power.

When the subject "Roller Bearings vs. Plain Bearings" was broached W. L. Affelder, general manager, Hillman Coal & Coke Co., Pittsburgh, Pa., stated that though more care is needed to be taken of the wasteful use of power where generated at an isolated plant, operators were more prone to watch such waste when purchasing power. The purchase of power therefore had done much to make the introduction of roller bearings rapid. He stated that he fully believed that roller bearings justified their use by reason of the power saved.

POWER SAVING NOT THE ONLY ADVANTAGE

H. K. Porter, of the Hyatt Roller Bearing Co., declared that the roller bearing was not to be advocated solely as a power saver. It saved in keeping the cars on the track, in lessening replacements, in the lubrication of cars both as to labor and as to lubricant. If the roller bearing never saved a kilowatt of power it would be amply justified by its other qualities. Furthermore, with roller bearings on the locomotive and cars the tractive effort required of the storage-battery locomotive is so greatly reduced that a locomotive that would run only part of a day could have its service extended a full day and could work at more nearly its full capacity the day long—an important consideration, making it possible to avoid boosting the batteries.

In the discussion on the "Advantages and Limitations of the Caterpillar-Mounted Shovel" J. F. Joy, of the Joy Machine Co., said that unless a machine had a long reach or the track was set in the center of the room the caterpillar mounting was absolutely necessary. A machine having long reach was likely to tip and come off the track. Where the track is over 42 in. wide, wheels can be used. Under 42 in. the caterpillar truck was preferable. By leaving a thin layer of bottom coal the caterpillar could be made to work over even the softest of clays but that was rarely advisable. He said that with his machine, the load on the caterpillar per square inch did not exceed the weight which a man imposed per square inch on the soles of his shoes when standing. Only in exceptional places and under unusual conditions was the caterpillar likely to become bemired.

On Wednesday afternoon the forum opened with a discussion on "Underground Power Equipment and Transmission" with R. Dawson Hall as chairman, the particular subject discussed being as to the relative desirability of alternating current and direct current from the standpoint of efficiency and safety. The question was on its way to pretty general settlement when fortunately, or unfortunately according to the point of view, C. L. Harrod, of the Indiana Coal Operators' Association, came in and took up the cudgels for the use of alternating current for mining machines—the well-recognized point of view of the Middle West, the East holding pretty generally to the view that nothing is to be gained by mixing current. Before Mr. Harrod came in it was generally conceded that big pumps and pumps near a borehole to the surface could best be run by alternating current and that alternating current could be favorably used on the surface and for distribution to substations but on the whole the current

below ground for all services should be direct current.

F. C. Pullen of the General Electric Co., wanted to know how 3,000-kw. pumps like those at Ishpeming, Mich., could be economically run without alternating current. It was pointed out that they lie near the shaft and if they did not, such installations of large units are, and must always be, a law to themselves. Where electric power was used for hauling, however, smaller gathering pumps could get their power from the direct current installed mainly for other purposes.

LOW-VOLTAGE ALTERNATING CURRENT WASTEFUL

J. H. Edwards said that where direct and alternating current were distributed at the same voltage the losses with direct current were less than with alternating, for there was no inductance. Alternating current was best fitted for use where voltages were high, but with such high voltages the current could not be used for general mine purposes till it had been stepped down or converted to direct current.

Another member present, in discussing the possibilities or rather the near impossibility of using alternating current for haulage underground, stated that with direct current speed control was the more easily obtained. Starting torque, however, could be best obtained with alternating current. In considering the availability of alternating current, the space which machinery to handle it would require must be borne in mind. It must be remembered that it is essentially uneconomical as the power factor can never be 100.

Here Mr. Harrod came in, declaring that with alternating current, mining machines and pumps could be run in idle time when the locomotives were not running without the necessity of running converting equipment. He also said that in the Middle West machines cut during the day and not during the night, as in the East. Thus the machines and the locomotives were drawing on the power at the same time and two series of wirings were therefore more justifiable.

In discussing "The Relation of Feeder Lines to the Return Current" J. H. Edwards said that the feeder lines should be tested by the short-circuit test. After the return has been made perfect there is no reason to provide a feeder equal to that which the return will carry. That would be a waste of money if the power demanded by the machines and locomotives could be supplied without exceeding the prescribed voltage drop.

WHEREIN CENTRIFUGAL PUMPS EXCEL

In the session on "Pumps and Mine Drainage," also presided over by R. Dawson Hall, G. V. Woody, of the Allis-Chalmers Manufacturing Co., stationed at Wilkes-Barre, Pa., read a paper on the relative desirability of various kinds of pumps urging that centrifugal pumps handling 1,000 gallons per minute or more were more economical than plunger pumps of the same capacity because of lower first cost both for equipment and emplacement and because of lower repair costs. Centrifugal pumps though less efficient would be more economical. Furthermore they do not take such a large and expensive pump room as the plunger units and the amortization of, and interest on, that investment with reciprocating units is considerable. C. R. Smith, of the Layne Bowler Mine Pump Co., then described a deep-well pump for installation in a borehole.

All the sessions of the Open Forum on Thursday were under the chairmanship of J. C. Wilson, of the Ohio Brass Co. Dr. John H. Barr delivered an address on the

"History of Power Transmission" the outcome of careful investigation the world over into the early methods of transmitting power. These inquiries had been made by F. L. Morse and C. L. Saunders of the Morse Chain Co. The address was accompanied by several illustrations from wall paintings, book illustrations, sketches and even a stained-glass window.

J. H. Edwards desired to know what efficiency could be obtained with various kinds of drive. Mr. Wheeler said that with silent chains the efficiency lay between 97 and 99½ per cent and that with belt driving it was about 90 per cent when the belt was new and 10 to 15 per cent lower when the belt was old. He declared that a silent chain continued to give the same efficiency after a long period of use. These figures are for the chain and belt alone and not for the bearings, the resistance of the latter being an additional cause of power loss.

Mr. Day, of Falk Corporation, said that with best lubrication friction loss with herringbone gears was 0.25-0.5 per cent. With heavier lubrication the loss would be more, yet it might be advisable to provide such lubrication in actual practice. In the case of marine turbine gears the efficiency ran from 98.7 per cent down to 97.4 per cent. This included all losses both for the gears and the journals. The losses of power were approximately the same whatever the load; in consequence the proportion of losses fell as the ratio of load to full load increased.

Dr. Barr said that at Cornell it had been ascertained that with a silent-chain drive, the losses due to the friction of the chain and the journal friction were such as to give an efficiency of 98.7 per cent.

The Standardization Meeting held its fourth general session on Thursday under the chairmanship of Lucien Eaton, of the Cleveland-Cliffs Iron Co. W. A. Durgin, of the Division of Simplified Practice of the Department of Commerce, addressed the meeting, using lantern slides to illustrate his remarks. He said that the Committee on Waste of the Federated Engineering Societies had found that the industries investigated were only 49 per cent efficient. The engineers who made that report cut the inefficiency alleged from 51 to 40 per cent so as to be on the safe side. The Department of Commerce has decided that it will be safe in assuming that industry is at least 20 per cent inefficient.

With a production of \$50,000,000,000 of commodities per annum the loss must be \$10,000,000,000. Our tax bill is conceded to be crushing, but it totals only \$8,000,000,000. It could readily be met by savings in industry.

SIMPLIFYING BY ELIMINATION OF TYPES

Among the big losses is the great variety of articles made. Every manufacturer seems to pride himself on the variety of his line. He could just as well get out a few standard patterns and stick to these instead of evolving a new one every day.

What Mr. Hoover is trying to do is to hasten the process of standardization. He realizes that the word is not popular. No one wants to be standardized. The standardization movement has supplied the press with many striking subjects for jibes. Mr. Hoover proposes "simplification" instead of the older term. This word appears to be, and is, less scientific than standardization. Instead of inquiring definitely what is the best, he would immediately inquire what design sells best or at least is most sold and then make this the standard till inquiry experiment and discussion develop a better one. Mr. Durgin said that, for instance, the bowl seat for agri-

cultural implements and tractors was made in a multitude of forms, with slits and holes of various kinds and of many different shapes. Of all of them, however, one was most generally used, and the work of scientifically selecting the best was a job requiring much research as to the relation of the seat to anatomy, ventilation, to the difficulty of shaping and to many other matters. These problems were all answered by taking the seat most commonly used and adopting it at least as a temporary standard.

Albert W. Whitney, chairman of the Engineering Standards Committee, spoke on the necessity for standardization and pointed out that many variations in vegetable and animal life had been rudely blotted out by the processes of nature. The number of our fingers, our toes, our eyes, our nostrils and our teeth is standardized by the rude hand of evolution. He said all standardization did was to hasten the action which when it acted by evolution, as it did in business as in nature, was cruel and crude. Our needs were clear and we might as well recognize them early and satisfy them rather than wait and suffer in consequence.

Charles A. Mitke, chairman of the metal-mining branch of the Division of Standardization, who is recovering from typhoid fever at Long Beach, Cal., was not present but Colonel Warren R. Roberts, of the coal-mining branch, detailed the advances of standardization in every department of activity in America.

IS THE FIRE DOOR A MENACE?

At succeeding meetings of the conference several important reports were made and there was discussion in some of them. The most notable was on machine loaders, and this has been covered by *Coal Age* in the report of the main meeting. The matter of fire doors versus reversing fans was inadequately discussed but it was pointed out that most coal mines must be ventilated continuously or gas will accumulate. In a metal mine ventilation is not so necessary and may be suspended temporarily by the use of doors. In that case the use of fire doors shutting off a burning shaft would be helpful even with men in the mine, provided that a second shaft is available, which is not always true at metal mines. The dangers of doors was not considered, apparently because those present, except one or two, sided with Mr. Mitke in the belief that a fire door could be shut at any time and under any conditions without menace.

Coal Consumption by Utilities Heavy in August; Power Production Declines

Electric public-utility plants consumed 3,196,950 net tons of coal during August, according to a report just issued by the U. S. Geological Survey. This compares with 3,034,915 tons consumed during July, according to corrected returns.

Fuel oil consumed by public-utility plants in August totaled 1,233,584 barrels, compared with 1,174,562 barrels in July. The average daily production of electricity by public-utility power plants during August was 150,200,000 kw.-hr., which was a virtual return to the May and June rates, thus confirming the occurrence of the "July slump" for this year.

The average daily production of electricity for the first eight months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent; April, 149,100,000 kw.-hr., 39.9 per cent, and May, 150,100,000 kw.-hr., 41.3 per cent; June, 150,800,000 kw.-hr., 38.9 per cent; July, 146,400,000 kw.-hr., 36.6 per cent; August, 150,200,000 kw.-hr., 34.2 per cent.



Problems of Operating Men

Edited by
James T. Beard



Prevention of Mine Explosions An Unsolved Problem

Recurring Disasters Makes Problem of Prevention Most Important — Continued Study of Conditions May Reveal Causes as Yet Unknown

AGAIN, the daily press is burdened with accounts of recent mine explosions and other disasters. Reading of the great number of lives sacrificed and children left fatherless and reflecting on the frequency of such disasters, we cannot refrain from being appalled and discouraged by reason of our seeming impotency in respect to their prevention.

The most recent disaster, which occurred in the Kemmerer mine, in Wyoming, and in which 99 miners lost their lives, makes us wonder if these terrible happenings will ever cease and, if so, what will bring about their cessation. In the face of all that has been done to prevent such occurrences, it is not strange that we are discouraged by their continued recurrence.

Today, as a means for the protection of the lives of mine workers, we have a Federal Bureau of Mines and State Mining Departments with their staffs of inspectors and a great army of certified mine foremen and firebosses. Notwithstanding this, the question is uppermost in our minds as to whether miners, today, have any greater assurance of safety than they had a decade ago. This is not intended as a reflection on the work of these organizations, but merely to emphasize the meagerness of our knowledge of conditions that prevail and underlie the work of mining coal.

SEEMINGLY WE HAVE YET MUCH TO LEARN

Time after time writers in *Coal Age* have advanced practical suggestions in reference to reducing the number of explosions in mines. Safety rules have been formulated, but how far these are being followed by miners and mine officials it is impossible to say. All we know is that the danger is not removed and is as imminent today as at any period of the past.

The question comes home to all of us, Are there some things yet to be learned regarding the causes of explosions in mines? It is not so long ago that these were attributed exclusively to gas. Then, explosions occurred under conditions that made it plain that gas was not the sole cause. Evidence pointed to the presence of fine dust as being a factor responsible for the initiation and propagation of the destructive blast.

Investigation showed that some coal dust was inflammable to a greater degree than other dust and that the fineness of the dust was also a problem. It was discovered that, under favorable conditions, the presence of this fine dust was a menace to the safety of the mine and if subjected to a flame of sufficient intensity and volume there would result a disastrous explosion.

Just here, let me ask, if our investigations have stopped there? Besides gas and dust, are there no other causes or conditions that will make an explosion possible? In this connection, I can do no better than to quote from a former contribution I made to *Coal Age* in 1915, in discussing the question of "Preventing Mine Explosions." (Vol 8, p. 269.)

POSSIBLE FACTORS IN MINE EXPLOSIONS

At that time, I asked "How much do we know in regard to the effect of strong air currents and the greater or less amount of available oxygen in the mine air; and to what extent are these actual factors in the initiation of an explosion in a mine, as has often been suggested by (the late) John Verner, former mine inspector in Iowa? Again, do we thoroughly understand to what extent or in what way changes of temperature, barometric pressure and seismic disturbances create conditions favorable to explosions in the mine?"

Did we know and understand all the conditions and causes that initiate and propagate explosions in mines, we could then doubtless prescribe an effectual preventive. But, as long as conditions exist that are favorable to explosions and regarding which we know little or nothing, it will be difficult to reduce their number or safeguard our mines against such disasters.

That both gas and dust accumulated in mines will, under favorable conditions, be the means of producing a destructive explosion is well known today. We realize that these elements of themselves are harmless; but the danger lies in their coming in contact with a spark or flame of sufficient intensity to cause their ignition. Knowing this, we are forced to the conclusion that disasters in gassy and dusty mines can be eliminated, or at least reduced to a minimum by adequate ventilation and other preventive measures.

GREATER CARE NEEDED TO AVOID DISASTER

Precaution suggests safer methods of installing high-voltage electric wires in mines generating gas or dust. Such mines are not immune from danger when operated with open lights, however well they may be ventilated and safeguarded by efficient and vigilant mine officials. Sudden changes that are always possible, in roof conditions, may release a quantity of gas that would be extremely dangerous if the mine is not worked exclusively with safety lamps of an approved type.

In conclusion, let me say that, even if our knowledge of conditions and causes that invite explosions was complete and rules prescribed to make the mine safe, nothing would be accomplished unless the rules were strictly followed by every worker in the mine. The careless act of a single miner may cause the injury or death of many others, who become the innocent victims of his neglect or disregard for safety.

Forgetting that there are a large number of careless and indifferent men employed in mines, some of

whom think or care little about their own safety, I am inclined to think that we are too often ready to attach blame to mine officials when disasters occur. We must remember there are miners who are opposed to all rules and restrictions and who will violate them at the hazard of their own lives. No mine can be safe when such men are employed. The strict observance of rules by all employees is essential to safety and this is particularly true in mines generating gas and dust.

Dayton, Tenn.

JOHN ROSE,

Former District Mine Inspector.

Ventilating by Compressed Air

Accident caused by attempt to remove gas with compressed air—System unreliable as a means of ventilation—Fan required for efficiency.

AFTER reading carefully the various letters relating to the attempt of a fireboss to remove a body of gas, by means of compressed air, which have appeared in recent issues of *Coal Age*, I concluded there was much uncertainty in regard to the actual occurrence and the movements of the fireboss, who with the unfortunate pumpman lost his life as a result. The writer of the last letter on this subject, however, S. K. Mottishaw, *Coal Age*, Aug. 23, p. 289, I notice takes exactly the same stand as that taken in a previous letter, by John Rose. (Vol. 23, p. 978).

As remarked by Mr. Rose, if we take his assumption to be correct, "It was not only a most careless, but a highly foolish act for an experienced fireboss." With that conclusion I am in hearty accord. The blast from the high pressure air line striking the lamp, whether the latter was sitting on the floor or was carried by the fireboss, was certainly sufficient to force the lamp flame through the gauze and ignite the gas surrounding the lamp.

This incident is only one of many others that reveal the careless acts of some firebosses who, in spite of their experience and knowledge, persist in taking chances and doing things that they know are not warranted by the conditions about them. It does not always happen, however, that the one to blame pays the forfeit by the loss of his own life, as in this case.

NO RELIANCE ON AIR LINE FOR VENTILATION

Attention has already been drawn to the fact that the use of compressed air for the purpose of removing a body of gas is dangerous and should never be attempted. Where a mine is equipped for using compressed air for driving drills and coal cutters it is often the case that too much dependence is placed on tapping the air line for the purpose of ventilation. While the air exhausted by the machines is an unquestioned benefit and improves the ventilation of the place, no dependence should be placed on that as a means of ventilation.

It is well known that there are too many things to interrupt the continuous flow of the air from the pipes. The engine at the powerhouse is often stopped and started many times, during a twenty-four hour run. Again, there are numerous valves at different points on the pipe line and these are opened and closed, from time to time, which makes the system unreliable as a means of ventilation.

In closing, let me emphasize the point I wish to make that the sole dependence for efficient ventilation of a mine should be placed on the continuous operation of a suitable fan. While I do not wish to imply that the

use of safety lamps is not essential in mines generating gas, yet I consider that the operation of a good ventilating fan is even more important than the light question, in a gaseous mine. While I believe in the exclusive use of safety lamps in gas, my conviction is that the providing of good ventilation in all mines is of far greater importance.

R. W. LIGHTBURN.

Gans, Pa.

Improvement of Mining Law

Enforcement of existing laws more needful than making new ones—Status of mine foremen and firebosses—Responsibility under the law.

PERMIT me to endorse the reference made by F. C. Cornet in his letter, *Coal Age*, Aug. 9, p. 218, regarding the need of enforcing our present mining laws in making our mines safer for work. Mr. Cornet remarks, "Certainly it is not right to ask our legislators to make new laws for us so long as we fail to give a fair trial to those now on the statute books."

He advises caution in respect to making changes in present laws and the framing of new ones, claiming that too many or too stringent laws would hamper the industry without increasing the safety of mining. With him I believe that it is more important to enforce the laws we now have than to enact new laws that would probably prove no more effective in attaining the purpose sought.

POINT NEEDING REVISION IN PENNSYLVANIA LAW

In this respect I am speaking with reference to the Tennessee mining laws and the conditions that prevail in our own state. My knowledge of the mining laws in other states is not sufficient to permit me to judge regarding their need of revision, except it may be in a few particular instances that have come to my attention and which have a common bearing on the conditions of mining in all coal-producing states.

One such instance, which has been thoroughly discussed in the columns of *Coal Age*, illustrates the danger that may result from changing laws that have proved effectual in maintaining safe conditions in mines. I refer to that provision made in the Pennsylvania law that authorizes the mine operator to employ uncertified mine foremen and firebosses. It is not my intention to expand further on this point, however.

FEDERAL EMPLOYMENT OF FIREBOSSSES

Another question that was broadly discussed in *Coal Age*, not long since, had reference to the suggested employment of mine firebosses by the federal government, instead of by the operator or company whom they served. In this connection, let me say that, here in Tennessee, the duties of both mine foremen and firebosses are prescribed by the law, which holds them responsible for any negligence on their part although they are employed by the company operating the mine and not by the state.

Few will deny that the two most important and necessary qualifications of all firebosses are competency and honesty in respect to the performance of their duties. Possessing these qualifications, it goes without saying that they will make safe officials whether employed by a company or by the federal government. On the other hand, if a fireboss does not have these qualifications, he will prove an unsafe official and it matters not who employs him.

For my part, I have never been able to see how the

employment of firebosses, either by the state or the federal government, could make our mines safer than they are under the present system. One thing is certain, the scramble for state and federal appointments always involves the idea of patronage; and it is generally true that, the more incompetent an applicant for a position may be, the more he will rely on his political pull.

Since the man with the strongest pull is the one commonly chosen for the place, it is reasonable to conclude that the employment of firebosses by the state or federal government would mean the appointment of many incompetent men for this responsible position. In other words, the more incompetent and dishonest applicants would generally land the job and the lives of our miners would be endangered thereby.

Dayton, Tenn.

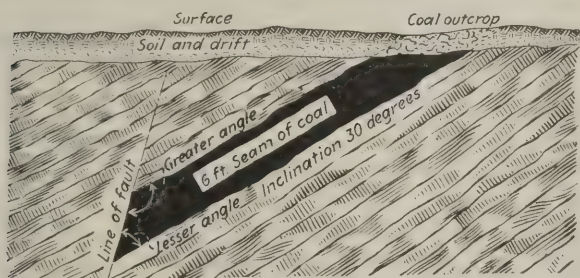
OBSERVER.

Dowthrow or Uptthrow, Which?

Hade of fault shows the fissure as having an inclination greater than that of the seam—Fault probably a dowthrow—Follow the lesser angle in the seam.

KINDLY permit me to refer to the inquiry that appeared in *Coal Age*, Vol. 23, p. 608, in which the inquirer stated that all efforts to find the coal beyond the fault had proved unavailing. If the hade of the fault line is rightly shown in the illustration given in the reply to this inquiry, I would say that the fault is undoubtedly a dowthrow.

By the "hade," I mean the angle that the fault line makes with the vertical. In this case, the fault line is shown as very steep and having an inclination greater than that of the seam. As stated in the reply made by the editor, I would follow the lesser angle in the seam, assuming the fault to be normal. As indi-



SEAM FAULTED ON A STEEP INCLINATION

cated in the accompanying figure, the lesser angle is at the floor and the fault, in my opinion, must be a dowthrow.

Some time ago, I remember, a writer, who discussed the question of finding the coal beyond a fault, stated that the deflection of the cleavage lines, in the seam at the fault, always pointed in the opposite direction from that in which the displacement had taken place. He said that if the deflection was upward the fault was a dowthrow; and, *vice versa*, if downward, the fault would be an uptthrow.

In spite of his claims that he has many times observed this to be the case, I want to say my experience is quite to the contrary, and I believe most mining men will agree that the bending downward or upward of the strata, in proximity to a fault, or any observed change in the inclination of the seam, is generally a fair index of the direction taken by the slip.

Linton, Ind.

W. H. LUXTON.

Inquiries Of General Interest

Weight and Percent of Screenings, Pittsburgh Run-of-Mine Coal

Specific Gravity and Weight of Coal Varies
—Average Weight of Prepared Run-of-Mine
Coal — Estimated Percentage of Screenings

HAVING in mind making certain changes in our tippie arrangements at the mine, I am particularly desirous of obtaining reliable information on two points in respect to No. 8 Pittsburgh Run-of-Mine coal of a highly volatile character. First, what is the average weight of this class of coal per cubic yard? Second, what average percentage of screenings may be expected to pass through the screen when the rods are spaced one inch apart, which is the arrangement I plan to make, believing it will be of advantage?

The data I have been collecting, for some time past, shows considerable variation and makes me anxious to learn facts that will be more reliable.

OPERATOR.

Akron, O.

At our request, A. F. Brosky, Pittsburgh editor of *Coal Age*, has given this matter close attention and sends the following information as being the most reliable:

The specific gravity of the coal forming the Pittsburgh seam, sometimes known as the "No. 8 seam," varies between the limits of 1.28 and 1.41. Taking the lower estimate, coal having a specific gravity of 1.28 will weigh, per cubic yard in the solid, $27(1.28 \times 62.5) = 2,160$ lb. Again, coal having a specific gravity of 1.41 will weigh, per cubic yard in the solid, $27(1.41 \times 62.5) = 2,380$ lb.

Observation and inquiry show that a fair average for this seam, in the Pittsburgh district and Ohio, may be taken as 1.31. This average specific gravity would make the weight of a cubic yard of the coal in the solid $27(1.31 \times 62.5) =$ say 2,210 lb.

Reports from various sources in the district show that the average weight of prepared run-of-mine coal (lump, nut and slack) of this class is about 1,300 lb. per cubic yard. We must bear in mind, however, that the particular character of the coal and the method of shooting, which vary in different localities where this seam is worked, will necessarily cause a considerable variation from this estimated average weight. Reliable figures, in any particular case, can only be reached by a careful consideration of both the hardness of the coal and the method of its extraction.

The foregoing remarks apply equally to the quantitative measure of screenings, in the handling of the coal in its preparation for the market. The character of the Pittsburgh seam and the hardness of the coal depend entirely on the location of the mine. Also, the manner in which the coal is mined will cause considerable variation in the relative proportions of lump, fine coal and slack.

A careful survey of the entire territory where this seam is mined justifies the statement that, under aver-

age conditions, from 35 to 40 per cent of the coal coming from the mine will pass through a 1-in. screen. Both the inclination and length of the screen bars, as well as the spacing of the bars apart, affect the percentage of screenings.

It is quite unusual to find the screen bars spaced one inch apart, the common custom being to use either $\frac{3}{4}$ -in. or $1\frac{1}{4}$ -in. spacing of the bars. Reports show that from 40 to 50 per cent of screenings pass through bars $1\frac{1}{4}$ in. apart; while from 25 to 35 per cent of screenings pass through bars $\frac{3}{4}$ in. apart. By interpolation, we estimate that bars 1 in. apart will produce from 35 to 40 per cent of screenings.

Examination Questions Answered

Examination, for Mine Foremen Olympia, Wash., Aug. 1, 1923

(Selected 1st-Class Questions)

QUESTION—*What are the regulations, in the state mine law, in regard to the inspection of a mine by the fireboss? What report is he required to make and what information should the report contain if gas is found?*

ANSWER—The state mining law of Washington (Sec. 33) requires the appointment of a fireboss, in every mine where inflammable gas has been found within a period of twelve months, or where spontaneous combustion occurs. The law further specifies that the fireboss so appointed shall inspect all working places within three hours of the time for commencing work, using for the purpose an approved safety lamp. The law also (Sec. 34) forbids workmen entering a mine where firebosses are employed, until the mine has been examined and reported safe for work.

Each fireboss (Sec. 115) must make a report of his examination on a bulletin board provided for that purpose at the entrance of the mine, indicating each place where gas is found and stating that all other places are clear of gas. This must be done before permitting the men to enter the mine. The fireboss must also immediately make a written report, in ink, in a book kept for that purpose in the mine office on the surface. His report must show the time of the inspection, the cause of any danger found and the steps taken for its removal. Where gas has been found, the report must state approximately the estimated amount. Every place where gas is found must be re-examined before men are permitted to enter for work. Removing gas by brushing, which is a common practice among many of the old miners, is forbidden by law.

QUESTION—*What are your views in regard to using mixed lights in a mine generating explosive gas?*

ANSWER—Where a mine is generating gas, in any section, in quantity requiring the use of safety lamps, no open lights should be used in any portion of the mine. In other words, the safest practice is to require the exclusive use of safety lamps or electric cap lamps. There is always danger in permitting the use of mixed lights in such mines.

QUESTION—*What does the mine law require in regard to electric locomotives operated by a trolley wire in a gaseous mine?*

ANSWER—The law (Sec. 155) forbids the use of electric locomotives operated by a trolley wire in any portion of a mine generating gas, except on the intake air.

QUESTION—*What is the maximum potential that can be used in a trolley system underground; and what does the law say in regard to trolley systems installed after passage of the law?*

ANSWER—The same section of the law (Sec. 155) limits the potential used in a trolley system underground, to medium voltage; provided, however, that all installations made after the passage of the Act and where the power is not taken from a station supplying power to a mine in operation previous to the Act, the potential is limited to low voltage.

QUESTION—*State the conditions under which mine explosions are most frequently produced. In what way do various kinds of coal dust influence the character of the explosion?*

ANSWER—Mine explosions are more common in mines generating considerable quantities of gas or dust and where adequate measures are not taken to prevent undue accumulations of these elements of danger. This includes all mines generating gas and deficient in ventilation; and all dusty mines where proper precautions are not taken to prevent the accumulation of fine dust and its suspension in the mine air. Strict rules and regulations must be enforced regulating the blasting of the coal, the kind of explosive used, amount of charge and manner of tamping and firing the shots to safeguard such mines against explosions.

The inflammability of the coal and the fineness of the dust are the chief factors that determine the danger and influence the character of the explosion, should one occur. Every possible means should be employed to prevent the accumulation and distribution of the dust and its suspension in the air where it becomes highly explosive.

QUESTION—*At mines that require the use of safety lamps, what type of lamp does the law require? What regulations does the mine law require where safety lamps are used?*

ANSWER—The mine law of Washington (Sec. 131) forbids the use of any lamp other than a magnetic-locked safety lamp, or an electric lamp, except by superintendents, shotlighters or other certified men, who may use such lamps as are approved by the mine inspector of the district.

The same section requires that all lamps used shall be the property of the owner of the mine. Every lamp must be examined by a competent person appointed for that purpose, immediately before the lamp is taken into the mine. No lamp may be used until so examined and found to be safe, clean and securely locked. The law forbids (Sec. 132) the use of open lights in any section of a mine requiring the use of safety lamps; and (Sec. 133) makes it a misdemeanor, punishable by a fine of not less than \$50 or more than \$200, or imprisonment for a term of not more than one year, if any unauthorized person is found opening or tampering with a safety lamp or having matches or other lighting device. The law provides, however, (Sec. 135) that an operator may appeal from the decision of a mine inspector to place a mine on safety lamps when he considers such order unreasonable, the appeal to be made to the mining board and their decision to be final.

Coal Commission Report on Labor Turnover In Bituminous Coal Fields Shows

Industry's Turnover as a Whole Not Unusually High Though Excessive in Some Districts

Labor Most Unstable in Non-Union Fields—Replacement Lower
Among Machine Miners Than Among Pick Miners and Loaders—
Movement of Outside Day Men Exceeds That of Inside Day Men

The study of Labor Turnover in the Bituminous Coal Mines of the Country for 1921 shows all varieties and extremes when looked at mine by mine and district by district. The study has shown percentages ranging from 7 per cent in a sizable mine in northern Ohio to 459 per cent for another in northeastern Kentucky. It has shown contracts for districts ranging from 30 per cent for Michigan to 224 per cent for the Kenova-Thacker region of West Virginia. For the country as a whole the degree of turnover for the industry does not appear to be greater than that which is accepted as the common experience of industries generally. The result for the 691 mines studied for the year 1921 are as follows: Total average on rolls, 122,048; all separations from rolls, 121,840; turnover percentage, 99.9.

As was pointed out in the report on turnover in the anthracite industry this does not differ greatly, and in fact is less than the experience of industrial concerns during 1913-14 and 1917-18. Brissenden and Frankel* in their study of turnover in some 160 varying concerns found an average for 1913-14 of 115 per cent. For 1917-18, a war-time year, the turnover average they found was 180 per cent. Their tables show that it was uniformly the experience for larger employers to have the lesser rate of turnover. For concerns employing under 1,000, which are more comparable in size to coal mines, the 1913-14 average for 29 concerns was 146 per cent and the 1917-18 average for 67 concerns, 221 per cent.

The anthracite report also gave the turnover percentages from a 1921 study of 11 industrial establishments in Philadelphia, made by the Industrial Research Department of the Wharton School of the University of Pennsylvania. The turnover percentages for these were as follows: 22, 36, 41, 59, 64, 110, 66, 140, 145 and 183.

The general experience of the bituminous industry in 1921 does not differ greatly from that of the anthracite industry during the same year. The median percentages for the three anthracite districts were as follows: Lehigh, 55; Schuylkill, 115; Wyoming, 100. The average for the three districts would not be far from the 1921 figures for the bituminous industry since Lehigh, though it has the least turnover, is much the smallest of the anthracite districts.

TURNOVER OF LESS THAN 50 PER CENT SATISFACTORY

However, most progressive industrial establishments giving attention to the costs of labor turnover are not content with seeing a 100-per cent per annum figure. A certain amount of labor turnover undoubtedly is healthful to an organization, but it would seem that there is somewhere, though unestablished, a point of stability that lends to the greatest productiveness. Concerns maintaining a turnover percentage less than 50 per cent consider that a most satisfactory figure.

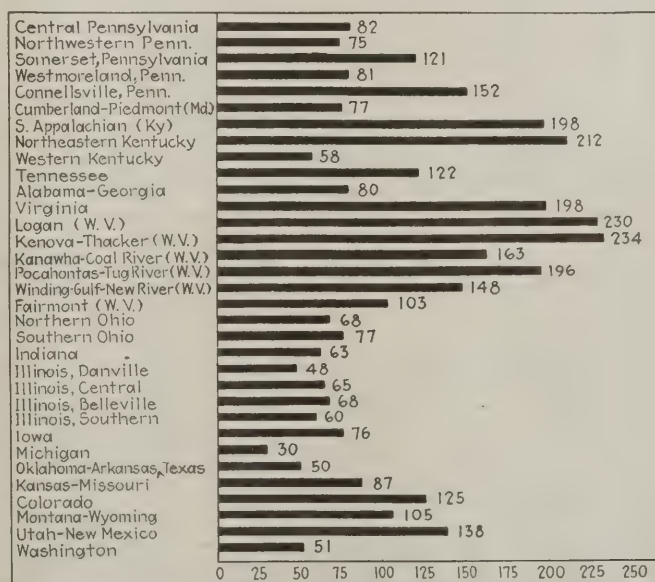
Table I shows the labor turnover in each of the 33 bituminous coal districts. This table and the accompanying diagram give a graphic picture of the variance in turnover percentages for districts. They show an astonishing contrast in the percentages for districts recognizably union and non-union. The non-union districts are uniformly much higher in turnover percentages than the unionized districts.

For purposes of reference the following lists of the dominantly union, dominantly non-union and equally mixed or balanced districts are given. These were the conditions as of the year 1921, at least so far as the mine representation in the tables of this study show.

Non-Union	Mixed	Union
Somerset (Pa.).....	New River-Winding...	Central Pennsylvania
Westmoreland, (Pa.).....	Gulf (W. Va.)	N. W. Pennsylvania
Connellsville (Pa.).....	Tennessee....	Panhandle-Fairmont (W. Va.)
Cumberland-Piedmont (Md.).....		Kanawha-Coal River (W. Va.)
Logan (W. Va.).....		Northern Ohio
Kenova-Thacker (W. Va.).....		Southern Ohio
Pocahontas-Tug River (W. Va.).....		Indiana
Virginia.....		Michigan
Northeastern Kentucky.....		Illinois—Danville
So. Appalachian (Ky.).....		Illinois—Central
Alabama-Georgia.....		Illinois—Belleville
Utah-New Mexico.....		Illinois—Southern
Colorado.....		Western Kentucky
		Iowa
		Kansas, Missouri
		Oklahoma, Arkansas, Texas
		Montana, Wyoming
		Washington

The graphic contrast which the chart shows on the union and non-union districts is subject to a variety of explanation. It would appear on the face of it that the non-union districts undergo an alarming instability. The causes probably are many. In the first place it seems reasonable to presume that unionized districts lend security of jobs to miners. That is, discharge is most uncommon in unionized mines, because of involved union protection.

The opinion of some non-union operators is that the men move quickly if work becomes slack and there is the faintest rumor of work elsewhere. The shifting rates of pay, from mine to mine, probably induce some of this movement among workers, seeking the best rate or the best working advantages. In any event, such high rates of turnover as exist in some of the non-union districts are certainly unhealthy from a managerial point of view. If organiza-



COMPARISON OF LABOR TURNOVER PERCENTAGES IN 33
BITUMINOUS COAL-MINING DISTRICTS IN 1921

*"Labor Turnover in Industry," (MacMillan, 1922.)

TABLE I—COMPARISON OF SEPARATIONS, ACCESSIONS, AND STABLE WORK FORCE FOR 33 BITUMINOUS DISTRICTS IN 1921

District	No. of Mines	Average		All		Total		Stable	
		No. on the Roll	Per Cent	No. on the Roll	Per Cent	No. on the Roll	Per Cent	No. on the Roll	Per Cent
1 Central Pennsylvania	50	11,431	9,408	82	10,808	95	6,638	58	
5 Northwestern Penna.	40	8,612	6,429	75	8,503	99	4,784	56	
2 Somerset (Pa.)	23	3,086	3,750	121	3,883	126	1,480	48	
3 Westmoreland (Pa.)	36	6,436	5,246	81	6,044	94	3,858	60	
4 Connellsville (Pa.)	23	4,097	6,212	152	6,864	167	1,704	42	
6 Cumberland-Piedmont (Md.)	28	2,974	2,303	77	2,601	87	1,683	57	
15 So. Appalachian (Ky.)	9	1,108	2,196	198	2,428	219	367	33	
14 Northeastern Ky.	32	3,891	8,263	212	7,372	189	1,439	37	
26 Western Kentucky	13	2,381	1,383	58	1,817	76	1,232	51	
16 Tennessee	13	2,556	3,130	122	2,844	111	1,298	51	
17 Alabama-Georgia	17	5,051	4,051	80	3,958	78	3,011	60	
13 Virginia	13	2,485	4,923	198	4,343	175	995	40	
9 Logan (W. Va.)	10	1,286	2,953	230	3,227	251	315	25	
10 Kenova-Thacker (W. Va.)	5	599	1,401	234	1,570	262	114	19	
8 Kanawha-Coal River (W. Va.)	22	3,036	4,956	163	5,203	171	1,172	39	
12 Pocahontas-Tug River (W. Va.)	12	2,434	4,770	196	4,875	200	786	32	
11 Winding-Gulf-New River (W. Va.)	10	1,814	2,684	148	2,813	155	840	46	
7 Panhandle-Fairmont (W. Va.)	64	6,904	7,115	102	7,642	111	3,452	50	
19 Northern Ohio	33	5,252	3,591	68	4,137	79	3,222	61	
20 Southern Ohio	12	1,711	1,320	77	1,648	96	993	58	
21 Indiana	33	7,602	4,768	63	5,874	77	4,552	60	
22 Illinois—Danville	11	3,394	1,611	48	1,945	57	2,336	69	
23 Illinois—Central	9	3,105	2,002	65	2,263	73	2,003	65	
24 Illinois—Belleville	12	3,558	2,428	68	2,906	82	2,266	64	
25 Illinois—Southern	14	3,409	2,036	60	2,253	66	2,247	66	
27 Iowa	31	5,614	4,279	76	4,498	80	3,232	58	
18 Michigan	6	874	265	30	268	31	719	82	
29 Oklahoma, Arkansas, Texas	12	1,665	826	50	1,036	62	1,098	66	
14 Kansas-Missouri	28	2,378	2,072	87	1,769	74	1,361	57	
32 Colorado	42	6,178	7,746	125	7,816	126	2,773	45	
30 Montana-Wyoming	22	3,804	3,998	105	4,421	116	1,981	52	
31 Utah-New Mexico	14	2,330	3,221	138	3,044	131	955	41	
23 Washington	6	993	504	51	696	70	652	66	

tion morale, familiarity with the establishment, and settled community make-up have any value, the waste is certainly high in such districts as Logan, where but 25 per cent of the mine work force is stable or steady throughout the year, and the turnover runs up to 230 per cent per annum.

The mixed union-non-union districts of Tennessee and New River-Winding Gulf (W. Va.) present a peculiar contrast to the extremes of the union and non-union districts. The turnover percentage in Tennessee is shown as 122, and that of New River-Winding Gulf, 148. One non-union district has a lesser percentage than Tennessee and four less than New River-Winding Gulf. No union districts have higher percentages than these two. Within the districts, however, there do not appear to be any marked differences in the experience of non-union and union mines.

Comparison of the percentage of stable or steady workers in the various districts, of course, bears a definite relationship to the turnover. As turnover increases, stable workers customarily decrease. It is therefore true that the union districts are more stable than the non-union. The actual range of stability is from 19 per cent for workers in the Kenova-Thacker district in West Virginia to 82 per cent for Michigan. The case of Michigan's unusual stability could perhaps be explained by the possibility that there is no competitive field of industry which would tempt these workers. In other words, it may be that there is no place for them to go if they decide to leave these mines.

The range of stability in the recognizable non-union districts is from 19 per cent for Kenova-Thacker to 60 per cent for Westmoreland in Pennsylvania. The range of stability for the union districts is from 50 per cent for Fairmont (W. Va.) to 82 per cent for Michigan.

Some comment should be made on the Westmoreland district because it stands out among the non-union areas with a high degree of stability among workers and a comparatively low rate of turnover. Westmoreland has a turnover percentage of 81, as contrasted with the 121 per cent for Somerset and 152 per cent for Connellsville, the other two non-union Pennsylvania districts. Its percentage of stable workers is 60, as compared to 48 per cent for Somerset and 42 per cent for Connellsville. There is nothing in the Commission's data to particularly account for this contrast.

The study has shown some contrasts in the turnover

among the occupational groups. For the 691 mines covered the percentages of turnover for the five occupational groups are as follows:

	Average No. on Rolls	Total Separations	Turnover Per Cent
Machine miners	5,171	3,916	75.7
Pick miners	30,807	29,763	96.6
Loaders	39,891	43,825	109.8
Inside day men	30,874	28,534	92.4
Outside day men	14,646	15,032	102.6

The lowness of the figure for the machine miners may be explained by the fact that this is preferred work and that earnings probably are better in this group. The loaders perhaps have the hardest task in mining, and this would explain in a degree the higher rate in this group. Some surprise may be occasioned by the fact that the turnover is greater among outside day men than among inside day men. It has been something of a popular belief that men preferred to work above ground. This 10 point difference is not explainable from data available. It is of interest to note that the median percentage of stability in the 33 districts is 59 for inside day men and 65 for outside day men.

Table II shows the turnover percentages on the occupational groups in each district. It bears out in a degree what is noted as particularly true of occupational groups in tables 1-66 [accompanying the report] for individual mines in districts, i.e., that where the turnover is high in one group, it is as a rule, uniformly high in the others.

TABLE II—PERCENTAGE COMPARISON OF LABOR TURNOVER BY OCCUPATIONAL GROUPS IN 33 BITUMINOUS DISTRICTS, 1921

District	Pick Miners	Machine Miners	Loaders	Inside Day Men	Outside Day Men
Central Pennsylvania	108	59	86	57	74
Northwestern Pennsylvania	78	52	87	54	61
Somerset (Pa.)	124	104	152	96	97
Westmoreland (Pa.)	80	49	105	61	78
Connellsville (Pa.)	168	152	201	111	137
Cumberland-Piedmont (Md.)	79	...	111	61	89
So. Appalachian (Ky.)	294	124	229	179	206
Northeastern Kentucky	280	97	226	203	199
Western Kentucky	101	35	52	68	56
Tennessee	116	163	176	67	116
Alabama-Georgia	75	51	76	82	97
Virginia	157	122	198	177	279
Logan (W. Va.)	295	209	213	232	271
Kenova-Thacker (W. Va.)	300	270	220	249	221
Kanawha-Coal River (W. Va.)	140	86	190	156	136
Pocahontas-Tug River (W. Va.)	137	190	233	192	175
Winding Gulf-New River (W. Va.)	234	150	134	154	138
Fairmont (W. Va.)	108	98	116	86	98
Northern Ohio	33	46	73	65	64
Southern Ohio	...	48	90	62	49
Indiana	53	50	55	76	100
Illinois—Danville	64	36	33	41	44
Illinois—Central	68	35	61	76	49
Illinois—Belleville	68	48	69	82	40
Illinois—Southern	60	59	73	53	28
Iowa	79	92	76	71	76
Michigan	11	22	28	36	37
Oklahoma, Arkansas, Texas	51	94	62	38	49
Kansas-Missouri	97	40	98	64	66
Colorado	129	123	163	87	122
Montana-Wyoming	131	57	100	87	88
Utah-New Mexico	163	61	143	123	110
Washington	51	0	50	41	59

It should be understood that the tables and data presented herein have been subjected only to a limited analysis and interpretation to meet the broader purposes of the Commission. The study has shown chiefly these things:

(1) That the turnover for the industry as a whole is not remarkably high, as compared with other industries, although it is excessive in some districts.

(2) That for various reasons labor is much more unstable in non-union districts than union districts.

(3) That in mixed non-union and union districts the turnover percentage occupies a middle point between the extremes of the other two.

(4) That the turnover among machine miners is noticeably lower than that for the other two tonnage worker groups, pick miners and loaders.

(5) That the turnover is higher among outside day men than among inside day men, although the stability is greater in the first group.

Basix for Bituminous Study.—In undertaking the study of labor turnover in the coal industry, the desirability of making a current survey in the field was immediately considered. This would of course have permitted a checking

of the number of men having employment in mines and permitted some opportunities for ascertaining reasons for leaving and thereby the relative cause of turnover. But considering the extent of the industry and the vast number of mines, a field study was believed impracticable. The expense involved and the seeming absence of any administrative machinery in the mines themselves to do or assist in such work, put this out of consideration.

It was therefore determined that the study be made from that data which the Commission had available in the form of earnings reports on miners for the year 1921. This data consisted of schedules submitted by individual mines, showing by pay periods the earnings, days worked, etc., for each miner on a payroll during the year. It amounted to a draft of mine payroll for that year. The schedule used was known as Form L1. It possessed information sufficient to show separations from employment, complete separations or disappearances for the year, re-employments, and new hirings. It also, by a count of the full-year service men, furnished the number of the stable force, and likewise the number of men who were unstable. In addition it permitted a tabulation of the new men hired after the beginning of the year, and a tracing of the service of these men furnished the number of new hires who remained steadily at work until the end of the year.

Having these primary totals for computing turnover and its allied personnel data, the next question arising was what figure should be used as a basis for arriving at the turnover percentage.

BASIS FOR ARRIVING AT TURNOVER PERCENTAGES

The average number in attendance, a number obtained by taking the total man days worked and dividing it by the number mine days worked, was considered and a fairly accurate figure could be obtained for tonnage workers, i.e., pick miners, machine miners and loaders. But the outside and inside day workers had overtime lumped with regular time so that no accurate figure could be obtained. The reports showed many day workers as employed more days than the mine worked within a period.

It was finally decided that the average number on the roll for all pay periods worked would be employed. This figure was obtained by taking the total number of "man-pay" periods worked and dividing it by the number of pay periods the mine worked. This method took care of the men who worked a short time and gave full weight to the full-year workers.

The final question was the decision on what should constitute a "separation" or exit, the determining factor in computing the amount of turnover. Because of the irregularity of the industry and the fact that the schedules showed the movement of men largely in the time unit of the pay period it was decided that a disappearance of a man's name from the payroll (schedule) for one month (two consecutive pay periods) or more would constitute a separation. In addition this was a liberal interpretation likely to correct any errors of judgment on a lesser time allowance.

Thus, having defined the terms there were a few other questions which required answer. One was that regarding mines which worked only a part of the year. The conclusion here was that wherever a mine suspended operation for one or more pay periods (two weeks or longer) those idle periods would be disregarded. For example, employees who reappeared after a shutdown were considered as having been steadily employed. If they did not reappear they were counted as exits or separations. In this connection it was determined that mines operating less than 10 pay periods would not be considered in the tabulation. There was not a great amount of rejections on this account.

It was questionable whether the turnover might not be seriously affected in those mines where frequent suspensions or shutdowns occurred, or where few pay periods were worked. As the study developed it was found that with the two-pay-period separation as a basis for turnover little or no difference was noted between mines in one district working many pay periods and those in another working but few.

The actual tabulation became fairly simple after a code of checks was perfected and clerks' errors were detected

easily, owing to the form of the tabulation record. For example, there could not be more unstable men than separations, or more "new men hired on the roll Dec. 31" than there were total "new men hired." The re-employments added to the complete separations or disappearances gave the total number of separations or exits, etc.

It is the prevalent custom both in bituminous and anthracite mines to pay miners semi-monthly. Here and there occasional mines pay monthly and some pay bi-weekly as differentiated from the semi-monthly practice. But these differences did not prevent uniform interpretation of "separations."

The method of districting the bituminous coal areas was arrived at by taking a simple consolidation of a geologic and trade districting developed by the U. S. Geological Survey. It is felt that the districts are easily identifiable for the purposes of this report.

It was the original desire to secure at least a 50 per cent representation of the mines in each district. This was possible for some districts, but for others, which were uniformly late in submitting their schedules to the commission, this delay and the pressure of time prevented a greater representation. This means that in some sections in West Virginia, such as Logan and Kenova-Thacker, and the eastern section of Kentucky a more adequate representation is to be desired. Actually the study has covered approximately one-fourth of the first-rate mines in the bituminous industry.

This study was made possible in its extensiveness through the use of data which Miss Anne Bezanson collected primarily for the purpose of the study of earnings, which lent itself to the needs of a turnover study, which has been made by Delos Walker. The plan and method of the turnover study was mainly due to the interest and attention which Dr. J. H. Willits and Miss Bezanson gave to it at its inception and during the course of its development. The actual work of tabulation and compilation was immediately in charge of Miss Elizabeth B. Lundy.

Brydon Committee Reaffirms Labor Policy; Recommends Advisory Board to Wadleigh

In recognition of the valuable services rendered the coal industry by the Bituminous Operators' Special Committee, its entire personnel has been included in a sub-committee of what has been the policy committee of the National Coal Association. The policy committee, however, will drop that name and will assume that of the Bituminous Operators' Special Committee. In this reorganized form, the committee, at its meeting held Oct. 9 in New York, adopted a resolution which reads as follows:

"Resolved, that this committee fully endorses and reaffirms the principles laid down by the Bituminous Operators' Special Committee in its statement on labor relations made to the U. S. Coal Commission under date of Nov. 10, 1922. The members of this committee believe such difficulties as exist in the coal industry to be due primarily to the following elements:

"(1) The monopolistic control of mine labor by absentee union officials.

"(2) Nation-wide as well as local strikes brought about by an irresponsible and autocratic organization.

"(3) Appeals by agitators and propaganda designed to breed dissatisfaction and create unrest among the people at large.

"We believe further that the following basic principles cannot be ignored:

"That every man has a right to work without interference or compulsion; when, for whom and upon such terms as he may see fit.

"That, while the right of workers to organize for legitimate purposes cannot be denied, such organizations have no right to impede or restrain those who do not care to join or to deal with them.

"That the right of private property is, and must remain, inviolable.

"That, in the last resolve, the law of supply and demand always will determine prices; that no legislation long can interfere with this inexorable rule; that any interference can be justified only, if at all, in time of war and that at any other time such interference inevitably will produce greater evils than those which it seeks to suppress.

"Be it further resolved that the National Coal Association, and its officers as such, refrain from taking any part, directly or indirectly, in the negotiation of a wage scale, in general or by districts, in any of the union or non-union bituminous-coal fields of the United States.

"Resolved, further, that all the data and statistics now in the possession of the National Coal Association, as a result of the work of the Bituminous Operators' Special Committee, compiled and in process of compilation, shall be placed at the disposal of every bituminous operator or group of bituminous operators in the United States, except information furnished with the understanding that it is to be held confidential."

Before the foregoing action was taken, J. C. Brydon addressed the committee. Among other things, he said:

"My experience as chairman of the Bituminous Operators' Special Committee naturally and necessarily placed me in touch with many coal operators. I found some who thought the National Coal Association could not continue to function without definitely recognizing the major problem of the industry, the problem of labor. Their minds were not clear as to how the problem should be taken up or as to the action which should be taken with respect to it. There was no crystallized thought on the subject. On the other hand, there are operators who feel that the National Coal Association should have nothing to do with labor matters.

"In my opinion, labor is the major problem, but there are legislative problems and many other important matters with which to deal. It was to meet such a situation that this committee was created to secure the common judgment of the industry. Its membership includes operators within and without the National Coal Association. Its membership is divided evenly as between so-called union and non-union operators. Its members are so located geographically as to be representative of the country's production.

"This committee will not, and cannot, usurp the functions of the board of directors of the National Coal Association. I am sure I bespeak the thought of the membership of that association when I say that this committee can be very helpful. There will be times when matters of policy that affect the entire industry must be considered. At other times, only sections of the industry will be affected, but in either event the counsel and advice of this committee will be representative of the entire industry.

"It was helpful many times that the Bituminous Operators' Special Committee had a broader sphere of action than did the National Coal Association. I can foresee that such may be the case with the new committee.

"The Special Committee leaves a legacy of information and statistics gathered from every bituminous field in the country. Never before was such an array of facts and figures available to those who must make the industry's case. This information in the form of final compilations which are being made will be available to any operator or group of operators, excepting of course the confidential information which was entrusted to the committee."

A committee composed of the presidents of the National Coal Association, the American Wholesale Coal Association and the National Retail Coal Dealers' Association was recommended to F. R. Wadleigh by the Bituminous Operators' Special Committee in response to his request for a suggestion as to what sort of advisory committee should be created to co-operate with the Department of Commerce on coal matters.

JOHN L. LEWIS, president of the United Mine Workers of America, has accepted the presidency of a co-operative labor bank which will open in Indianapolis about Jan. 1, with a capitalization of almost \$1,000,000. Election of officers of the bank, to be known as the United Labor Bank & Trust Co., is to take place at the end of this month. A number of other unions, as well as that of the miners, are participating in the formation of the bank, it is announced.

THE U. S. SUPREME COURT on Oct. 10 issued a rule upon the Corona Coal Co. to show cause why the appeal in its case against the United States should not be dismissed. The case involves the basis of settlement for coal requisitioned by the Railroad Administration.

Iron and Steel Electrical Engineers' Meeting And Exhibition Well Attended

The annual convention of the Association of Iron and Steel Electrical Engineers at Buffalo, N. Y., Sept. 24-28, was the most successful in the history of the organization. This year the convention was held jointly with an exposition by more than a hundred manufacturers of electrical and mechanical machinery. Much of this equipment covered electric transmission, power drives, material handling and transporting machinery, pumping, control apparatus, power-plant accessories, together with steel-mill production apparatus. Many of these exhibits included operation and demonstration of the equipment.

The attendance, as reported by the association secretary, John F. Kelly, showed about 1,200 members present, a large proportion of the membership, which includes many coal-mining men who found both the exhibit and convention of great interest and value.

At the first day's session Walter C. Kennedy made an interesting survey of the rapid increase in the application of electric equipment. The saving in cost of attendance, maintenance and repairs in many instances has done much to further the application of electric equipment in the steel mill as also in coal mining.

The discussion on the work of the special bearing committee showed that there is an increasing desire on the part of those who have used ball- and roller-bearing motors to work out their problems with the manufacturers with a view toward standardizing on a range of fifteen different sizes of bearings for motors up to 100 hp.

The paper on "Motor Operated Centrifugal Pumps" brought out considerable discussion on the subject of overloading the motor when the pump operates at heads less than that for which the pump was originally intended. By using a 40-deg. rated motor it was shown that damage to the motor was more remote at low heads than when the pump was driven by a 50-deg. rated motor.

In the paper on "Economical Use of Fuel" H. C. Siebert gave examples showing that the average boiler plant operated at an efficiency of 50 per cent whereas it should be 80 per cent by the use of more efficient boilers and regulation and control of the fuel used.

The paper on "Tempering of Coal," by Thomas A. Marsh, gave results obtained by moistening coal before burning. The advantages claimed were: Less holes in the fire bed, higher combustion rates, less ash and less excess air. Interesting conclusions gathered from questionnaires, however, showed that although moistening coal is in general desirable it should be done only after careful study, as too much moisture or moisture added in stoker hoppers does not bring about the desired results.

"High-Pressure Steam Boilers" was the title of a paper by Dr. D. S. Jacobus, in which he showed how the superheating of steam was controlled by placing the reheater above the upper deck of boiler tubes and provided with a damper.

Thursday evening a banquet and dance was held at the new Hotel Statler. After the banquet announcement was made of the following officers for the coming year: President, R. S. Shoemaker, superintendent of maintenance, American Rolling Mills Co., Middletown, Ohio; Secretary, John F. Kelley, Pittsburgh, Pa.; Treasurer, James Farrington, Steubenville, Ohio.

Owing to the broadening of the field of the society, a suggestion has been made to change the name of the society to Iron and Steel Engineers. Action on this question will no doubt be given consideration at future meetings of the society and its branches.

THE INTERSTATE COMMERCE COMMISSION will continue its investigation of anthracite rates at hearings at Augusta, Me., Oct. 29; Montpelier, Vt., Oct. 31; Boston, Nov. 2; Albany, Nov. 5; Rochester, Nov. 7; New York City Nov. 9, and Philadelphia, Nov. 13. The commission's inquiry has been undertaken at the recommendation of the U. S. Coal Commission. A preliminary hearing was held last month at Pittsburgh.

Sees Non-Union Producers in Commanding Position as Result of Rigid Wage Agreement in Union Fields

Closing of Lake Season on Heels of Resumption of Anthracite Mining Expected to Be Depressing Factors to Organized Mines—Union Operators Unlikely to Be Able to Grant Increase or Fight Union

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

Never before in the history of coal mining in America have the non-union coal operators been in as strong position as they are today. Even with the large number of non-union mines that have been opened during and since the war period, the depression which is slowly and surely settling around the coal business is bringing no gloom to the non-union territory. The operators there are buoyant because the next six months promise to be a succession of great field days for them. The union fields are tied, hand and foot, with an inflexible wage agreement. The Lake movement will be over soon, robbing portions of the union territory of much of the vitality that it still possesses. It now is apparent that the demand for bituminous coal to take care of the requirements of those who are unable to get anthracite will be small indeed. In fact the saturation point in anthracite will have been reached before many weeks have passed. Bituminous coal stocks are heavy—ten million tons more than those on hand during the corresponding period before the 1922 strike.

In the face of a situation such as they now are facing, the union operators have reason to feel gloomy. By the end of this coal year they will be in no position to grant an increase of wages. Neither will they be in a position to fight the United Mine Workers. They will be, more or less, at the mercy of that organization unless Congress should threaten some drastic action which would be indicative of crystallization of public sentiment against the forcing of the wage for one craft to the point where it loses all semblance of proportion with the wage paid in other industries for comparable service.

STRIKES ACT AS DOPE TO UNION MINES

Were the United Mine Workers willing to leave the whole matter in the capable hands of John L. Lewis, it is probable that he would give prompt assurance that no increase in wage would be asked for the workers in union bituminous mines. He knows that nothing would work more discomfiture to the non-union operators. He knows that if he takes full advantage of the weakness of the operators in the union fields and exacts the last shekel he can wring from them, it simply will close down an additional large number of union mines and throw another big block of tonnage into the lap of the non-union operators.

The growing schism between union and non-union operators is becoming more and more apparent. It is the outstanding weakness of the bituminous-coal industry. The operators were quite right in their New York meeting last week in reaffirming their statement that shortages and high prices of coal hark back to strikes, but it was these very strikes which brought prosperity to the non-union fields and put them in their present commanding position. These strikes have been as dope to the union operations. Following a strike, they have a period of hectic activity, but as the effect of the narcotic, in each recurring instance, wears off, the industry becomes more and more devitalized and unstrung. This is having its effect on the United Mine Workers. If the radicals and the one-eyed among them insist on pushing costs to a new high level, there are not going to be many mines left to check off.

The operators are correct in saying that the Harding Coal Commission emerged from its studies without recommending any national labor policy. We are no nearer an answer to the question as to whether or not we are to continue to have nation-wide strikes. It is significant, how-

ever, that the Bituminous Operators' Special Committee, in its old form or in its new form, has been just as inconclusive as was the Coal Commission. Its members can agree upon a denunciation in round terms of the monopolistic United Mine Workers, but they have no plan that promises any relief from present conditions. They can get together and affirm certain general principles, such as the right to work, the right to organize for peaceful purposes or to declare that private property should be inviolate, but their criticism of the civil liberties report applies with equal force to their own accomplishments. They can agree on a statement of abstract rights, but they cannot apply them.

The clash of interest between union and non-union operators is just as real, just as clear as it was in 1922. Apparently the application of any constructive principle must await the time when the non-union operators will pledge themselves jointly to maintain some reasonable, proper and constant relationship between their wage rates and those in effect in the union fields. If the non-union operators were to visit England and visualize the working of the district autonomy wage rate, they might see some advantages for the nation and even for themselves in the stabilization of rates.

I. C. C. Grants Rehearing in Assigned-Car Case; Change in Decision Unlikely

While the Interstate Commerce Commission has bowed to the large number of requests for a rehearing in the assigned-car case, there is no reason to think that the Commission will change its opinion as to the preferential use of cars for railroad fuel. The rehearing will be before Commissioner Aitchison at Washington, Oct. 22. The only hope of the protestants apparently is that some amendment may be worked out which will mitigate somewhat the blow to those owning private cars. There is a powerful influence behind the movement, in that this action is certain to be the forerunner of restrictions on private cars used for the transportation of commodities other than coal.

All admit that the decision has precipitated a serious situation for the owners of private coal cars. The number of coal cars privately owned is not less than 30,000, representing an investment of \$75,000,000. If the order of the Commission becomes effective, the owners of this property will have only one buyer. The cars will have to be sold to the railroads and they will take them at their own price, it is argued. In the case of some producers of coal, their investment in cars is greater than their investment in mines.

In certain instances, perhaps in many, prospective purchasers of private cars wrote to the Commission asking if there were any thought of abolishing their use. On assurances of the country, millions of dollars are thought to have been invested. It is known that this phase of the question will be emphasized at the rehearing.

The Commission's opinion, as it now stands, will result in great advantage to certain large coal-mining interests, it will be argued. Where the mines of a powerful company are served by a short railroad line, it will be possible for that railroad to purchase a large supply of cars which would assure those mines a full car supply. An instance is the recent sale of the Sandy Valley & Elkhorn R.R. by the Baltimore & Ohio to the Consolidation Coal Co., which owns

most of the mines on the line. This railroad already has a large ownership of cars. If the decision stands, there will be many cases in which branch lines will be sold in such a manner.

The private-car owners will argue that the Commission should not go further than denying them preferential use of railroad facilities for their cars. The validity of an order which goes beyond what is necessary to eliminate an actual discrimination will be questioned.

The long and respectable history of private cars will be reviewed. When the charter was granted to the Pennsylvania Company, the railroad was regarded as a public highway on which the user was expected to furnish his own vehicle for the handling of his freight. It will be pointed out that private cars have had a great effect on stabilizing the coal market and have been a great public safeguard, especially in their use by public-utility companies.

The attitude of those who favored abolition of the assigned-car practice toward the rehearing granted by the Interstate Commerce Commission is one of waiting for developments. A conference was held Oct. 15 by officials of the National Coal Association, which had advocated abolition of assigned cars for railroad fuel and which maintained a neutral attitude toward privately-owned cars, and arrangements were made for representation at the hearing. Inasmuch as the Coal Association is a party to the proceedings, traffic officials of that organization declined to comment upon the action of the Commission in reopening the case.

It was pointed out by some of those who had viewed with satisfaction the order of the Commission last spring doing away with the assigned-car rule that inasmuch as the Commission had this case before it about two years and took testimony and evidence for more than 30 days, the granting of only twelve days' time between the order for rehearing and the date of that rehearing indicates that the Commission expects argument and not further evidence to be developed.

Within the twelve days, it was declared, it would be practically impossible to obtain new evidence bearing on the case, even if all the evidence had not been exhausted previously. Supporters of the original decision assert that the move at the rehearing is up to the petitioners, and that those favoring retention and execution of the order will be present to meet whatever develops from these petitioners.

The decision of the Commission in the assigned car case was by a 7 to 4 vote. Unofficially, it is understood that the case was reopened by a vote of 6 to 5.

Proponents of abolition of the assigned-car practice point out that the United States Coal Commission, in its report, condemned this practice, although suggesting the advisability of some system of assuring transportation to those contracting for large coal supplies.

Dean Cooley Announces Resignation

Mortimer E. Cooley, dean of the College of Engineering and Architecture of the University of Michigan, announced his resignation as president of the American Engineering Council of the Federated American Engineering Societies at the opening session of a two-day meeting of the Executive Board of the Council held in Rochester, N. Y., Oct. 12.

In presenting his resignation to the Board, Dean Cooley said that he retires on account of ill-health. He also made it known that he has been granted leave of absence by the University of Michigan for the second half of the academic year of 1923-1924. Dean Cooley, who is now in his sixty-ninth year, succeeded Herbert Hoover as president of the Federated American Engineering Societies two years ago.

The Executive Board, it was announced, will call for nominations for the presidency of the Federation and Dean Cooley's successor will be formally chosen at the annual meeting of the American Engineering Council, executive organ of the Federation, to be held in Washington, D. C., early in January.

The Committee on Storage of Coal, W. L. Abbott, chairman, named by the Federated American Engineering Societies, appointed Dean F. L. Walker as field executive, who visited forty-four cities to obtain co-operation in the making

of the report. Eighty-five subcommittees formed in as many cities or states are considering the problem and will make reports. Forty-eight have done so already. The number of engineers serving on the main and subcommittees is 388. To date \$10,450 has been paid in or promised to finance the inquiry. The report should be ready about the middle of January.

Leland Coal Co. Expands in Illinois, Kentucky and Indiana

A reorganization and expansion of the Leland Coal Co., of Chicago, sets that concern up as an important operator of Illinois, western Kentucky and possibly Indiana. The company leases the six mines of the associated Union Fuel Co. in the Springfield (Ill.) district, and is now operating them. Also the Leland company is opening up an acreage it has purchased from the Verona Coal Co. at Verona, in Grundy County, Ill. There it will operate in the northern Illinois longwall region the only room and pillar mine on the Santa Fe R.R. The coal is under about 100 ft. of cover and varies in thickness from 5 to 10 ft. The mine may be developed to an output capacity of 2,500 tons a day.

At Waverly, Ky., 50 miles southwest of Evansville, Ind., the company has taken over the old Waverly mine in Union County, on the Illinois Central R.R. This mine, which has stood idle for several years but which is considered to be in excellent condition, will be rehabilitated at once by the Allen & Garcia Co., engineers, of Chicago, and put into operation. The company also is negotiating for the purchase of certain Indiana mines. The officers of the company are W. H. Leland, president; John D. Harris, secretary, and B. F. Bliss, treasurer.

Illinois Miners' Union Did Not Sell Herrin Strip Mine After All

It is authoritatively reported that the recently announced "sale" of the Lester strip mine, scene of the Herrin massacre of 1922, was no sale at all. The United Mine Workers of Illinois continue as owners of the property, having created the Mammoth Coal Co. with C. C. Shive as president, merely as an operating concern. The plant is now loading coal as fast as a dragging market will absorb it. The property was taken over by the Illinois branch of the miners' union in order to quiet large damage claims of the Southern Illinois Coal Co. against the union following the destruction of the plant and the slaughter of twenty-two non-union workers by an attacking mob.

PRESIDENT COOLIDGE HAS COMMENDED F. R. WADLEIGH for the service he rendered as Federal Fuel Distributor. In a letter to Mr. Wadleigh the President says: "I have received your final report as Federal Fuel Distributor under the provisions of the act of Sept. 22, 1922, your office having expired by limitation on Sept. 22, 1923. I have noticed the report with interest and am glad to have this résumé of the work concerning the distribution of coal during the past year. As I have had some occasion during the last few weeks to know of your work in this connection I want to take this opportunity to express to you my very cordial thanks for the able and efficient manner in which you have conducted the affairs of your office and your willingness to be helpful at all times. I want to assure you of my high appreciation of your services and express best wishes to you in whatever line of work you may take up in the future."

THE U. S. SUPREME COURT has allowed the motion of the government to advance argument in the appeal of the Federal Trade Commission against the decision of the Court of Appeals of the District of Columbia in the case of the Claire Furnace Co. The lower court ruled against the authority of the Commission to require basic industries, such as coal and steel, to furnish cost data reports. The case has been assigned for argument Dec. 3.

Coal Probes On in New York

Richard A. Enright, Police Commissioner of New York City, on Oct. 9 directed police commanders in every precinct to make a complete survey of the coal situation. The purpose is to assist the recent campaign undertaken by the Department of Public Markets to stop profiteering in coal and to co-operate with the state in case of another coal shortage.

The police were directed to ascertain from coal dealers the amount and sizes of the coal now in stock, the price per ton and the approximate amount they will obtain monthly. If in certain sections it is found that fuel is readily obtainable while in other districts with the same class of residents a scarcity is apparent, the reason for this will be brought to light and steps taken to remedy the situation.

Complaints from different parts of the city of inability to obtain coal since the settlement of the coal strike having reached the Federal District Attorney's office, Colonel William Hayward, U. S. Attorney, also has announced an investigation to discover whether he can obtain enough evidence to go before the Grand Jury and ask indictments.

Southwest Operators See Traffic Victory

An important traffic victory for the Southwestern Interstate Coal Operators' Association is foreshadowed in the recommendation made to the Interstate Commerce Commission by its examiner in the case of the association against the Arkansas Western Railway Co. The examiner recommends certain lower rates to the highly competitive consuming points of Kansas City, Omaha, St. Joseph and Leavenworth. He suggests that the Commission should find as follows:

"That the rates assailed on lump coal are and for the future will be unreasonable to the extent that they exceed or may exceed to Kansas City, Mo.-Kan., \$1.35 from the Rich Hill group, \$1.60 from the Pittsburg group, \$2.75 from the Arkansas-Oklahoma group, and \$1.35 from the Spadra group; to St. Joseph, Atchison and Leavenworth, \$1.65 from the Rich Hill group, \$3.05 from the Arkansas-Oklahoma group, and \$3.45 from the Spadra group; to Omaha and points taking the same rates, \$3.70 from the Arkansas-Oklahoma group and \$4.05 from the Spadra group; and to Sioux City, \$3.10 from the Rich Hill group, \$3.35 from the Pittsburg group, \$4.20 from the Arkansas-Oklahoma group, and \$4.55 from the Spadra group.

"That the rates assailed on slack coal are used and for the future will be unreasonable to the extent that they exceed or may exceed to Kansas City, \$1.10 from the Rich Hill group; to St. Joseph, Atchison and Leavenworth, \$1.35 from the Rich Hill group and \$2.75 from the Arkansas-Oklahoma and Spadra groups; to St. Joseph, \$1.60 from the Pittsburg group; to Omaha and points taking the same rates, \$3.35 from the Arkansas-Oklahoma and Spadra groups; and to Sioux City, \$2.80 from the Rich Hill group and \$3.85 from the Arkansas-Oklahoma and Spadra groups."

Gompers Again Heads Federation of Labor

Samuel Gompers was re-elected unanimously as president of the American Federation of Labor just before the adjournment of the forty-third annual convention, at Portland, Ore., Oct. 12. Addressing the convention just before its close, Mr. Gompers, who is 73 years old, declared that the gathering had given notice that a cleavage had been made between those loyal to organized labor and those who, boring from within, had sought to stab the labor movement in the back. "The results of this convention," he said, "will make for solidarity in the ranks of labor."

All the present officers of the Federation were re-elected. In reviewing the convention's work Mr. Gompers referred to the expulsion of William F. Dunne, delegate from Butte, Mont. "This is a convention of organized labor," he said, "and any man who is hostile to labor has no right in this convention. I feel that the action taken has clarified the atmosphere. I think we have been entirely too lenient toward those who have been boring from within. Those men

who meet at midnight in the forest, plotting not only against the government but against the labor movement can go ahead as they please, but they must do so outside the ranks of organized labor."

Commission Issues Report on Wage Rates In the Bituminous Coal Industry

The U. S. Coal Commission issued its report on Wage Rates in the Bituminous-Coal Industry, Oct. 17, the examination having been made by W. E. Fisher, of the Wharton School of Commerce and Finance of the University of Pennsylvania. This is one of several studies made under the general supervision of Dr. Willits and was co-ordinated with his investigation of the Causes of Strikes as well as on Miss Bezanson's study of Earnings. The report on wage rates comprises 54 typewritten pages with an appendix of 102 tables showing rates and changes in rates for specified occupations from 1912 to 1923.

Wadleigh, in Final Report, Says Nation Is Assured of Full Winter Coal Supply

In his final report to the President, made public Oct. 16, F. R. Wadleigh, Federal Fuel Distributor, says the country can feel assured of an adequate supply of coal during the coming winter. His office, which was created during the strike emergency of 1922, expired by limitation Sept. 22.

"The railways are successfully meeting to-day's unprecedented traffic demands, and it is expected that the transportation of coal and other fuels will be adequately handled during the coming winter season," says the report.

"Since there is no reason to anticipate any substantial interference with production of coal during the winter months the country may be reasonably assured of an uninterrupted supply of this commodity so necessary to its health, comfort and prosperity."

Coal shortage last winter, the Federal Distributor said, was largely nothing more than anthracite shortage. He said domestic consumers used substitutes with great reluctance and that other fuels were usually available.

Domestic consumers have not stored an unusual quantity of coal, but no difficulties during the coming winter are foreseen by Mr. Wadleigh.

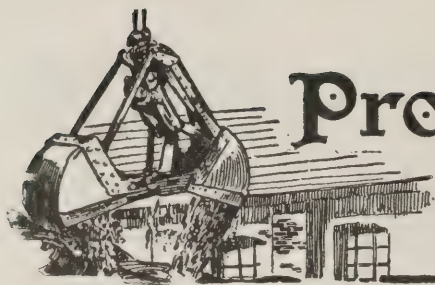
Pinchot Consults Operators on Coal Prices

Governor Pinchot held a conference Oct. 15 at Harrisburg with S. D. Warriner, chairman of the Anthracite Operators' Policy Committee; W. J. Richards and A. B. Jessup and discussed with them "available methods of reducing the price of coal to the consumers to the level of last year." The conference was held at the invitation of the Governor.

The operators present were members of the producers' negotiating committee which met with the miners' union officials last month and agreed on the anthracite wage contract now in effect. W. W. Inglis, the fourth member of the committee, was not present. The result of the conference was not divulged but Governor Pinchot said that the operators would return for another conference next week.

IN A LETTER sent to President Coolidge Oct. 15, Governor Silzer of New Jersey urges that the coal situation be included in the subjects considered at the conference with state executives at the White House next Saturday. "The situation is one that can only be dealt with and solved by the national administration (with some aid from Pennsylvania)," wrote Governor Silzer. "Nevertheless, I am sure that the Governors will be glad to aid you by stimulating public sentiment in their respective states if you have an effective plan to relieve the people."

THE INTERSTATE COMMERCE COMMISSION has announced that hearings in the Virginian case, Finance Docket 2812, have been postponed until Oct. 31 at Washington before Examiner Charles D. Mahaffie.



Production and the Market



Weekly Review

Production of soft coal has been affected by the resumption of anthracite mining; demand is slower and prices show a further decline. The spot market is quiet, while deliveries of contract coals are being curtailed wherever possible. In the West warm weather has curtailed the demand for domestic coals, while in the East reserve stocks together with reduced industrial operations in various lines have affected the steam-coal situation.

For the sixth consecutive week *Coal Age* Index of spot prices of soft coal shows a decline. On Oct. 15 it registered 185, a drop of five points from the previous week, and of twenty points since Sept. 10. The average price of soft coal was \$2.24 on Oct. 15, a drop of 6c. from the preceding week and of 25c. from Sept. 10.

OUTPUT DROPS; REBOUND LOOKED FOR

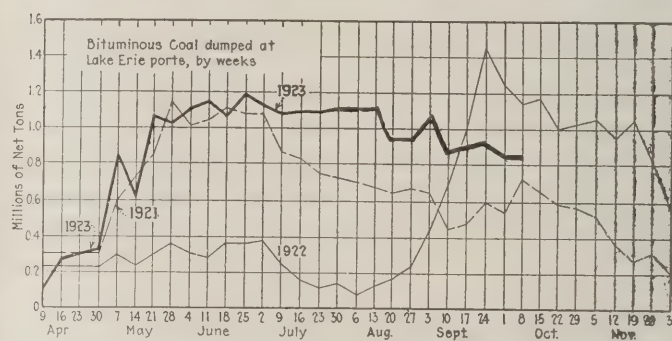
Production of soft coal for the week ended Oct. 6 is estimated by the Geological Survey at 10,782,000 net tons, a decline of 565,000 tons when compared with the previous week's output, but it is expected that last week's production will show a partial recovery from this loss. Production of soft coal during the first 236 working days of this year was 424,257,000 net tons, which has only been exceeded once during the corresponding period of the past six years in 1918 when it was 454,515,000 tons.

Movement was slow in the Chicago market. "No bills" affected the Illinois mining operations, while the situation in western Kentucky is anything but satisfactory. Mine closings in Illinois and Indiana are growing in number.

Dullness prevails in the Ohio markets, with inquiries scarce. The Pittsburgh market is quiet and buyers are slow to show any interest in the situation. In New England the steam-coal market is in bad shape and trade is stagnant. Reports of further curtailment in the textile industry are current, either by a complete

shutdown of some mills or a reduction in working time.

Output of anthracite was 2,015,000 net tons during the week ended Oct. 6, indicating that the industry has recovered from its strike. While the production showed a decrease of 10,000 tons from the preceding week it equals the weekly rate of output that prevailed just before the strike and exceeds by 60,000 tons the average weekly rate in the first five months of the present

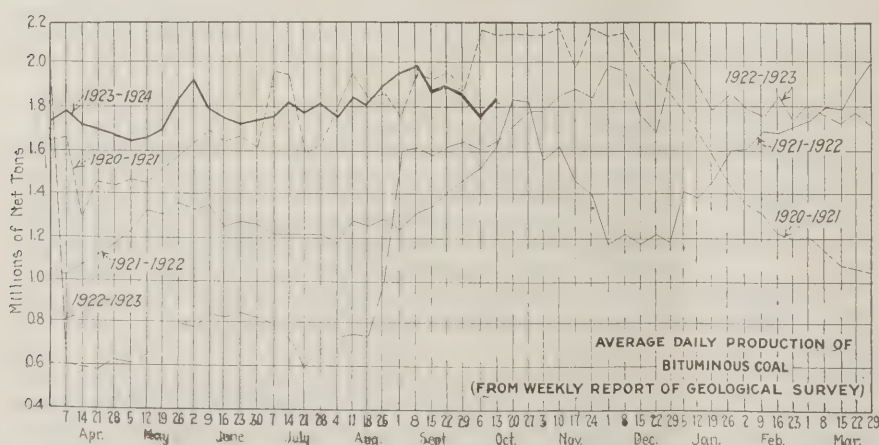


	Week Ended Oct. 8	Season to Oct. 8
Cargo.....	785,199	22,799,322
Fuel.....	53,311	1,245,839
Totals.....	838,510	24,045,161

coal year. Cumulative production during the calendar year to Oct. 13 amounted to 73,279,000 tons, which is more than two and a quarter times that of the corresponding period for 1922. Domestic sizes of anthracite are in heavy demand, but the steam coals are hard to move.

Movement of coal from the lower Lake ports remains around 800,000 net tons weekly, with cumulative shipments of cargo and fuel coal for the season totaling about 24,045,000 tons.

There is no activity in the export market. Inquiries are few and chartering of vessels is on a slow scale.



Estimates of Production (Net Tons)

BITUMINOUS

	1922	1923
Sept. 22.....	9,747,000	11,454,000
Sept. 29 (a).....	9,822,000	11,347,000
Oct. 6 (b).....	9,736,000	10,782,000
Daily average.....	1,623,000	1,797,000
Calendar year.....	280,751,000	424,257,000
Daily av. cal. year.....	1,186,000	1,796,000

ANTHRACITE

	1922	1923
Sept. 22.....	1,897,000	877,000
Sept. 29.....	1,982,000	2,025,000
Oct. 6.....	1,994,000	2,015,000

COKE

	1922	1923
Sept. 29 (b).....	162,000	321,000
Oct. 6 (a).....	173,000	313,000
Calendar year.....	4,958,000	14,815,000

(a) Subject to revision. (b) Revised from last report.

There is no sign of improvement at Hampton Roads, but dumpings there for all accounts during the week ended Oct. 11 was 339,332 net tons, an increase of 15,239 tons from the previous week.

Bituminous screened coals, Welsh anthracite and coke are practically out of the market as substitutes for anthracite. There are few inquiries being received, while prices for coke show a further decline from last week.

Middle West Still Unhappy

The whole Midwest coal region continued in a state of funk during the past week. Warm weather slacked down lump sales and stalled practically everything except a little call for fine coal. The shortening of work time had the effect of tightening up a trifle on screenings prices, which last week appeared to be going down without a bottom to touch. A slight rebound was noticed in southern Illinois screenings on the Chicago market, lifting the "low" spot quotation from \$1 to about \$1.20, and central Illinois from 60c. to about 75c. Improvement in prices that are as low

as those, however, is not particularly stimulating when the domestic sizes are not gaining strength.

The mining fields of Illinois are all suffering from "no bills." This affliction has spread from the fine sizes and nut up to domestic lump in the central Illinois territory, though in the Standard district, which offers the cheapest coal in the state, several mines are oversold on lump. Most of the operations in that field can place all the lump they can load at \$2.50@3.15. Shutdowns throughout the state and in Indiana are growing more numerous week by week.

St. Louis at a Standstill

Domestic business in St. Louis is at a standstill. Dealers' trucks and wagons are laid up. Yards are billed up, coal is on demurrage and yard owners are cancelling orders and stopping shipments. Reports from the country show that a similar condition exists everywhere throughout the Middle West on account of mild weather. The little call in evidence has been for a middle grade of medium-priced coal. Some dealers are eliminating Franklin County altogether. Wagonload steam shows some improvement and continues to hold its own in a small way. Carload steam

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

		Market Quoted	Oct. 16 1922	Oct. 1 1923	Oct. 8 1923	Oct. 15 1923†			Market Quoted	Oct. 16 1922	Oct. 1 1923	Oct. 8 1923	Oct. 15 1923†
Low-Volatile, Eastern							Midwest						
Smokeless lump.....	Columbus....		\$6.75	\$6.10	\$6.10	\$6.25@ \$6.50	Franklin, Ill. lump.....	Chicago.....	\$5.35	\$4.05	\$4.05	\$3.75@ \$4.35	
Smokeless mine run.....	Columbus....		6.00	3.10	3.05	2.85@ 3.25	Franklin, Ill. mine run.....	Chicago.....	4.50	2.85	2.60	2.25@ 3.00	
Smokeless screenings.....	Columbus....		5.50	2.35	2.25	2.15@ 2.40	Franklin, Ill. screenings.....	Chicago.....	3.25	1.30	1.25	1.20@ 1.50	
Smokeless lump.....	Chicago.....		6.00	6.10	6.10	6.00@ 6.25	Central, Ill. lump.....	Chicago.....	5.10	3.10	3.10	3.00@ 3.25	
Smokeless mine run.....	Chicago.....		5.60	2.85	2.85	2.75@ 3.00	Central, Ill. mine run.....	Chicago.....	3.60	2.10	2.10	2.00@ 2.25	
Smokeless lump.....	Cincinnati.....		6.60	6.10	6.10	5.75@ 6.00	Central, Ill. screenings.....	Chicago.....	2.35	.95	.70	.75@ .90	
Smokeless mine run.....	Cincinnati.....		5.95	2.75	2.75	2.00@ 3.00	Ind. 4th Vein lump.....	Chicago.....	5.10	3.35	3.35	3.25@ 3.50	
Smokeless screenings.....	Cincinnati.....		5.80	1.85	1.60	1.25@ 2.00	Ind. 4th Vein mine run.....	Chicago.....	4.60	2.60	2.60	2.50@ 2.75	
*Smokeless mine run.....	Boston.....		7.20	4.80	4.80	4.60@ 4.75	Ind. 4th Vein screenings.....	Chicago.....	3.25	1.25	1.20	1.15@ 1.30	
Clearfield mine run.....	Boston.....		4.25	2.20	2.15	1.60@ 2.60	Ind. 5th Vein lump.....	Chicago.....	5.10	2.50	2.50	2.25@ 2.75	
Cambria mine run.....	Boston.....		4.50	2.85	2.75	2.85@ 3.00	Ind. 5th Vein mine run.....	Chicago.....	3.75	2.10	2.10	2.00@ 2.25	
Somerset mine run.....	Boston.....		4.30	2.35	2.35	2.00@ 2.75	Ind. 5th Vein screenings.....	Chicago.....	2.85	1.05	.80	.75@ .90	
Pool 1 (Navy Standard).....	New York.....		5.25	3.25	3.10	3.00@ 3.25	Mt. Olive lump.....	St. Louis.....		3.00	3.10	3.00@ 3.25	
Pool 1 (Navy Standard).....	Philadelphia.....			3.25	3.20	3.00@ 3.80	Mt. Olive mine run.....	St. Louis.....		2.25	2.25	2.20@ 2.30	
Pool 1 (Navy Standard).....	Baltimore.....		5.40				Mt. Olive screenings.....	St. Louis.....		1.25	1.25	1.20@ 1.30	
Pool 9 (Super. Low Vol.).....	New York.....		4.65	2.50	2.35	2.25@ 2.50	Standard lump.....	St. Louis.....	4.25	2.80	3.00	2.90@ 3.15	
Pool 9 (Super. Low Vol.).....	Philadelphia.....		4.35	2.60	2.55	2.35@ 2.60	Standard mine run.....	St. Louis.....	3.35	2.05	2.05	1.80@ 2.30	
Pool 9 (Super. Low Vol.).....	Baltimore.....		4.60	2.40	2.40	2.25	Standard screenings.....	St. Louis.....	2.10	.55	.55	.50@ .60	
Pool 10 (H.Gr. Low Vol.).....	New York.....		4.10	2.10	2.05	1.90@ 2.25	West Ky. lump.....	Louisville.....	5.05	2.55	2.55	2.50@ 2.65	
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....		3.60	2.15	2.10	1.90@ 2.80	West Ky. mine run.....	Louisville.....	3.00	1.85	1.75	1.50@ 2.00	
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....		4.35	2.25	2.25	2.15	West Ky. screenings.....	Louisville.....	2.85	.75	.55	.50@ .65	
Pool 11 (Low Vol.).....	New York.....		3.50	1.85	1.85	1.75@ 2.00	West Ky. lump.....	Chicago.....	4.10	2.60	2.60	2.50@ 2.75	
Pool 11 (Low Vol.).....	Philadelphia.....		3.25	1.85	1.85	1.70@ 1.85	West Ky. mine run.....	Chicago.....	3.50	1.95	1.75	1.50@ 2.00	
Pool 11 (Low Vol.).....	Baltimore.....		4.10	2.00	2.00	1.80							
High-Volatile, Eastern							South and Southwest						
Pool 54-64 (Gas and St.)..	New York.....		3.85	1.75	1.65	1.50@ 1.85	Big Seam lump.....	Birmingham..	3.25	3.75	3.75	3.65@ 3.90	
Pool 54-64 (Gas and St.)..	Philadelphia..		3.75	1.75	1.70	1.65@ 1.80	Big Seam mine run.....	Birmingham..	2.75	1.95	1.95	1.75@ 2.15	
Pool 54-64 (Gas and St.)..	Baltimore....		4.05	1.60	1.60	1.75	Big Seam (washed).....	Birmingham..	3.25	2.35	2.35	2.25@ 2.50	
Pittsburgh so'd gas.....	Pittsburgh....		5.25	2.55	2.55	2.50@ 2.60	S. E. Ky. lump.....	Chicago.....	6.25	3.35	3.35	3.25@ 3.50	
Pittsburgh gas mine run.....	Pittsburgh....		3.60	2.25	2.20	2.15@ 2.25	S. E. Ky. mine run.....	Chicago.....	4.75	2.25	2.25	2.00@ 2.50	
Pittsburgh mine run (St.)..	Pittsburgh....		3.60	2.05	1.85	1.75@ 2.00	S. E. Ky. lump.....	Louisville....	6.75	3.25	3.25	3.00@ 3.85	
Pittsburgh slack (Gas).....	Pittsburgh....		3.85	1.25	1.20	1.15@ 1.30	S. E. Ky. mine run.....	Louisville....	4.35	2.00	2.00	1.75@ 2.25	
Kanawha lump.....	Columbus....		6.25	3.15	3.15	2.85@ 3.50	S. E. Ky. screenings.....	Louisville....	4.10	1.05	.85	.75@ 1.00	
Kanawha mine run.....	Columbus....		4.50	1.85	1.85	1.75@ 2.00	S. E. Ky. lump.....	Cincinnati..	6.75	3.60	3.25	3.00@ 3.85	
Kanawha screenings.....	Columbus....		3.60	1.05	.95	.90@ 1.00	S. E. Ky. mine run.....	Cincinnati..	4.10	1.60	1.35	1.25@ 1.85	
W. Va. lump.....	Cincinnati..		6.25	3.50	3.35	3.25@ 3.50	S. E. Ky. screenings.....	Cincinnati..	4.00	1.00	.85	.65@ 1.00	
W. Va. Gas mine run.....	Cincinnati..		4.60	1.75	1.35	1.35@ 2.00	Kansas lump.....	Kansas City..	5.75	4.50	5.00	5.00	
W. Va. Steam mine run.....	Cincinnati..		3.75	1.75	1.35	1.35@ 2.00	Kansas mine run.....	Kansas City..	4.25	3.50	3.50	3.50	
W. Va. screenings.....	Cincinnati..		4.00	1.10	.85	.65@ 1.00	Kansas screenings.....	Kansas City..	2.50	2.60	2.25	2.25	
Hoeking lump.....	Columbus....		5.45	3.10	3.10	2.85@ 3.85							
Hoeking mine run.....	Columbus....		3.50	1.85	1.85	1.75@ 2.00							
Hoeking screenings.....	Columbus....		3.25	1.05	.95	.90@ 1.00							
Pitts. No. 8 lump.....	Cleveland....		3.81	2.60	2.60	2.15@ 3.00							
Pitts. No. 8 mine run.....	Cleveland....		3.56	1.95	1.95	1.85@ 1.95							
Pitts. No. 8 screenings.....	Cleveland....		3.31	1.15	1.10	.95@ 1.15							
							* Gross tons, f.o.b. vessel, Hampton Roads.						
							† Advances over previous week shown in heavy type, declines in italics						

* Gross tons, f.o.b. vessel, Hampton Roads.

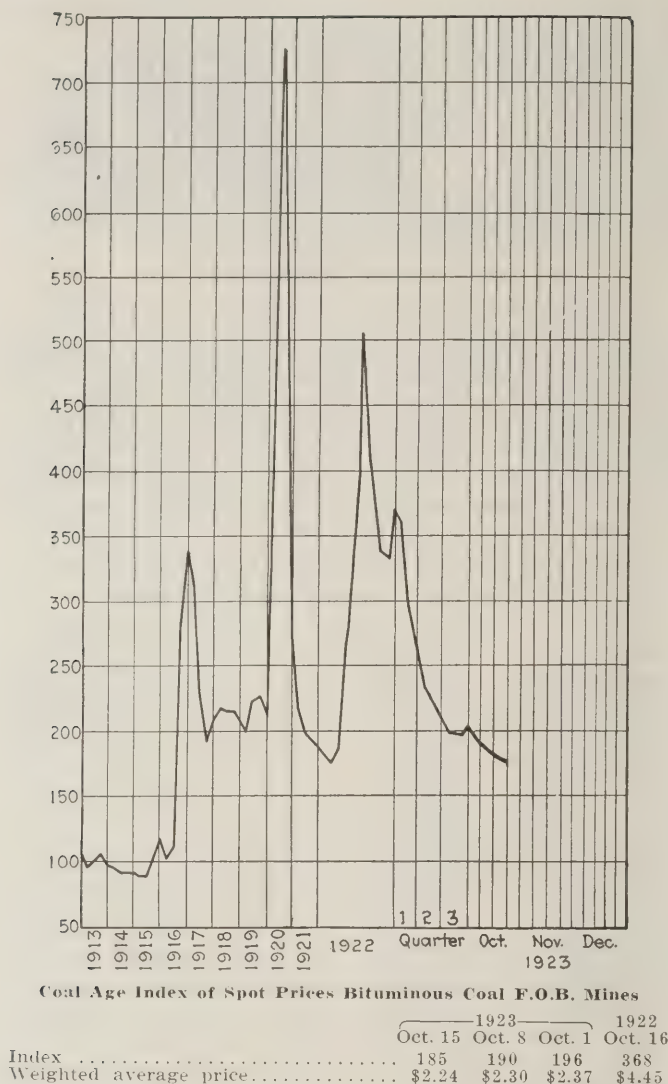
† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Oct. 8, 1923		Oct. 15, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....		\$2.34	\$9.00	\$7.75@ \$8.25	\$9.60@ 12.25	\$8.00@ \$9.25	\$9.60@ 12.25	\$8.00@ \$9.25
Broken.....	Philadelphia.....		2.39		7.90@ 8.10				
Egg.....	New York.....		2.34	\$9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Egg.....	Philadelphia.....		2.39	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago.....		5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove.....	New York.....		2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Philadelphia.....		2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Stove.....	Chicago.....		5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York.....		2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Chestnut.....	Philadelphia.....		2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Chestnut.....	Chicago.....		5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range.....	New York.....		2.34		8.25		9.00		9.00
Pea.....	New York.....		2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.00	6.15@ 6.65	6.75@ 8.25	6.15@ 6.65
Pea.....	Philadelphia.....		2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea.....	Chicago.....		4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Backwheat No. 1.....	New York.....		2.22	4.00@ 5.00	4.00@ 4.10	2.50@ 3.50	3.50	2.50@ 3.50	3.50
Backwheat No. 1.....	Philadelphia.....		2.14	5.00	4.00	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice.....	New York.....		2.22	3.00@ 3.25	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Rice.....	Philadelphia.....		2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley.....	New York.....		2.22	1.75@ 2.00	1.50@ 2.00	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Barley.....	Philadelphia.....		2.14	1.00@ 1.75	2.00	1.50	1.50	1.25@ 1.50	1.50
Birdseye.....	New York.....		2.22		2.10		1.60		1.60

* Net tons, f.o.b. mines.

† Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

is hard to find. There is no demand for smokeless, anthracite or coke. Country steam is about as hard to find as in St. Louis and everybody is waiting for cold weather.

Kentucky Prices Bump Bottom

The situation in western Kentucky is anything but satisfactory. Lack of steam demand has resulted in screenings working lower, until the market is quoted as low as 50c. a ton for pea and slack and 75c. a ton on nut and slack, while mine-run can be had at from \$1.50 upward. In prepared coals the market holds fairly well, but an average of top prices of prepared and top prices of screenings makes a realization too low to allow many mines to break even.

Car supply is reported at from 87 per cent on one line to 134 per cent on another railroad, which is making it possible to load more cars than the market can well absorb. Steam demand while good is being supplied by very cheap screenings.

The Louisville coal trade is reported as quite dull with a little coal moving at give-away prices. Steam coal in Louisville is lower than at any time since the early part of 1922. Western Kentucky screenings are being offered at 50c. a ton and up, while western Kentucky as well as eastern Kentucky nut and slack is being offered at a minimum of 75c. and ranging up to \$1, with some 60c.

stuff reported from eastern Kentucky. With screenings so cheap the demand for mine-run is almost nothing.

Northwestern Trade Barely Alive

During the past week there has been little doing in the Northwest except a casual movement of anthracite. The increase of from 25c. to 80c. on domestic sizes at the various Northwestern markets had a restraining influence on even that standard trade. Warm weather simply flattened the market out leaving little to look forward to except a cold snap.

This condition produced some reductions in prices of various soft coals. At Milwaukee retailers cut Pocahontas screened coal \$1.25; mine-run, \$2.50, and smithing coal, \$3. West Virginia screened was shaded 25c., and Illinois and Indiana domestic sizes, \$1.50. These cuts resulted from reductions at wholesale of nearly the same amounts. Kanawha gas mine-run was dropped 50c. At Duluth no further reductions were made. In the region about Minneapolis the market is so glutted that various cuts have been made to hold business and much "snowbird" coal has penetrated into the territory. There is little demand anywhere in the Northwest for coke or the briquets around which a small industry has developed.

Shipments from the docks at Duluth-Superior harbor continued heavy last month, a total of 23,174 cars of coal going out. This compares with 23,914 cars in August and 16,178 cars in September of last year. Shipments to the docks continued good last week with thirty-six cargoes arriving, of which three were hard coal. Twenty-seven cargoes are reported on the way, of which three are hard. Every indication points to a continuation of the movement. It is safe to say, from present indications, that a surplus of bituminous will be on the docks when navigation opens in the spring.

October receipts at Milwaukee by lake thus far aggregate 42,200 tons of anthracite and 144,090 tons of soft coal, making the season's receipts 675,938 tons of the former and 2,229,434 tons of the latter, or 2,905,372 tons in all.

Western Market Low Too

The Southwest is able to sell a little domestic lump coal these days, but little else. Steam continues to drag heavily. Further west, in the mountain country, Colorado market conditions remain practically unchanged with the trade experiencing about as low a fall as the old inhabitants can remember. The mines are getting about 60 per cent running time, however, which would not be considered bad in many another coal region.

Utah operators feel a slight increase in business coming in not only from the mountain states but from the coast and the great Northwest. Running time averages about four and a half days. Domestic sizes sell rather easily but steam continues draggy. A suggestion of car shortage has appeared, but the trade generally sees no sound reason why it should become acute.

Ohio Markets Are Lifeless

Retail dealers and steam coal users in the Columbus market are playing a waiting game and there is no life in the situation. Householders are not buying to any extent and retailers are in the market for only sufficient coal to keep their stocks intact. Retail prices remain steady. Screenings are moving the slowest; some mines in the Hocking Valley and Pomeroy fields closed down because of their inability to sell their slack output. Mine-run, while not nearly as weak as screenings, is being bought according to present needs. Reserve stocks of steam sizes are sufficient for from sixty to seventy-five days. Cleveland reports that the dullness in market conditions is being felt now to a greater extent than a week ago. Inquiries are scarce and distress coal is affecting spot prices, as well as demand. Steam coal is not being stored to any extent. The general market is practically a buyers' market. Notwithstanding this condition, receipts of coal at Cleveland last week were reported as greater than in any week since the end of March, being about 300 cars over those of the preceding week. This increase, it is

said, is due to large disposals of distressed coal and the fact that a good quantity of coal is being bought on track rather than on orders being placed for shipment from the mines.

Markets for smokeless coals at Cincinnati begin to show signs of sliding, the dullness and weakness in Chicago and interior points reflecting on the local situation. Lake shipments are slowing up, which will result in the necessity of other means of disposal being found. Rejections continue to grow. Retail prices show little change locally, except where in a few instances dealers have cut the price on slack to \$4.25 and domestic lump to \$7.50. Smokeless grades remain unchanged.

Reports from 441 mines received by the Southern Ohio Coal Exchange show output to have been 171,714 tons during the week ended Sept. 29.

Pittsburgh Buyers Hold Off

The Pittsburgh market continues in the dumps, and everywhere it is said that it is almost impossible to sell coal. There is no well-established price on any description of coal, and sales are made at figures according to circumstances, but while the market is weak it is not certain that the average of all transactions is at a materially lower level than last week. Buyers seem to be particularly conservative about taking hold. There is a disposition to reduce stocks rather than to increase them. This, at any rate, is the attitude of some steel mills having byproduct coke ovens. Market conditions in Buffalo are flat, with complaints of poor business increasing.

New England Market in Bad Shape

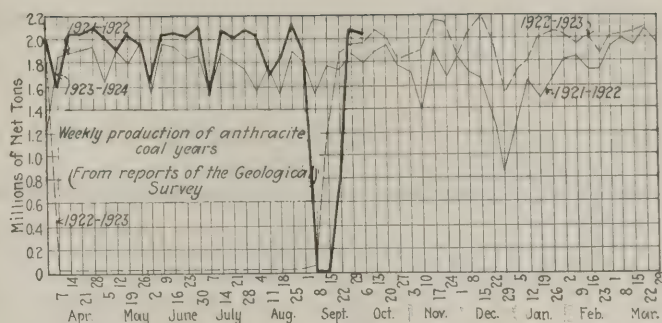
To the trade in New England it seems as if the steam-coal market could not possibly be in worse shape. With factors pressing buyers to absorb cargoes that are on the market it is only natural that prices should be further depressed. No. 1 coal has been offered at \$5.80 per gross ton on cars Boston for spot shipment, and it is freely said that coal f.o.b. Hampton Roads could be purchased on offers down to \$4.60, or possibly less. In all directions trade is stagnant.

Even producers of quality grades from central Pennsylvania who supposed their output was reasonably well covered are seeking shipping instructions in the open market and offering material concessions from a price basis that was considered barely the cost of production. The less favorably known coals apparently find no market whatever, for nothing about them is heard in this market. Moshannon coals of fair grade are offering at \$2 per net ton and more than a few Pennsylvania coals have netted much less than this figure when disposed of at New York and Philadelphia piers.

At Hampton Roads there are no signs of improvement. There are accumulations at the piers up to the point permitted by restricted output and all the agencies find the going extremely hard.

Seaboard Soft Coal Market Quiet

The spot market for soft coal at New York is extremely quiet. Coal is plentiful and cargoes of distress coal can be picked up at prices below current quotations. Shipments of contract coals are being curtailed, with the result that fair tonnages of some of the better grades have been thrown into the open market. Conditions at Philadelphia show



no improvement and are far from satisfactory to those producers who some months ago elected to put the bulk of their tonnage on a spot basis. In order to keep their coals moving it is said that some producers holding contracts at high figures have been willing to modify those figures. The tidewater business at Philadelphia is being confined in the main to bunker loading, no clearances being reported last week, nor were any charters registered for future sailings.

Considerable quantities of Pool 9 and 71 coals are being offered in the Baltimore market on a keen competitive basis, causing the demand for the cheaper coals to fall off. Gas coals are holding up well. The market in West Virginia is described by operators as bad everywhere without regard to the grade of coal offered. Low prices on both high and low volatiles are no incentive to buyers. In the southwest Virginia fields "no market" losses are said to be responsible for the greater part of the cut in production.

No improvement is noticed in the Birmingham market. The amount of spot business was smaller, if anything, than for the previous week. A fair amount of contract coal and for coke manufacture is moving from the mines. Furnace mines have curtailed production because of the blowing out of a number of furnaces.

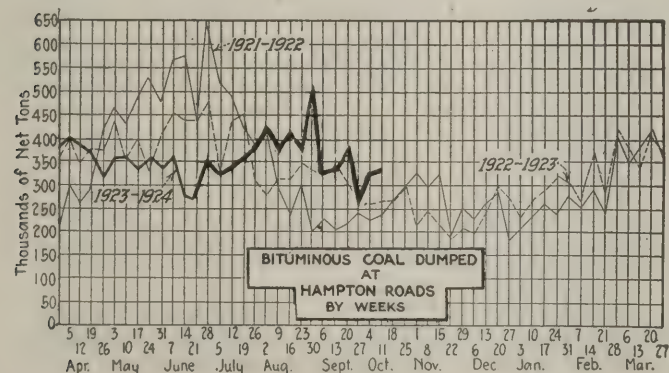
Shipments of soft coal to Lake ports during the week ended Oct. 8 amounted to 838,510 net tons, a decrease of 1,720 tons when compared with the previous week.

Anthracite Demand Absorbs Output

While demand for anthracite domestic coals continues sufficiently strong to absorb the output, quotations for the independent product are easier but retail dealers are not showing a disposition to buy heavily of these coals when it is possible to take care of their trade with company coals. Larger shipments would be welcome, many yards being bare of supplies, the retail dealers delivering the coal as soon as it arrives. In some sections it is difficult to move pea coal, consumers sticking to their favorite sizes. Movement of the steam sizes is slow and the smaller producers are selling their product at prices far below company figures. Some producers and dealers are initiating an educational program to induce consumers to use a portion of these sizes with the larger coals.

The market for coke and bituminous screened coals has almost disappeared, although some retail dealers carry small stocks.

The steady decline in the production of beehive coke continued during the first week in October, production being estimated at 313,000 net tons, a decrease of 8,000 tons from the previous week. Production during September is estimated at 1,373,000 tons, as compared with 1,494,000 tons in August. Production of byproduct coke during September was 3,112,000 net tons.



Car Loadings, Surpluses and Shortages

	Cars Loaded —	
	All Cars	Coal Cars
Week ended Sept. 29, 1923.....	1,097,274	200,970
Previous week.....	1,060,436	182,524
Same week in 1922.....	977,791	187,812

	Surplus Cars —		Car Shortage	
	All Cars	Coal Cars		
Sept. 30, 1923.....	41,745	5,651	15,331	5,439
Same date in 1922.....	5,843	3,486		
Sept. 22, 1923.....	59,008	16,840	13,515	5,482

Foreign Market And Export News

British Coal Production Exceeds Demand; Firmer Tone Noticeable

Although production exceeds the demand, output of coal of Great Britain's mines is increasing, a cable to *Coal Age* giving the output during the week ended Sept. 29 at 5,575,000 tons, as compared with 5,005,000 tons the previous week.

A firmer tone is noticeable in the South Wales market and sellers are less disposed to make concessions for prompt shipments. The possibility of an early settlement of the Ruhr problem, an increase in German coal output and its effect on European coal markets are some of the factors which are reflected in the waiting attitude adopted by customers towards forward buying. European business is poor, except the trade with France which is good. Italian orders have increased slightly. Belgian buying is below normal, and Dutch and German business is quiet.

Improved demand for better classes of large coal has absorbed much of the accumulated stock, and also created a steadier tone. Some of the mines are badly placed, and there is plenty of coal to satisfy existing demands.

The Newcastle market is unchanged. The only bright feature in the market is that the operators have been able to book up a certain amount of fairly steady business which will keep the pits busy through most of this month.

Paris Retail Dealers Advance Prices

The French coal market remains firm. Retail dealers are receiving inquiries while prices are steady. Although conditions in the Ruhr are clearing, it is expected sometime will elapse before coal deliveries will become normal, and before any agreement is made effective the French mines, with the assistance of British, Belgian and Dutch coals, will have to meet the demand.

At its recent session the Miners National Congress asked the Federal Board to discuss with the various committees the readjusting and raising of wages throughout the mining regions.

Retail dealers in Paris have increased the prices on all coals, with the ex-

ception of British anthracite sizes, from 5 fr. to 12 fr. per ton.

During August coal production of the Nord and Pas-de-Calais mines amounted to 1,853,298 metric tons, as compared with 1,723,850 tons in July, while the output of coke from the same districts during the same period was 125,231 tons as compared with 118,690 tons in July.

United States August Exports by Custom Districts

	(In Gross Tons)		
	Anthracite	Bituminous	Coke
Maine and New Hampshire.....	61	4,084	430
Vermont.....	930	605	1,036
Massachusetts.....	54		
St. Lawrence.....	115,843	219,971	4,064
Rochester.....	79,888	71,473	83
Buffalo.....	202,047	247,080	34,110
New York.....	12,442	93	1,922
Philadelphia.....	4,090	17,182	1,202
Maryland.....		128,033	10,117
Virginia.....		267,685	11,255
South Carolina.....		23,775	
Florida.....		2,799	499
Mobile.....		1,162	
New Orleans.....		636	56
San Antonio.....		355	154
El Paso.....	282	3,800	1,045
Arizona.....	70	2,013	4,546
Los Angeles.....		9	
San Francisco.....		200	9
Washington.....		468	20
Alaska.....		150	
Dakota.....	7,951	7,727	1,736
Duluth and Superior.....	7,909	1,650	253
Michigan.....	199	103,003	13,086
Ohio.....	10,709	1,013,151	13,614
Totals.....	442,475	2,117,084	99,237

Market at Hampton Roads Soft

Business at Hampton Roads was exceedingly dull last week, with the market softening, movement at the piers falling off, and inquiries slackening. Indications were that the business for the first half of the month would approach the low record for any similar period for the year.

Export business showed a tendency to decline, while bunkers was weak, and coastwise trade scarcely holding its own. The tone of the market was weak, and the outlook not bright. Shippers attributed the inactivity of the market to the fact that reserved stocks were being consumed.

Coal Strike Halts Czechoslovak Industry

The Czechoslovakian coal strike, which has completely stopped coal and partially coke production, is now in its sixth week, and threatens serious industrial results, says Acting Commercial Attaché, H. L. Groves in a cable to the Department of Commerce. A reduction in production of the principal Czechoslovak industries will probably result if this strike is continued. An embargo has been placed on all domestic coal stocks by the government and sales are permitted only by special license. The stocks of coal on hand, however, are reported as still sufficient to meet all the current essential needs of the government and industries. Imports of Silesian coal to relieve the situation are increasing considerably.

Export Clearances, Week Ended Oct. 13, 1923

FROM BALTIMORE		Tons
For Cuba:		
Br. SS. Berwindale		1,016
For Italy:		
Br. SS. Grelstone		7,297
COKE		
For Chile:		
Br. SS. Republic		1,465
FROM HAMPTON ROADS		
For Newfoundland:		
Dan. SS. Gorm, for Bathurst.....		2,923
Du. SS. Svanhild, for Bathurst.....		3,013
For West Indies:		
Nor. SS. Bur, for Fort de France.....		6,107
Dan. SS. Josey, for Cuarcacao.....		3,763
For Cuba:		
Br. SS. Berwindale, for Havana.....		6,778
For Italy:		
Jap. SS. Egypt Maru, for Porto Fer- rajo		8,580
For Brazil:		
Br. SS. Nilemede, for Para.....		5,985

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 4	Oct. 11
Cars on hand.....	1,350	1,194
Tons on hand.....	77,111	67,277
Tons dumped for week.....	86,709	113,677
Tonnage waiting.....	22,800	1,900
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,890	1,761
Tons on hand.....	112,050	102,350
Tons dumped for week.....	84,158	110,814
Tonnage waiting.....	10,958	10,100
C. & O. piers, Newport News:		
Cars on hand.....	1,899	2,120
Tons on hand.....	99,975	102,500
Tons dumped for week.....	118,502	78,484
Tonnage waiting.....	6,800	4,000

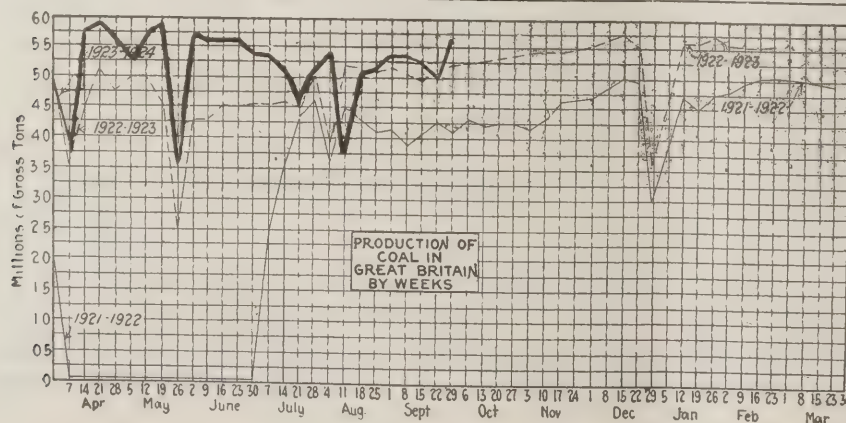
Pier and Bunker Prices, Gross Tons

PIERS		Oct. 6	Oct. 13†
Pool 9, New York.....	\$4.95@	\$5.35	\$4.95@ \$5.35
Pool 10, New York.....	4.50@	5.00	4.50@ 4.90
Pool 11, New York.....	4.35@	4.75	4.25@ 4.60
Pool 9, Philadelphia.....	5.30@	5.55	5.30@ 5.50
Pool 10, Philadelphia.....	4.55@	5.10	4.50@ 5.05
Pool 11, Philadelphia.....	4.30@	4.65	4.25@ 4.60
Pool 1, Hamp. Roads.....	4.60@	4.75	4.75@ 4.85
Pools 5-6-7 Hamp. Rds.....	4.40		4.30@ 4.40
Pool 2, Hamp. Roads.....	4.40		4.25@ 4.40
BUNKERS			
Pool 9, New York.....	5.25@	5.65	5.25@ 5.65
Pool 10, New York.....	4.80@	5.30	4.80@ 5.20
Pool 11, New York.....	4.65@	5.05	4.65@ 5.00
Pool 9, Philadelphia.....	5.55@	5.95	5.50@ 5.90
Pool 10, Philadelphia.....	5.00@	5.40	5.00@ 5.35
Pool 11, Philadelphia.....	4.60@	4.90	4.55@ 4.85
Pool 1, Hamp. Roads.....	4.75		4.75@ 4.85
Pool 2, Hamp. Roads.....	4.40		4.25@ 4.40

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to <i>Coal Age</i>		Oct. 6	Oct. 13†
Admiralty, large.....	27s. 6d. @	28s. 6d.	27s. 6d. @ 28s. 6d.
Steam smalls.....	17s. 6d. @	18s. 6d.	18s. @ 19s.
Newcastle:			
Best steams.....	24s.		24s. 6d. @ 25s.
Best gas.....	24s. @ 24s. 6d.		24s. 6d. @ 25s.
Best bunkers.....	23s. @ 24s.		24s. @ 24s. 6d.

† Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

ALABAMA

An adjustment of wages by the Woodward Iron Co. at its Dolomite Mines Nos. 1 and 2 resulted in a temporary suspension of work on the part of miners at those operations on Oct. 1. However, all differences were satisfactorily settled and the men returned to work. The slump in the price and demand for pig iron and coke, officials explained, necessitated a reduction in production cost in order to allow any margin of profit on pig iron and coke in the present market. Operations at other mines where the reduction was put into effect were not interrupted.

The Town Creek coal mine, near Empire, Walker County, has been sold by J. E. Creel to Elmer Faucett, of Dora, for a consideration of \$10,000.

The Cullman Property Co., of Cullman, has sold to Charles Lark, of New York, mineral rights on 40,000 acres of lands in Winston, Morgan and Cullman counties for a reported consideration of \$100,000.

Fourteen hundred acres of coal land has been acquired in Bibb County, in the Cahaba coal field, by W. R. Young, George W. Randall and associates. These lands are on the Louisville & Nashville and the Southern railroads and carry the Thompson seam of coal, one of the best domestic coals in the state. It is understood that the property will be developed at an early date by the new owners, who are experienced operators and are now interested in several companies operating in the Cahaba field.

The Baker Towboat Co., of Tuscaloosa, has separated from its organization the Baker Coal Co., with a capital stock of \$10,000. Officers of the company are: J. E. Baker, president; G. E. Little, vice-president and general manager, and A. T. Baugh, secretary-treasurer, all of Tuscaloosa.

ALASKA

The bridge on the branch of the Alaska R.R. to the Healy River coal field, according to a telegram received Oct. 5 at the Interior Department, Washington, will be completed this month, making the coal mined in this district accessible for domestic and railroad consumption.

ARKANSAS

Judge Frank A. Youmans, in U. S. District Court, recently denied a motion to dismiss the suit of the Coronado Coal Co., Fort Smith, Ark., against the United Mine Workers of America. Judgment for \$2,223,000 is asked.

CALIFORNIA

Charles Piez, president of the Link-Belt Company, Chicago, announces the purchase of the Meese & Gottfried Co., of San Francisco, Los Angeles, Seattle and Portland. The improvement in distributing facilities effected by the consolidation and the additional manufacturing facilities acquired are expected to give the rapidly-growing industries of the Pacific coast highly economical and efficient service. The new organization will be known as Link-Belt Meese & Gottfried Co., with headquarters at San Francisco. The officials will be: Charles Piez, chairman of the board; B. A. Gayman, president; Harold H. Clerk, vice-president and sales manager; Leslie W. Shirley, treasurer; Richard W. Yerkes, secretary.

COLORADO

A gas explosion in the mine of the Midwest Coal Co. at Palisades, Oct. 7, killed Walter Scott, the manager, and five workmen. Investigation into the explosion was started by Coroner E. A. Krohn, Oct. 8, when all but two bodies had been removed.

ILLINOIS

The Hickory Grove Coal Co., an organization with headquarters in Rochester, N. Y., has purchased 120 acres of land

about two miles south of Riley, for a striping mine, and expects to begin loading coal soon. The mine may have a capacity of about 2,000 tons a day or about 40 carloads. The company has purchased steam shovels and other equipment. The E. I. & T. H. lines are at present building switches from their main lines to the new field. The new concern has extensive striping mines in Ohio and West Virginia. L. A. Fitch, of Rochester, N. Y., is president of the company and the local operations will be supervised by J. A. McLean, recently in charge of the company's mine at Clarkburg, W. Va.

The Central Illinois Public Service Co. through a consolidation becomes the owner of the mammoth power station under construction on the Mississippi river at Grand Tower, and of the double-circuit 66,000-volt steel tower transmission line now being built to deliver energy from Grand Tower to West Frankfort, where it will be redistributed through the coal fields and communities of southern Illinois. Electric service is rendered 107 active mines in the coal fields of central and southern Illinois. Although more than 48,000 hp. is furnished to serve coal mines, the present connected business is slightly less than 32 per cent of the total amount of business of this character adjacent to the company's transmission lines.

The Madison Coal Corporation is erecting a new mine-rescue building at the Crystal Mine in Tilden. This new building will be equipped with every modern appliance for rescue work. The company also is building a new wash house and when this done it will have 621 lockers and 26 showers. This mine now employs 500 men.

Donk Brothers Coal & Coke Co. at Edwardsville, has completed a new shaft and tippie and coal is now being hoisted through the new skip. About 300 men are being employed at the mine. As soon as the underground workings can be extended the mine will employ 200 additional men.

Dr. F. C. Honnold, head of the Honnold Coal Bureau of Chicago, made an illustrated talk on "The Story of Coal" before the Chicago Rotary Club, Oct. 16.

The Dodds mine, near Carrier Mills, owned by the Dodds Coal Co., has resumed operations. The company has just completed installation of new screens and cleaning machinery which will give the mine a cleaner product than heretofore.

At Marion a night school in coal mining is now in operation under the supervision of Prof. H. W. Bradbury. About 200 miners are enrolled. Courses in technical training and in branches that are difficult for practical miners to obtain are offered. Graduates will be able successfully to pass state examinations for promotion in mining.

The Harrisburg Colliery Co. has completed the erection of 25 modern four-room cottages, near its plant at Harrisburg, to help relieve the housing shortage there.

Electrification of hoisting and other machinery at mine No. 16 of the Old Ben Coal Corporation at Sesser is about complete. With the exception of a few minor repairs on the tippie and additional work about the mine, everything is in readiness to resume hoisting again.

John Meyers has resigned as mine manager of the Majestic mine, at Du Quoin, and will accept a position as superintendent for a large coal company at Johnston City.

W. K. Kavanaugh, head of the Southern Coal Coke & Mining Co., which operates in the Belleville region, is sponsoring a new type of coal burner for domestic furnaces. It is called "The Electric Furnace Man." It is a coal hopper and small motor-driven stoker to be installed under any household furnace, aimed to burn any kind of small coal, even Standard district screenings, the cheapest coal now on the market, without making any smoke. The device has just been put on the market.

Two new coal mines near Lewistown have opened and coal is being hoisted. The Lindquist and Fleming Brothers mine, located on the John Bowen farm, is on a lease of 105 acres of thin vein coal. E. W. Duvall has begun the mining of coal from the shaft on the Griffith farm at the end of North

Railroad Street. Robert Nahm is operating his mine in the east part of Lewistown at full capacity. Lewistown now has three mines.

INDIANA

In accordance with agreements reached several weeks ago, concessions for mining coal underlying the Wabash River from the State Department of Conservation to the Grasselli Chemical Co. and the Miami Coal Co., have been recorded at Terre Haute. The companies will pay a royalty of 10c. a ton. Engineers of the departments are at work to determine the amount of coal taken from the state-owned ground before the agreement, to ascertain what sum is due to the state for coal already mined.

Reports from Clinton are to the effect that a party of Terre Haute men have been taking options on Helt Township coal land the past few weeks and it is now definitely known that options have been obtained on about 2,000 acres. The options are taken on the big waste of farm land lying between St. Bernice and Summit Grove. There is believed to be a rich deposit of coal under most of the land. One hundred dollars an acre has been the prevailing price for coal lands in that township.

Clem J. Richards was appointed receiver for the Sugar Valley Coal Co. Monday, Oct. 8 by Judge John E. Cox in Superior Court of Vigo County immediately after a suit had been filed in that court against the company by Frank M. Steiner, seeking payment of \$5,000 alleged to be due and asking for a receiver. Mr. Richards' bond was fixed at \$50,000 as receiver and he was directed by the court to close the mine and employ men to care for the property.

A movement for a uniform eight-hour day for all labor employed in connection with coal mining in District No. 11, U. M. W. of A., has been launched by local union 2,648, located at Shirkieville, in behalf of mine firemen. The action taken by this local in the form of a resolution adopted sets forth that mine firemen are compelled to work ten and twelve hours a day, "which is not in line with the miners' constitution." The resolution places the local on record as favoring a uniform work day and calls upon other locals in the district which are in favor of a shorter work day for firemen to pass resolutions to that effect.

Suit for recovery of about \$2,500 for rents due for use of coal lands was filed by Milton Webster against the Otter Creek Coal Co. in Superior Court at Terre Haute, recently. Along with the complaint was filed a copy of a contract between the two parties, in which the coal company guaranteed Webster \$300 a year or more for use of his lands at 80c. a ton. According to the plaintiff, this sum has never been paid since Jan. 1, 1912.

KANSAS

Involuntary bankruptcy proceedings have been inaugurated in the Federal District Court in Fort Scott, Kan., against the Acme Coal & Mining Co., asserting the liabilities are \$40,000 and assets half that amount. A Pittsburg bank is the principal creditor. The Acme has been operating a steam-shovel mine on leased land at Gross, Crawford County.

A. W. Dickinson, formerly general superintendent of the Western Coal & Mining Co., with operations in Illinois, Kansas and Arkansas, has entered the service of the Union Pacific Coal Co. in the capacity of safety engineer. Mr. Dickinson will have direct charge of all matters pertaining to mine safety, the Union Pacific Coal Co. operating some twenty mines in the State of Wyoming.

The Buckeye Shale Brick Co. has been chartered with a capital of 2,000 shares, no par value, for the purpose of mining coal. Incorporators are M. E. Kundmiller, Jean B. Clyde, Ralph W. Edwards, Pat D. Collins and A. K. Strong.

Holmes Wager has been appointed general treasurer of the Western Coal & Mining Co., with headquarters in St. Louis. He succeeds Edward S. Johnson, who recently resigned to assume a connection with a St. Louis building and loan association. Mr. Wager has been in the employ of the Western for 23 years. Beginning as billing clerk he became cashier and then general claim agent.

A new record for a single day's production in the Kansas field was established Oct. 5 by the Central Coal & Coke Co. in its mine No. 51, near Mingo. On that day the output from the one shaft was 1,433 tons. The mine had been idle two days. On Oct. 1 the production was 1,291 tons and on Oct. 2 it was 1,332 tons.

KENTUCKY

The coal operators association in Kentucky has decided to organize and maintain a coal co-operative insurance company of their own and carry their own risks. This step was taken as a protest against the action of the associated compensation insurance companies, which has filed with the Workmen's Compensation Board of the state an application to increase the compensation rate from a basic rate of \$3.40 to \$3.85.

The St. Bernard Coal Mining Co., of Earlington, operating a branch in Louisville under the management of W. B. Gathright, has arranged to install an exhibit at the second annual Better Homes and Building Exposition, during the week of Oct. 22. Mr. Gathright is planning to install a mine operation in miniature.

MINNESOTA

The County Attorney of Hennepin County has had an investigation on in Minneapolis for some days, seeking to ascertain if there is any conspiracy existing which results in the high cost of coal. The attempt has been made to show a collective understanding among members of the dock association as to high, uniform prices. This was disputed by the Twin City Coal Exchange, which is antagonistic to the docks. But exchange men testified that the prices were made at the instance of the producers and that the dock men had little to say about them. Dock association officers stated that the organization had nothing to do with prices. The advance of 75c. in anthracite due to the increase to the miners, will also be investigated. It is estimated that the receipts of 900,000 tons of hard coal for the season over the docks, now reduced to 160,000 tons, must have been put in hiding in order to take advantage of the increase in price. So the investigation is to be extended to the books and records of the railroads and dock concerns, to ascertain where the dock receipts have gone. County Attorney Olson expects to go to Duluth in search of evidence on this phase of the matter. The dock charge, amounting to \$1.90, also is to be investigated.

MISSOURI

The mine at Mosby operated by the Mosby Coal Co., has been leased by a new firm under the title of the Mosby Block Coal Co. Of the new company, David Lodwick is president, and John S. Lodwick is secretary and treasurer. Both are from Domestic, Ia. The mine has been closed several months because of sand and water, but inspectors after an examination, predicted no more trouble would be experienced. They explained the flow as due to the release of a stratum of the fluid material from between two strata of limestone, which finally have come together, thus damming the flow.

W. J. Patterson, of St. Joseph, for the last twelve years connected with the F. M. Brinson Coal Co. in that city, has gone in the wholesale business for himself and opened an office in the Corby-Forsee Building.

W. K. Kavanaugh, president of the Southern Coal, Coke & Mining Co., of St. Louis, was appointed foreman of the new grand jury at St. Louis, which was recently impeached for the October term of court.

One hundred and eighty miners employed by the Elmira Coal Co. in its mine at Elmira, have returned to work, pending arbitration, after having been out on strike six weeks as a result of a disagreement between the company and one of its men over a claim of \$45. The room in which the man was working encroached upon a railway right of way, and he was laid off while another room was being made ready. He demanded \$45 payment for this idle time. Other miners, thrown out of work by the same cause, made no claim against the company.

A. B. Jefferis has started the Big River Coal Co. at St. Louis. He is the son of J. A. Jefferis, well known in the Middle West as manager of the Kerens-Donnewald Coal Co.

MONTANA

The King Coal Mining Co. has been incorporated for \$250,000 at Aberdeen, S. D., by James M. Brown, H. E. Kenyon and K. K. Kearney to purchase and operate the Star Coal Co.'s property at Musselshell.

OHIO

The October term of the U. S. District Court at Cincinnati shows a number of coal disputes that will have to be ironed out in the court.

The Columbus-Pocahontas Coal Co. has been organized by Columbus capitalists with a capital stock of \$500,000, its principal office to be at Columbus. Interested as incorporators in the new concern are F. A. Mossgrrove, H. N. Bargar, N. D. Kerns, R. T. McClure and W. T. Thompson, all of Columbus.

The Cincinnati Credit Bureau, backed by that branch of the American Wholesale Coal Association, is again functioning. Offices have been opened on the 29th floor of the Union Central Building, and J. E. Phillips, who was connected with Sanborn's Blue Book for several years, is now in charge.

The Columbus Board of Education will open bids Nov. 8 for 1,000 tons of Hocking nut, pea and slack for the Central High School building, which is nearing completion. The proposal terms provide that it must be free from dirt and must be delivered to the building.

The City Ice & Fuel Co., Columbus plans the building of a large retail yard at West Broad St., and the Big Four tracks to supplement yards already in operation. The yard will be equipped with modern loading and unloading equipment as well as other machinery.

The Columbus-Pocahontas Coal Co., which will have headquarters in the Hartman Bldg., Columbus, has been chartered under the laws of West Virginia with an authorized capital of \$300,000 for the purpose of operating mines and holding coal properties in the smokeless field. No announcement has been made of the properties to be taken over. The incorporators are N. D. Kerns, R. D. McClure, W. T. Thompson and F. A. Mossgrrove.

Papers have been filed with the Secretary of State increasing the authorized capital of the Long Hollow Coal Co., of Columbus, from \$25,000 to \$120,000.

The Swan Creek Lumber & Supply Co., Toledo, has purchased the retail coal business formerly conducted by the Fort Meigs Coal Co. The deal was closed Oct. 1 and the yard temporarily has been placed under the management of Henry S. Wingard. A new company, to be known as the Swan Creek Coal & Coke Co., will be chartered to handle the retail coal business from the new location. Improvements to the amount of \$25,000 are planned.

The Moss Run Coal Co., Bellaire, has been chartered with a capital of \$30,000 to mine coal and operate coke mines. Incorporators are Robert C. Williams, Herman R. White, R. N. Shaver, Fred McConn and Robert C. Brown. Mail will reach this company at R. F. D. No. 1.

Fifty thousand tons of coal came into the Cincinnati harbor from Kanawha River points the latter part of the first week in October, making the largest single shipment of coal that has been brought down from the upper reaches by water since the Ohio River was canalized. This coal was collected at the mouth of the Kanawha River and was wafted down on the waves created by the lock and dam system on which the government has spent millions of dollars. Eight fleets in all were brought down and nearly all were represented by Cincinnati coal merchants. Some of this coal continued on down the river destined for Louisville and midway points, but the most of it was either transferred directly to the rails or went into stockpiles at Cincinnati. Coal men point to this as a clear indication of the price having at last hit below the cost of production even to mines that have the least overhead to bear.

The Whittier-Crockett Coal Co., of Columbus, has installed a \$60,000 tippie at its mine near that city. It will handle 2,500 tons of lignite daily.

OKLAHOMA

Bituminous coal mines of Oklahoma produced 2,802,551 tons of coal valued at \$11,527,000, during 1922, according to statistics just made public. The McAlester district proved the most productive, with an output of 1,022,242 tons, valued at \$4,244,000. The value of the coal produced in the other fields is as follows: Coal County, \$371,000; Lattimer County, \$903,000; LeFlore, \$851,000; Okmulgee, \$3,340,000; Tulsa, \$986,000, and Craig, Haskell, Muskogee, Rogers, and Wagoner Counties, \$837,000. The average value of the Oklahoma coal was \$4.11 per ton, and the number of miners employed during the year was 7,828, of whom 6,500

worked underground. The average number of days during the year worked in the McAlester district was 128, while the average for the entire state was 114. The conversion of many railways and industrial plants to crude oil-burning types of boilers has given the coal-mining industry a distinct setback, but the depletion of oil stocks and a let-up in drilling operations give the coal mining industry a brighter outlook.

PENNSYLVANIA

The Mahoning Coal Co. has declared a dividend of \$10 on the common stock, payable Nov. 1, to stock of record Oct. 22. This makes \$30 a share declared so far on the common stock this year.

Jas. M. McIntyre & Co., of Rommel, have contracted with the Roberts & Schaefer Co. for a complete steel tippie and reinforced concrete screening bin to be built at their mine at Rommel. The tippie will be complete with dumps, crushers, conveyors and rescreening plant.

The Winstead Coal Co., of Uniontown, will open a new mine in the Eighth pool, Monongahela River, where the company has 96 acres of coal, the seam of which is said to be 7 ft. thick. The opening will be made about 500 ft. above Lock No. 8 on the right bank of the river.

Employees at two collieries of the Glen Alden Coal Co., who walked out last Oct. 6, protesting that they had not received the 10-per cent increase in wages granted under the terms of the new agreement, returned to their places Oct. 9. They decided to leave the adjustment of their grievances to union leaders. A third Glen Alden colliery was still idle, but it was expected the differences there would be speedily adjusted.

The general grievance committee representing the union mine workers of the Hudson Coal Co. voted Oct. 9 to call off the strike which had been in effect at nineteen of the company's twenty-two collieries and authorized the resumption of work Oct. 10. More than 19,000 men were affected. The committee decided to present its grievances in regular form, first to the district union officials and finally to the anthracite board of conciliation for adjustment. This action was taken on advice of officials of the United Mine Workers, who had declined to sanction the walkout. Production was curtailed approximately 60,000 tons by the two-day strike, which company officials declared was a violation of the new wage contract.

The Pittsburgh Steel Co. has called a special meeting of stockholders for Oct. 30 to vote on the proposal to transfer all the coal and coke properties of the company to the Monessen Coal & Coke Co., all the stock of which will be sold for the present by the steel company.

The three judges of the Common Pleas Court of Schuylkill County started hearings Oct. 8 on the appeal of the coal companies from the triennial assessment of 1922. All of the big coal land owners are represented in the appeals, the Reading Girard Estate, Lehigh Coal & Navigation, Madeira Hill, Lehigh Valley, Susquehanna Collieries Co. and Calvin Pardee holdings being represented by a score of attorneys. The court will hold continuous sessions on the appeals which originated in every township and borough in which there are coal holdings and it is estimated that a month will be required to hear the various appeals. The companies are appealing from a change in the taxation of coal lands from \$62,000,000 to approximately \$500,000,000. C. A. Snyder, State Treasurer, is heading the legal corps of the County Commissioners while Cyrus G. Doerr of Reading, and A. L. Williams of Wilkes-Barre, are among the attorneys representing the coal companies.

Thomas Kennedy, of Hazleton, president of District No. 7, United Mine Workers, has been appointed a member of the State Welfare Commission by Governor Pinchot.

The Oliver & Snyder Steel Co. has closed down its Oliver Nos. 1 and 2 plants near Uniontown, leaving the No. 3 plant running. The Champion-Connellsville Coke Co. also has closed down its plant near Brownsville.

The two properties of the American Coke Corporation, in Fayette County, which were advertised to be sold at receiver's sale on Oct. 4 were bought by W. M. Robinson, of Pittsburgh, member of the law firm of Reed, Smith, Shaw & Beall representing the Union Trust Co., American No. 1 plant, composed of 142 beehive coke ovens, about 30 acres of available unmined Pittsburgh or Connellsville seam coal, and machinery, plant and dwellings, sold for \$125,000. American No. 2 plant, composed of 240 beehive coke ovens, 170 acres of Sewickley seam coal and 17 acres of Pittsburgh or Connellsville

seam coal, with machinery, plant and dwellings, sold for \$75,000. No. 1 plant is located at Linn, near Brownsville, on the Pennsylvania R.R. and has been working off and on for the past few months, but was closed down by the new owner. No. 2 plant is at Martin, near Masontown on the Monongahela R.R. It has been idle for several months. The Orient plant will be sold Thursday, Oct. 25, and consists of 480 beehive ovens and 461 acres of Pittsburgh or Connellsville seam coal, with elaborate machinery and a large number of dwellings.

TENNESSEE

T. C. Miller has resigned as mine superintendent for the Sterling Coal & Coke Co. of Mauring, to accept the general superintendency of the Storm King Coal Mining Co., of Storm King, Ky.

UTAH

The Union Coal Co. has filed articles showing capital of \$500,000. The company takes over Carbon County property. C. N. Strevel, Salt Lake City, is president. He owns 498,000 shares of the stock. W. B. Outcalt is secretary-treasurer of the company.

Title to what some regard as one of the richest undeveloped coal sections in the state has been cleared by a decision just handed down by Eli F. Taylor, register of the local land office. The Lund family, of Salt Lake City, descendants of the late Anthony H. Lund, high official of the Mormon Church, are favored by the decision. The Lunds applied for patent to the land following its survey in 1917.

The majority stockholders of the Lincoln-Kemmerer Coal Co., Ogden, were prohibited in an order issued by District Judge Barker, of Ogden, from disposing of the company's property in Wyoming until after a hearing on Oct. 15. This hearing was for the purpose of deciding whether or not a receiver shall be appointed for the concern, as requested by the minority stockholders. Petitioners maintain that the defendants have allowed the property to deteriorate by allowing the mine to fill with gas and water and the timbers to rot, for purpose of selling to their agents, also that dividends from the property in the past have been diverted.

The Blazon Coal Co., of Salt Lake City, has applied to the Public Utilities Commission for permission to sell \$249,000 worth of stock with which to continue development of its property in the Point-of-Rocks district, Wyoming. It is the intention to build a railroad to this property. L. F. Rains, prominent as a promoter of the Columbia Steel Corporation, is president of the company.

The Salt Lake City office of the Sullivan Machinery Co. removed Oct. 1 from its old quarters in the Walker Bank Building to the Dooly Block, 121 West Second Street. B. B. Brewster is manager of the Inter-Mountain territory, comprising Utah, southern Idaho, eastern Nevada and western Wyoming.

VIRGINIA

The Chesapeake & Ohio Coal & Coke Co. has sold its mines at Stonegate, and will discontinue the operation of its Norfolk office Nov. 1, it has been announced. J. R. Routten, Norfolk manager, expects to go to New York to enter the home office of the company.

Offices of the Fort Dearborn Coal Co. have been moved from the Flat Iron Building to the Law Building, Norfolk, in order to be in the center of the business district. The Central Pocahontas Coal Co.'s offices have been moved into the Law Building, also.

WASHINGTON

Washington coal mining is the third largest industry of the state with between 5,000 and 6,000 men employed and with a normal payroll of \$11,000,000. The industry absorbs about \$9,000,000 worth of timber and mine supplies each year. Coal is mined in eight counties. The largest area of coal is in the Cle Elum district, where there is estimated to be 10,000 acres, according to a writer in Seattle.

WEST VIRGINIA

The coroner's jury at the investigation into the explosion at the Benwood mine of the Wheeling Steel Corporation late in September, conducted by the State Mines De-

partment of West Virginia and by the County of Marshall, brought in a verdict that the explosion was due to unknown causes.

Denial is made of the report that there has been any general effort on the part of operators in the Logan field to revise wages downward, although some companies are understood to have made a reduction for a short period at least. There does not appear to have been any general reduction made in the mining fields of southern West Virginia, however. In some of the non-union fields in the northern part of the state, however, it has been necessary to reduce wages to the extent of about 20 per cent in order to continue operations, but such a cut does not appear to have been general to non-union territory, although the fact that the present selling price is below the cost of production.

The sum of \$200,000 was involved in a deal in coal land in Logan, Mingo and McDowell counties in which Sheriff Don Chafin of Logan County, one of the best known figures in southern West Virginia, figured as one of the principals, when a large block of coal land was acquired from Maynard Stiles, Hattie Dixon and Thomas Bullock, of Los Angeles. There are two seams of coal underlying the land, one being 4 ft. thick and the other 7 ft. thick. This is said to be one of the largest pieces of undeveloped coal land which has changed hands in southern West Virginia in a long time, constituting the last remnant of the famous King land grant, which was in the courts under litigation for so long a time.

Plans for maximum production with minimum use of mine workers have worked out satisfactorily at the plant of the Hardy Coal Co. on the Norfolk & Western, where there are about 6,000 acres available for development. The company shipped 2,000 tons in May, 10,000 tons in June, 18,000 tons in July, 23,700 tons in August and 27,000 tons in September and expects to produce at the rate of 50,000 tons a month by April next. It is stated that with a little further construction work it will be possible to mine and ship coal at the rate of 1,000,000 tons a year. The mine is said to be one of the best equipped mechanically in the country. Although in operation a short time, the Hardy mine ranked tenth among a total of three hundred mines on the Norfolk & Western during September.

After smouldering for 18 months, a mine fire at the No. 2 mine of the Boone County Coal Corporation at Sharples has at last been extinguished. Although the fire did not cover a wide area nor burn very fiercely, yet it proved to be exceedingly stubborn owing to the fact that after frequent sealings, the air was still able to filter through the roof, furnishing just enough oxygen to keep the fire going. It was only recently that the sealing shut off all air and then the mine was flooded late in September. Little damage has been done the mine.

Although the strike at the Lowesville plant of the New England Fuel & Transportation Co. involving about 350 miners apparently was settled Oct. 3 after they had been on strike a week, the men were called out again on Oct. 6. The men walked out late in September because the company desired them to bore three holes before shooting down the coal. The men returned to work and agreed to drill three holes, but remained at work only a few days, when they were called out. On Oct. 8 an agreement was reached between sub-district officials and the management to arbitrate the differences between the men and the company.

The Minok coal mine, idle for some months, pending improvements, is now ready for work. The headframe has been extended, making the top about 100 ft. high. This addition will permit the installation of new sheave wheels in a short time. Two new 13-in. steel hoisting cables have been installed. A new deep well pump with cylinder 600 ft. down has been installed. A concrete floor of a 500-ton lump coal pocket is soon to be laid.

WASHINGTON, D. C.

An insistent demand has arisen in the coal-mining sections of the country for more precise knowledge in connection with the use of electricity in coal mines. Since the problem is a national one and involves the safety of large numbers of men working in mines, it is urged that the federal government should provide the funds to undertake the necessary study of the problem, which is becoming more and more acute. Alternating current is being used to a greater extent in coal mines, because of the economies of transmission which are

not possible when direct current is used. Mines are becoming more extended and the use of electricity is increasing with the result that the cost of this item is becoming a factor and is resulting in many properties being changed over from direct to alternating current. The number of accidents has increased materially with the more general employment of alternating current. The point has been reached where mine inspectors are in doubt as to the advisability of allowing the continuance of the use of alternating current. Mine operators, to whom a change in the electrical system means large expenditure, are of the opinion that the relative danger of the two forms of current should be established before any drastic regulations are put into effect.

The case of the Federal Trade Commission vs. the Claire Furnace Co. has been given a special preference by the U. S. Supreme Court. It will be argued before that Court on Dec. 3. In the case of the Corona Coal Co. vs. the United States, the Court calls upon the coal company to show cause why the appeal should not be dismissed.

The U. S. Supreme Court has been asked to review the case brought against the Pittsburgh & West Virginia Coal Co. and others by the Canute Steamship Co., Ltd. An adjudication in bankruptcy against the Diamond Fuel Co. was approved by the Circuit Court. The steamship company is a creditor of the Diamond Fuel Co. and has attached certain property of the coal company at Baltimore.

Quite contrary to the usual custom, the Supreme Court of the United States has reopened the case of Pennsylvania vs. West Virginia, in which the court held that local consumers are entitled to no preference in the use of gas in its flow through interstate pipe lines.

CANADA

The British Empire Steel Corporation reports September coal production at 412,850 gross tons as compared with 425,044 for September, 1922. Production for the first nine months of the year was 3,924,628 gross tons as compared with 2,836,352 tons for the corresponding months of 1922, an increase of 1,088,276 tons.

J. D. Galloway, provincial mining engineer for the northeastern division of British Columbia, just returned from a tour of inspection in the Peace River region, reports that the known coal area at Rocky Mountain Canyon is 40 by 60 miles in extent. The grade of the coal is semi-anthracite, and is markedly lower in ash than the majority of the Western coals. As a rule the seams are small, but there are an appreciable number of commercially workable seams. A shipment of 40 tons has been sent by water to Peace River Crossing, consigned to the Canadian Pacific Ry., which will give it a practical test to determine its steam-raising qualities. Mr. Galloway stated that if transportation difficulties were overcome he believed the coal would compete with Pennsylvania anthracite in Ontario markets. Mr. Galloway stated that he found the people much opposed to comparatively recent legislation reserving coal and oil lands, thus making it much more difficult to obtain coal and iron leases.

Definite steps have been taken in the Canadian province of Alberta to protect coal buyers against deception in the fuel they get. The government has enacted a law aimed to prevent substitution of poor coal for good by requiring the trade name, mine of origin, class and grade of every coal shipment to be recorded on all documents involving the coal. Fine and imprisonment up to six months are the penalties for infraction.

Alberta coal is in demand in Ontario, according to press dispatches. It is stated that in the City of Windsor, Ont., the City Hall was stormed by hundreds of citizens anxious to obtain some of the Western coal, which was being offered at \$14.50 a ton. In order that the distribution might be fair the authorities were compelled to limit each applicant to one ton. The regular price of coal at Windsor, it is said, is \$20 a ton and it is difficult to get at that price.

Forty-six tons of semi-anthracite from the Peace River country in the vicinity of Hudson's Hope have been delivered by scow to the Canadian Pacific Ry. to be used as a test of its steaming qualities in the locomotives of the E. D. & B. C. Ry., a subsidiary of the C. P. R. running into Edmonton. If it is a success, of which there is no question in the minds of the members of the coal company, it will mean the establishment of a new coal industry in northeastern British Columbia. Neil Gething, W. Gething, L. Gething, and Leslie Ayland, all of Hudson's Hope, are the promoters of the enterprise.

Obituary

William Harrison Conkle, 69, prominent pioneer coal operator of Sullivan County, Indiana, died at his home recently of a complication of diseases. He became suddenly ill the day before and his condition became rapidly worse, finally developing into double pneumonia and heart trouble. Mr. Conkle was born in Beaver County, Pennsylvania, Oct. 5, 1854. Surviving are the widow, two daughters, Mrs. Tine Huff and Mrs. Max Crowder, of Sullivan, and one son, W. E. Conkle, of Pekin, Ill.

Thomas Cunningham, 76, died recently at his home in Edwardsville, Ill. For the past 20 years he had served most of the time as county mine inspector for Madison County. Born in Scotland, he took up coal mining as a boy and came to Illinois at the age of twenty. He celebrated his 53rd wedding anniversary last December. Besides a widow he leaves five children.

Recent Patents

Water Filters and Filtration Equipment. The Permutit Co., New York City. Bulletin 105. Pp. 23; 8x11 in.; illustrated. Covers the theory and practice of modern filter design and construction. Method of operation is shown by detail drawings.

Sullivan Machinery Co., Chicago, Ill., has just issued the following bulletins: **Rotator Hammer Drills.** 81-B. Pp. 31; 6x9 in.; illustrated. Describes new line of rotator drills redesigned to obtain increased drilling speed. **Ironclad Overcutter, Class CE-11.** Bulletin 79-H. Pp. 7; 6x9 in.; illustrated. A new type of machine is described for mining out dirt bands or partings midway of the coal seam so as to prevent mixing the dirt or impurities with the clean coal when it is loaded out. **"WA-6" Air Compressors.** Bulletin 77-G. Pp. 7; 6x9 in.; illustrated. Describes single-stage steam-driven straight-line air compressors. This bulletin is a reprint of a former edition. **Drill Sharpeners.** Bulletin 72-H. Pp. 32; 6x9 in.; illustrated. Describes the drill-steel sharpening machines of two types and their adaptation to making different classes of drill bits and drill shanks on solid and hollow steel.

Trade Literature

Type AA Reliance Induction Motors. Reliance Electric & Engineering Co., Cleveland, Ohio. Bulletin 5018. Pp. 14; 8x10 in.; illustrated. These motors are for two and three-phase alternating-current circuits. Details of construction are outlined.

Bristol-Fuller Controller Valve. The Bristol Co., Waterbury, Conn. Bulletin No. 319. Pp. 15; 8x10 in.; illustrated. For use with automatic temperature-controlling apparatus to control the flow of air and gas, steam, oil and other liquids. Describes some of the variations for which this equipment can be supplied.

Lopulco Pulverized Fuel Systems. Combustion Engineering Corp., New York City. Catalog L-1. Pp. 11; 8x11 in.; illustrated. Describes both the theory and mechanical features of the powdered-coal system installed by this company in some of the boiler plants in this country, and includes a section through a Lopulco-equipped boiler plant showing all the different elements of the system.

Type "AR" Squirrel-Cage Induction Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin 1118-B. Pp. 10; 8x11 in.; illustrated. A feature of these motors is the use of cast steel in place of cast iron wherever practicable.

A new illustrated circular just issued by the Davenport Locomotive Works, Davenport, Iowa, illustrates the various types of steam locomotives of large and small gage. This company specializes in locomotives for mine and contract work and has incorporated many new features of design in its locomotives that will prove interesting to the coal-mining engineer.

Two new bulletins of interest have just been published by the Atlas Powder Co., of Wilmington, Del. **"Move Your Oldest Stock First"** is the title of one which explains the advantages of stocking explosives in such a manner as to move the oldest stock first and thus always have the advantage of new supplies. This arrangement obviates the necessity of discarding

any old supplies which may deteriorate with age. The second bulletin is on the subject of **"Small-Diameter Dynamite Cartridges Inferior."** This is an extract from the Bureau of Mines Report by S. P. Howell and J. E. Crawshaw. This bulletin shows that as the diameter of cartridges of dynamite, gelatines, permissibles and other high explosives is reduced the velocity, sensitivity and efficiency also are reduced and the objectionable fumes given off when the explosion is detonated are increased. The loss in strength or efficiency is due to partial or incomplete detonation resulting from insensitivity.

Bulletin No. 43976 of the General Electric Co. covers **Charging Equipment for Motor Power Storage Batteries.** This bulletin describes charging equipment which has proved reliable and satisfactory in service. There are two classes of apparatus described in the bulletin: (1) Individual battery charging motor-generator sets with switchboards for Edison or lead batteries for (a) Non-automatic or (b) Automatic operation; (2) motor generator sets with switchboards for charging two or more Edison or lead batteries for (a) Non-automatic or (b) automatic operation. Due to the varied nature of the sizes of the batteries to be charged, of the requirements to be met in different localities, of the methods of charging, etc., no attempt has been made in this bulletin to show any but a small proportion of the equipment that is manufactured by this company.

"It Pays to Keep Boiler Tubes Clean" is the title of a new pamphlet recently put out by the Heine Boiler Co., St. Louis, Mo. A most interesting statement on heat transmission in this pamphlet is to the effect that tests have shown that one-fiftieth of an inch of scale deposited on steel plates reduce the rate of heat conduction 60 to 75 per cent. In addition, the scale prevents rapid transmission of heat to the water, thus causing the tubes to become overheated and their life greatly shortened. Mud deposited on the heating surfaces results in lower heat transmission—fuel waste—overheated and bagged tubes. It pays to keep boiler tubes clean.

The Rome Wire Co., Rome, N. Y., has issued the following bulletins: **Super Service Cord and Cable.** Pp. 16; 7x10 in.; illustrated. Size of gage, stranding, capacity amperes, diameter of two- and four-conductor cords, three-conductor and single-conductor flexible cable, concentric, two-conductor cables and parallel duplex mining cables are given. **Super Service Junior Cord,** especially adaptable for mine, telephones and other mine equipment is covered in this bulletin and also in a 3x6 four-page folder. **Welding Cable,** declared to be absolutely waterproof, is described in the 7x10 in. bulletin and in the smaller one, which also gives prices.

Gas Conditioning for CO₂ Recorders. Uehling Instrument Co., Paterson, N. J. Bulletin 116-A. Pp. 7; 9x11 in.; illustrated. Describes the "Pyro-Porus" filter, gas drier and gas purifier, three simple devices which are claimed to completely eliminate soot, moisture and sulphur. Small bore seamless-drawn tubing used for the gas sampling line also is described.

Hose Fittings. Schlangen Bros. Co., Chicago, Ill. Pp. 43; 6x9 in.; illustrated. Covers nozzles, sprinklers, connections, clamps, couplings, bushings, valves. The bulletin has an attractive appearance, being bound in heavy brown paper.

The Osgood Co., of Marion, Ohio, has recently issued Bulletin No. 236. This is in the form of a four-page folder illustrating and describing its new 14-yd. heavy duty steam shovel.

Association Activities

The board of directors of the Central Pennsylvania Coal Producers' Association and the executive committee of the Association of Bituminous Operators of Central Pennsylvania met Tuesday, Oct. 9, at the Lincoln Trust Building, Altoona, and re-elected B. M. Clark of Indiana, Pa., president; G. Webb Shillingford, of Clearfield, vice-president, and Charles O'Neil, of Altoona, secretary-treasurer of both organizations. John C. Forsythe was re-elected commissioner of the Association of Bituminous Operators and W. A. Jones was re-elected statistician of the Coal Producers' Association. Conditions in the field were considered in an informal discussion, one of the subjects taken up being the negotiations for a new scale that must be framed to take the place of the one that expires on April 1, 1924. The coal business is decidedly dull in the district at present, the general opinion among the operators present being that

it is due to overproduction, the extended use of fuel oil by the shipping interests and by the gradual development of electric power in the New England states, where there always has been a good market for central Pennsylvania coal. Operators present at the meeting who have visited the New England states recently declared that electric-power plants are springing up along the various rivers and the promoters contend that because of strikes in the coal regions, high freight rates and the tying up of the railroads during the extreme weather of winter, coal is becoming too expensive and the supply too uncertain. It also was reported that the use of oil as fuel is increasing by leaps and bounds and is adversely affecting the coal industry. It was shown that prices at the mines are so low now that there is no profit in the business.

Traffic News

The movement of freight cargoes through the canals at Sault Ste. Marie during September totaled 12,776,048 net tons, according to the monthly report of the U. S. Engineer's Office, as compared with 10,986,056 short tons in September last year. The movement of coal upbound was 1,945,344 net tons of bituminous and 73,461 net tons of anthracite compared with 2,353,745 net tons of bituminous and 10,805 net tons of anthracite in September a year ago.

A complaint against the present level of railroad rates on coal from Illinois, Indiana and Kentucky to Iowa cities was filed with the Interstate Commerce Commission Oct. 10 by the Iowa Board of Railroad Commissioners. Consuming territory of Minnesota, Wisconsin, Illinois, Missouri and Indiana, the petition said, has more favorable rates on coal than Iowa. The commission was asked to institute an investigation to fix a fair rate level.

Rates on coal from the Crescent group in West Virginia and Kentucky from the Pocahontas field and from other producing areas to various consuming points in Indiana have been attacked in a score of complaints filed Oct. 6 with the Interstate Commerce Commission on behalf of various Indiana consumers.

On Sept. 28 the Interstate Commerce Commission closed its hearing of the Louisville & Nashville R.R. and Atlantic Coast Line R.R. for exercising an agreement for a 999-year lease on the Carolina, Clinchfield & Ohio R.R., which is opposed by the Seaboard Air Line and other Southeastern railroads, which fear a monopoly. The Commission has given those interested until Oct. 29 to file briefs, for final argument of the case.

It was reported from Pineville, Ky., Oct. 4, that work had started on another 18-mile section of double track on the Cumberland Valley Division of the Louisville & Nashville R.R., several sections of which have been double tracked, in the plan of making this division a double-track affair from Corbin to Loyal, in an effort to give better service to tonnage from Bell and Harlan County fields. A 17-mile section of the Eastern Kentucky division of the road into the Hazard field also is under double track construction. If the L. & N. obtains its Clinchfield lease it will be in excellent position to give fine service to the shippers after connections are made from the Eastern Kentucky and Cumberland Valley divisions to the Clinchfield.

Coming Meetings

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

American Welding Society, Oct. 24-26, Pittsburgh, Pa. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Harlan County Coal Operators' Association, Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

Second National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, OCTOBER 25, 1923

Number 17

A Squeeze Can Be Helpful

"CONSOLIDATE!" has been the cry. "Let economic pressure squeeze these excess mines either out of business forever or else into big, well-operated groups. Then the problems of coal will be solved."

Today that economic pressure is hard at work. The weeding-out process in the coal industry is leading to consolidations. In the Middle West right now there are no less than three new consolidations forming and the stronger of the groups formed years ago are carefully choosing the new properties they would like to absorb. In nearly every case the absorbing company is making definite plans to rehabilitate the newly acquired mines so that those operations may have, by the aid of the best equipment and management obtainable, a chance for life.

The encouraging thing about all this is not that the number of mining companies is reduced. Merely eliminating such unfortunates is of no permanent value, for a new crop always is able to spring up from nowhere during each favorable coal season. The real gain to industry lies in the fact that every siege of adversity proves more convincingly than its predecessor that pot-hole methods of mining do not pay in the long run. The mining property that endures is the one that is efficiently equipped and managed.

Today the first act of wise men of coal, upon taking over a failing mine, is to equip and man that mine so that it may have a real chance to stand up under the shocks of a highly competitive industry. Such investing is going on all over the country. As it increases, the measure of engineering and management knowledge in the coal industry increases. Perhaps that is how sound consolidations solve the problems of coal.

Why Not Fix Girard Royalties?

FEDERAL Trade Commission activities are directed against an agreement alleged to have been entered into between a producing coal company and some wholesaling firms to divide profits at a time when Pennsylvania had established a production price. The question arises, why is the producer alone regulated? Why not also fix the royalties on coal, especially that owned by the Girard estate? Is the producing price of coal to be fixed and the royalty price to be immune? Is the agreement to pay a certain percentage of the selling price of coal to the Girard estate also a trade conspiracy? Why not prevent such contracts from being made?

The coal mined by the coal company to be investigated was produced in Pennsylvania and was sold in another state. Is the regulation of price in one state to prevent participation in a profit in another state? Is a coal company, compelled to sell coal at a restricted figure when it knows the buyer will sell at an unrestricted figure and pocket a large profit?

If so, where is the justice of such a proceeding? The

payment is alleged to be conditioned on this large profit being made. It is admitted by the commission that if the consumer did not have to pay it the producer was not to receive any part of it. It seems that what this company is said to have done discouraged profiteering by making it less profitable. According to the commission's statement the man who made the price was allowed to make only part of the profit and so had only that part of the margin to act as an incentive to profiteering.

Meanwhile, as S. D. Warriner said the other day, one of the worst profiteers in coal is the City of Philadelphia in the person of the Girard estate.

Firedoors in Coal Mines

SOME of our metal-mine engineers are opposed to reversible fans. They prefer firedoors, operated by hand or electrically. These, Charles A. Mitke says, are foolproof. It will be difficult to get any coal-mining man to assert this of any door. In coal mines generating explosive gas almost any readily closed stopping is a menace. They are necessary evils at best, not to be erected without due need, for the closing of one of them when it should be open or the opening of one of them when it should be closed may result in an explosion.

Even in a mine which does not produce explosive gas naturally or as the result of a mine fire, firedoors are not absolutely foolproof. A mine on fire generates carbon monoxide, and the closing of a door may baffle the air current and hold the monoxide in the workings. If that fire is confined to a mine portal or to a shaft the danger in a mine not normally generating explosive gases is inconsiderable, but if the fire is raging where men are working it may cause the gases to stay and spread in those workings and asphyxiate the workmen.

As it is easier for a single miner to close a door than for an individual to reverse a fan, a door is a dangerous facility, especially when it is not in charge of a responsible man. Still it is not clear that the superintendent would not feel safer if he had a few doors in his mine that could on occasion be unlocked and closed by a man entrusted for that purpose with a key, but he would have to be a reliable man, for the opening or closing of a door is fraught with as many unfortunate possibilities as the reversal of a fan. In fact, how is a fan reversed but by the opening and closing of doors?

At the Argonaut mine, in California, the fire was in the shaft, and firedoors would have kept the gases which were generated in the shaft and circulated by the fan from entering the workings. They would have served their purpose in one way better than a reversed fan, for the air would have been instantaneously stopped, and in another way worse than such a fan because the reversal of the air current would have rid the mine of such gas as the fan had before reversal driven into the mine.

Even in the case of the Argonaut fire the argument

for the fire door is not quite conclusive. However, it is tenable in comparison with a case where the workings are on fire and the shaft is not burning. The ventilation is needed in the mine itself, for it reeks with poisonous gas and is all the time generating more, and it is easy to imagine what might happen in a coal mine with explosive gas and open lights; and, be it remembered, a burning coal mine develops methane whether it is present normally or not. The gas from a coal fire, moreover, contains not only carbon dioxide, carbon monoxide and methane but hydrocarbons of various kinds that are exceedingly harmful to human life. In a shallow shaft and drift workings the right kind of gas mask in the hands of all the men would prove a greater security than either firedoors or reversible fans.

Beautify a Coal Mine? Certainly!

LORADO TAFT, American sculptor, declares there should be art and beauty in every industry—yes, even in coal mining. In coal mining? The average American operator, saturated, so to speak, with the gloom and dust and slime of the “dark industry,” achieves that well-known physical impossibility of pricking up his ears. Then he smiles paternally upon Mr. Taft. Has Mr. Taft ever seen a bituminous-coal mine? Is he familiar with the gulches and wastelands in which so many mine towns stand? Has he ever seen the dust and spillage and smoke that are inevitable around a top works? Does he know the attitude of the average miner toward things of beauty, such as green patches of lawn and well-papered and painted houses, which the company may provide? What chance is there for any art or beauty under such conditions?

Well, we are not going to argue that mine operators should erect marvelous figures of the huntress Diana to grace mine-camp crossroads. Nor yet that Italian sunsets in oil should grace the smudgy sheet-iron sides of tipples. There are, however, beautifying touches that can be applied to coal-mine towns and to mines themselves—practical touches. The industry already has a few examples of beauty in mining towns. Trees and parks and flowers in such towns are recognized as exercising a wholesome effect upon labor relations between employer and employee, disturbed only by the influence of outside labor leaders and agitators.

But few indeed are the examples of beauty around the top works of the mine itself. Yet what sound argument can be brought against landscaping the property immediately around the tippie and power plant? A job of grading and sodding, a pleasing layout of shrubbery, a few trees, a cleaning up of discarded sheave wheels and broken cars, a coat of paint—and the place is transformed. City and town electric-light and pumping plants once were as blasting to their neighborhoods as the most slovenly coal-mine top works. A few hundred dollars expended in the “setting” has converted them. The same thing can be done at most mines.

But is there any need for it? Who cares what a coal mine looks like? Many of them are seen only by the miners and their families. The answer is that the effect upon those very people often is worth the expenditure. A Colorado mine superintendent of the hardest-headed, most practical type declares the proper lighting and whitewashing of the shaft bottom makes better workmen out of his miners. They instinctively get the idea the property is well managed, and that something of neatness and efficiency is expected of them in their

own work. A big Western coal company which once invested \$100,000 in architects' fees and extra building costs on a new property frankly to evade the excess-profits tax, found that the appearance of the property improved the performance of the workmen in that mine to such an extent that a permanent clean-up and beautifying program was adopted at all the other mines of the company for the entirely practical results to be attained. So there is something sane and sound in this talk of beautifying industry—even coal mines.

A Little Stone Dust—and Safety

IN COMMON estimation no mine is unsafe unless it has gas and has had an explosion. Coal dust looks as harmless as powder—and it is. It is remarkable with what confidence the man who knew the qualities of neither would view them both. They are both heavily fraught with mischief, but both look harmless enough. Strange also it is how proof and experience leave the average man blind to the dangers of coal dust. He is confident that what happened in Johnson's mine will never happen at his.

When something frightful does happen, when the women gather around the drift mouth or shaft and a hurried call goes over the wire for rescue men, he still declares that no one in reason would have expected anything like that at his mine. Meantime powdered coal, an explosive mixture, lay on the floor and the ribs of the mine. It looked harmless enough until it exploded.

And yet a little powdered shale dust on shelves, on the floor and ribs, or better yet in a stone-dust barrier would have prevented or at least shortened the travel of the blast. Such a simple remedy, that needs only occasional renewal, that is not like water cut off by freezing or the breaking of a pipe, and that does not fail because some underling overlooked some hazardous corner or misjudged the quantity to use; such a simple, readily installed remedy is passed over largely because it is so simple and unimpressive.

Rock dust has the advantage that it can be seen. No superintendent can fail to note if it is present. The use of it does not injure the roof, does not interfere with ventilation, does not involve a heavy charge for piping and pumping or for the maintenance of steam, does not becloud roadways or rot timber. It is useful in the West, where aridity and water scarcity make moistening prohibitively expensive. Yet in how few places is it used! Europe has ordered its application by law and regulation and has availed itself of it. But the United States still lags behind, despite all that has been done to inform the mining public of its value.

Unfortunate is it that the use of it has never been patented and put on the market. Rock dust is too cheap. We can all make it and use it. If it had only been commercialized and advertised, if permission to use it had been sold by traveling men and advocated by a corps of engineer salesmen, it would now be extensively used. As it is, it probably is utilized nowhere but at those mines where disaster has proved in some dire way that the coal dust at that mine is dangerous. Must we have explosions in every mine to make every operator realize that all the bituminous and lignite mines are dangerous and that a few of the semi-anthracite mines might be if the right opportunity were present?

Winter is coming. Surely now is the time to make sure that the mine which has never yet exploded never shall.

Safe Methods for Electric Mine Haulage That Insure Protection to Motorman and Equipment*

Maximum Grade for Locomotives—When and How to Repair Wheels
—Safety Features of Locomotive Design—Burn-outs Due to Defects
in Series Fields—Advantages of Good Feeders and Return Circuits

By J. F. MACWILLIAMS

Electrical Engineer, Pennsylvania Coal & Coke Corporation,
Cresson, Pa.

THE quantity of coal to be hauled per day, weight of the empty car, number of cars per trip, distance the loads have to be transported, track conditions and the grades to be traversed, all combine to govern the weight of the locomotive or the size of the hoist that must be used in mine haulage.

On a grade of 7 per cent a locomotive or loaded car will slide if once started downward; therefore hoists should be used instead of locomotives on grades of 7 per cent or over. This commends itself as a policy, for as a locomotive must haul itself as well as its trip up all grades encountered it becomes extremely inefficient on grades greater than 7 per cent.

As a trip will run readily on a $2\frac{1}{2}$ per cent down-grade, drags should always be provided to prevent run-aways in case of a coupling breaking where the grade is $2\frac{1}{2}$ per cent or over. Even if no one is injured, the wrecking of a single trip will prove far more expensive than providing a drag. Thus economy as well as safety will be promoted by its use.

As heavy rails give conditions favorable to traction and also support the load more safely and keep the track in better shape for a longer time, they should be used in preference to light rails.

RADIUS OF CURVES INFLUENCES MANY FACTORS

The wheelbase, diameter of the wheels, speed and other factors of a locomotive should be proportioned to the radius of the curves the locomotive is to run over. For instance, with a curve of 8-ft. radius, the wheelbase should be $20\frac{1}{2}$ in. and the diameter of the wheel should be 18 in. Similarly with a curve of 55 ft. radius, the wheelbase should be 10 ft. and the wheel 33 in. in diameter.

No less a tread than 3 in. should be used on a gathering locomotive running on 16- or 20-lb. rails, as the track cannot be kept in gage unless the tread is at least that specified. With a haulage locomotive, however, a $2\frac{3}{4}$ -in. tread will suffice if the tracks are kept in proper condition.

The minimum clearance of the lowest part of the locomotive from the cross rails should be $3\frac{1}{2}$ in., this allowance being increased to 5 in. at the bumpers; otherwise on a slight rocking of the locomotive or at changes of grades the bumpers will strike the rails and switches.

The weight on the drivers of a locomotive should be carefully balanced. Otherwise the locomotive will tend to climb the rails on curves, the drivers will be likely to slip, pinions and gears may be stripped, the brakes may fail to hold the load and the motors may burn out.

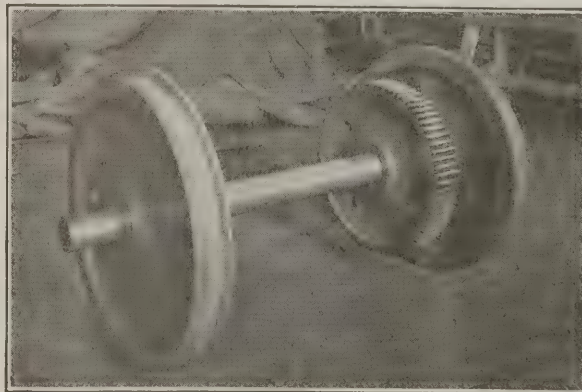
It would appear that the practice of connecting sets

of drivers by sprockets and chain so as to balance the load between the motors could be carried much further than is customary, with beneficial results. The braking effect on a steel wheel is greater and its tendency to slide is less than on a cast-iron wheel. For these reasons it is a safer wheel to operate, but care should be exercised in changing from cast-iron to steel wheels, as the motors are likely to be overloaded by the greater tractive effort after the change is made unless the speed is reduced in some manner.

The cast-iron wheel is cheaper in first cost and will wear less when first installed than the steel or steel-tired wheel, but as soon as the "chill" is worn through it must be scrapped. Due to the hardness of the tread of the chilled cast-iron wheel its adhesion to the rail is less than that of steel wheels. This reduces the drawbar pull as well as the power of the brakes. The steel wheel, whether rolled or cast, or the steel-tired wheel will give 25 per cent more tractive effort than the cast-iron wheel and if properly designed can be turned and trued up successfully several times, thereby offsetting the lower first cost of a wheel made of cast iron.

The most dependable form of brake is one which acts directly on the wheels. Brakes acting on the armature or intermediate shafts may be put out of service by the fracture of a shaft or the stripping of a pinion. For this reason regenerative braking with the motor should be regarded as merely auxiliary. When such braking is provided, the hand brake, which applies pressure directly to the wheels, by no means should be neglected. The brakes should be arranged so that the pressure against all the wheels will be equalized, for by that means the maximum braking effect will be attained.

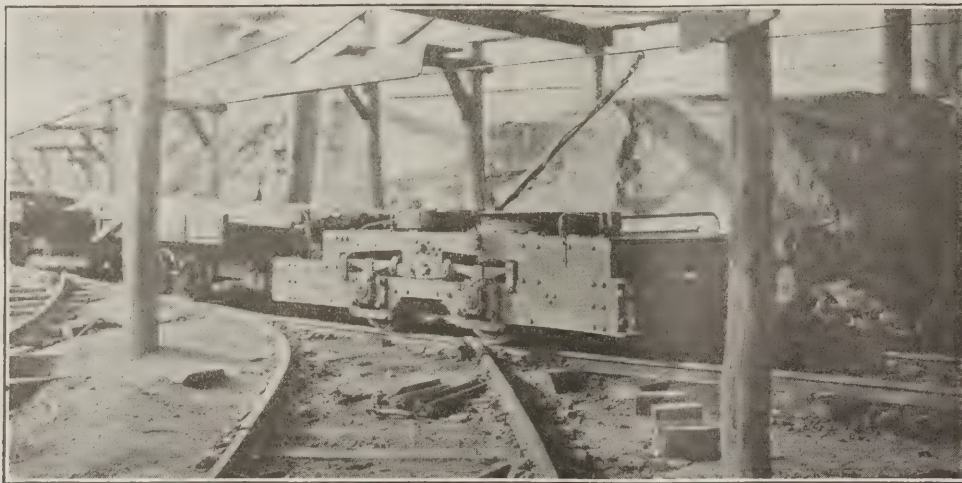
In order to prevent overloading of the motors, which may cause the trip to get out of control when ascend-



WHEELS, AXLE AND GEAR

Care should always be taken to have the wheel tread and flange correctly shaped. Solid gears pressed and keyed to the shaft is becoming standard practice.

*Abstract of paper presented before Mining Section, National Safety Council, at its Buffalo meeting, Oct. 1-5.



Locomotive With Cable Reel

The equipment on the locomotive should be arranged to obtain proper balance. Minimum clearance should not be less than $3\frac{1}{2}$ in. Concentric cable with the negative on the outside renders the cable safer.

ing or descending grades, and because of the high cost of maintenance when the motors are overloaded they should be of such capacity that they can cause the wheels to slip before being overloaded.

One side of the motor should be suspended on springs to prevent shock to gears, pinions, axles and armature shafts. Many cases of high cost of maintenance may be traced to the poor condition of these springs or their elimination at the mine.

The axle linings and the housings of bearings should be carefully inspected for wear, for many armatures as well as many gears and pinions are destroyed from lack of proper adjustment of the gear centers and their alignment.

I prefer a bumper made of a steel channel with wood blocks having two inverted ells or climbing guards near the center. In a collision the wood acts as a cushion and the guards prevent the locomotive from being overridden by the cars. When the bumper is thus constructed the steel channel will bend or spring under severe impacts, whereas if the bumper is a casting it may be broken.

Wheels should be kept in good condition to prevent derailments. Many methods have been tried for overcoming the effects of wear, and the best means for maintaining safe wheels is a consideration closely allied to their efficient operation.

Steel tires, if shrunk on, will prove expensive to maintain unless a good mechanic is on hand to see that the tire is shrunk on the wheel in the correct manner. A tire that can be removed and installed like that on an automobile has been used with success by our company. We have a dummy center on which it can be readily installed for turning whenever the tire becomes worn. We tried for some time to true the wheels by grinding, but the cost was high and the mechanics made much objection to the dust raised during the truing operation. Furthermore, it is difficult to grind the wheels true by this method.

We have reduced the number of shapes and sizes of wheels on our locomotives to conform to certain standards and have so arranged them that in many cases after a wheel has been turned down a number of times it can be used on a locomotive taking a wheel of smaller diameter. Whenever a wheel has worn on the tread so as to have a false flange of $\frac{1}{4}$ in. deep it is sent to the shop for turning.

At the shops standard shapes are kept to which the flange and tread are turned to fit; all wheels are checked before the wheel is mounted on the axle to determine

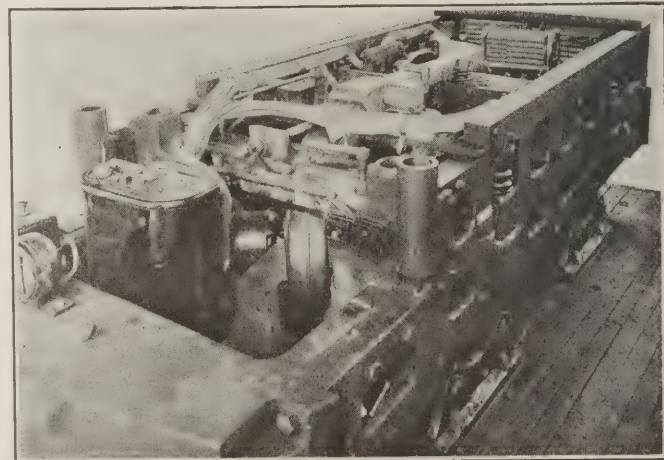
if the bore and tread are at right angles. The wheels of any pair must be turned so that the diameters are within $\frac{3}{8}$ in. of being the same.

The wheels are gaged at the four quarters with a track gage, with ends shaped to the tread and made of $1\frac{1}{2} \times 1\frac{1}{2}$ -in. flat steel, the purpose being to determine if the axle and wheels are true. The wheels are checked again at the mines with a similar gage to determine whether they have been damaged in shipping. We have made no attempt to build up the whole tread of a worn or damaged wheel by welding for fear that doing so would warp the wheel or set up heat strains. However, flat spots in the tread not over 2 in. in length are sometimes restored by welding, the wheel being turned true after this operation.

We have not been successful in using self-grinding brake shoes, as every locomotive wheel would need a shoe suited to the deformity produced by wear and the wheel would have to be carefully watched. The shoe would have to be removed when it had done its work or it would wear down the tread excessively.

All the wheels should be turned at the same time, for if one pair has a thin flange and the other is new, derailments are likely to occur. In that event the locomotive will not ride parallel to the track. Consequently, when new wheels are installed a complete new set should be provided.

I believe it is safe to state that 20 per cent of the series fields in locomotive motors that have been oper-



STORAGE-BATTERY LOCOMOTIVE

Note the large protecting fuse and safety fuse box. The lip or climbing guard on the bumper to prevent the cars climbing on the locomotive can be faintly discerned.

ated over three years are defective, and it is good practice to test the fields whenever an armature is changed, otherwise the armature may burn out because an armature running in a defective field will tend to rotate faster than normal and if in parallel with another motor will carry an excessive load. It is for this reason principally that I believe it to be bad practice to provide only one circuit breaker or one fuse for a locomotive. Contrary to the general practice each individual motor should have its own protection.

If a thorough inspection were made of all locomotives it would be found that in many of them the wire is too small. In consequence time is lost on the road, material is destroyed, and the motorman unnecessarily exposed to danger. These defects could be avoided if more consideration were given to the size of the wire and its proper installation.

In most cases 4/0 trolley wire is as small as should be used in the trolley circuit and in some cases we are about to try 6/0 wire so as to obtain more power and give the trolley wheel a better contact. In but very few roadways should the hangers be placed over 25 ft. apart, and in many places they should be set even closer,



SPLIT MOTOR CASING

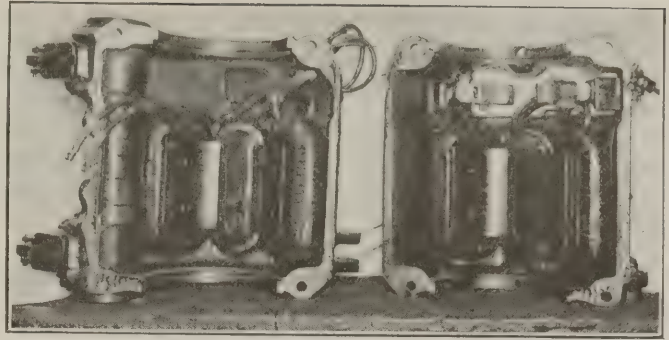
Many burn-outs and troubles with armatures are due to bad series field coils. A short-circuited coil will still pass current, but the reduced field strength causes the armature to become overloaded by taking more current for a given load.

as the price of a hanger and the cost of its installation is easily lost in the damage to pole heads, wheels, poles, etc. Furthermore, when the wheel leaves the trolley wire the motorman is exposed to many dangers due to flashes and the possibility of the trolley head catching something and being pulled off or becoming damaged.

Seldom are enough hangers installed on curves, and the trouble resulting from the incorrect alignment of the wire is so frequent that the motorman regards it as a condition altogether to be anticipated. The feed to the trolley wire from the feeder generally is mechanical and of insufficient capacity. Soldered feed ears with soldered lugs instead of setscrews and a soldered tap to the feeder would give better results.

It is remarkable to me that no one wishes to try out in the mines the Edison three-wire system, using the rail as a neutral. If the locomotive is in perfect condition, safety and economy are still lacking.

In many instances it will be found that a feeder having a cross-section of as much as a million circular mills has been installed, with 2/0 or 4/0 bonds on the rail and no return conductor. If the rail is of ample capacity it is more economical to bond the rail to its capacity than to go to the expense of a return conductor, as the labor cost of installing a small bond will be nearly as great as that for installing a large bond, and the material cost of the large bond will be much less than the cost of the small bond plus the return



MAIN AXLE BEARINGS

All bearings should be kept at a reasonably close fit to prevent excessive lash between the gear and pinion teeth. Hard metal end plates on the journal box prevent excessive end play of the driving axle.

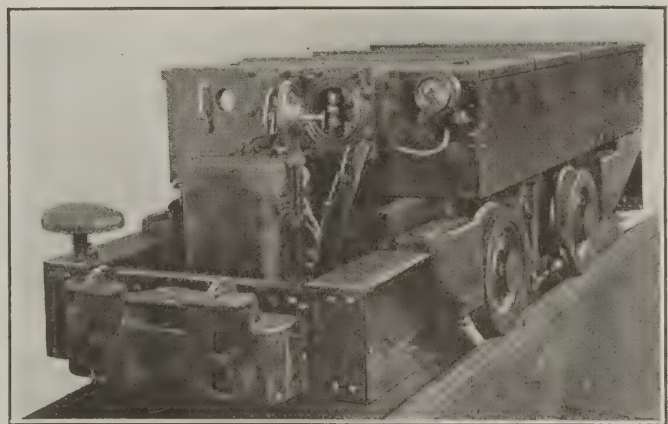
conductor. I prefer the welded bond, for while the initial results obtained with the compressed type of bond are as good as those of the welded type, the welded bond unquestionably lasts longer.

Wherever possible feed ears should be of the soldered type, for after a clamp feed ear has been in service for a year its value is doubtful. To give the necessary strength the suspension ear should be long and thin rather than short and thick, so that the trolley wheel may pass over it smoothly and without vicious sparking.

With an inadequate feeder or return system the locomotives will work inefficiently, the cost of maintenance will be high and as the headlights will fluctuate, an irregular illumination of the track will make the haulage service dangerous. Furthermore, with bad trolley wire and hangers the vicious sparking that will inevitably occur will partly blind the motorman and distract his attention.

For main haulage hardly anything will compete with the trolley locomotive. If the excessive ventilation required by a gasoline locomotive can be provided for without undue cost that form of haulage can be used, but where such ventilation is costly or hard to obtain the gasoline locomotive cannot compete with the electric.

For gathering service, the storage-battery locomotive probably is the safest but it has the disadvantage that during the day's work it is constantly losing power. The cable-reel locomotive probably is the type most likely to cause accidents, for at the room neck the operative must make connections either with the trolley wire or with both the trolley wire and the rail. The dragging cable and cable reel also need care if accidents are to be avoided. We have found the duplex (trolley



FAN VENTILATED LOCOMOTIVE

The motors should be of sufficient capacity to spin the wheels before becoming overloaded. Overheating can be prevented in many cases by proper ventilation of the motors.

and battery) locomotive economical, as the battery has to handle only one or two cars in a room and the time lost in connecting a reel cable is obviated. The duplex locomotive is safer than the cable-reel type because the danger in the coupling of the cable is eliminated. We get more coal per locomotive with the duplex gathering locomotive than with either of the other types, the straight-battery machine gathering least coal of any.

All our cable reels are grounded through the frame of the locomotive and when using concentric cable some of the dangers may be avoided by making the outside copper always of negative or ground polarity.

The more nearly the proper amount of sand used the safer and more economical is the operation. The ideal quantity of sand to use would be such as would give

the rail a coating as thin as that placed on sand paper. A handful of sand will offer as much resistance as a 2-per cent adverse grade, and a large quantity will obstruct the trip after the locomotive has passed. It also will tend to reduce the power received by the locomotive and is likely to insulate it from the rail, making it dangerous for persons to touch the locomotive frame.

In conclusion I may say that we have had at our mines only one minor accident due to locomotives in three years and only three minor accidents due to electricity in that same period. In the past we had many derailments some of which were due to the springing of axles in the unloading of wheels. Since we have put our safety rules in force we have had no locomotive derailments for a whole year.

Open Cut to Head Off a Six-Acre Fire

AN UNDERGROUND fire in the Pittsburgh seam of coal near Charleroi, Pa., adjoining the workings of the Youghiogheny & Ohio Coal Co., of Cleveland, Ohio, bids fair to be extinguished after nearly a year of effort. All known means were tried, without success, to extinguish the fire, which covers about six acres.

Finally decision was made to cut off the fire by means of an open trench. This cut is approximately 1,000 ft. long. It has an average depth of 45 ft. at the ends, within 50 ft. of the outcrop, and the overburden runs up to 65 ft. at the center of the cut. The excavation when completed will have an average width of 65 ft. on the top of the cut and 25 to 30 ft. at the top of the coal. The material at the center of the cut lies in regular strata, approximately 15 ft. being yellow clay, 20 ft. hard shale, 12 ft. hard sandstone, 12 ft. hard slate, 3 ft. very hard sandstone and 3 ft. hard slate, the last being over the coal.

The material was drilled partly with jackhammers and partly with well drills but the greater part of the work was with the latter, 40-per cent dynamite being used. Cuts were made in low lifts, that being necessary largely because of cave-ins to old workings, for the excavation had to be made in ground undermined long ago, which accordingly afforded an uncertain support to the steam shovel. In fact only a shovel mounted on continuous treads could be used. Effective drilling

was difficult, because many holes went through to old workings, the location of which could not be determined in advance. Such holes were, of course, of no value for blasting purposes.

The contract for this work is being performed by the F. E. Welsh Contracting Co., Inc., of Cleveland, Ohio, and has been in progress since Feb. 10, in which time about 70 per cent of the total yardage of approximately 80,000 cu.yd. has been handled. The equipment consists of an Osgood one-yard continuous-tread revolving steam shovel, two four-car trains of 3-yd. cars and two 12-ton dinkies of 36-in. gage. Work is carried on in two shifts of nine hours each, and the material removed runs as high as 800 cu.yd. per day, the shovel often handling material that is too large to pass through the dipper. Large rocks are either chained to the dipper and loaded on the car or are cast back of the shovel to be jackhammered into sizes that the dipper can pass.

The upper 12 ft. of clay was cast over the sides, and the remainder hauled to waste at either end of the cut by the two dinky trains. The other 30 per cent of material is solid rock and hard slate, and progress is slow and difficult because of the cave-ins and by reason of the mine gas and gaseous fumes leaking through from the fire. Some of the material being loaded is too hot to handle with bare hands.

To date the work has been performed without accident, but the hazard is greater as excavation comes closer to the coal.



Digging Trench Across Fire

A cut 65 ft. deep is being excavated across the path of a mine fire despite escaping fumes and poisonous mine gases and in rock some of which is so hot that it burns the hands. The cut is about 1,000 ft. long, mostly in solid rock. The caterpillar mounting gives the shovel stability despite the uncertain footing.

Construction and Care of Distribution Transformers*

Selecting the Best Transformer for the Work—Consideration of Iron and Copper Losses—Building the Transformer—Careful Testing—Recommendations as to Proper Care

BY L. G. MASON

Engineer with Westinghouse Electric & Manufacturing Co.

THE use of distribution transformers in the mining field has an aspect somewhat different from their use in the distribution system of a central station supplying electric energy to light and power customers. In the case of a central station the entire income is derived from the sale of electrical energy to the power and lighting customers, and this revenue from the sale of electrical energy is directly contingent on the efficient operation of the generating and distribution system and the continuity of its power supply.

Where the revenue is derived from the sale of the product, as in a mine, the electrical machinery becomes merely an incident in the production, however essential it may be to the safe or continuous operation of the mining property. Its importance, however, is apparent from the serious effects a breakdown might cause in hazard to human life or loss of output from the mine through interference with regular production.

MINE OPERATIONS REQUIRE BEST EQUIPMENT

This brings up an important point. Has the mining industry always appreciated that only the highest quality of electrical apparatus is entitled to consideration for mining service? I believe that this is more generally true today than ever before, but looking back several years you can undoubtedly recall the time when you first decided to electrify certain parts of your system—competitive prices were obtained and in some cases the lowest bidder received the business irrespective of the better quality of higher-priced equipment. The actual comparison of the stability of the apparatus was not always appreciated and this undoubtedly was partly due to incomplete data on the characteristics of the apparatus. This to a certain extent prevented the selection of the most suitable material.

Today, however, conditions in this regard are vastly improved. Manufacturers have envisaged the opportunities for mining electrification, special equipment is developed for its service, and sales offices and branch service stations are testimony of the importance that this field of application of electricity is assuming.

This question of service may be considered from two standpoints: First, service delivered by the transformer when in operation, which is contingent on the quality of the apparatus; and second, service rendered by the manufacturer in assisting in maintaining service at all times through engineering help, through prompt shipment and through prompt handling of repair jobs.

Under the first classification we may consider the electrical performance of the transformer. Actual losses due to transformer operation may not show up on the books as a direct loss, but obviously a mine cannot avoid paying for the internal losses in its transmission and distribution system, so that a transformer

with better electrical performance possesses advantages over one with inferior performance.

Therefore price always should be secondary to quality, for the initial difference in investment will be recovered many times over in improved service.

In the consideration of the characteristics of a transformer essential to reasonable economy of operation, a relatively low iron loss is necessary as the iron loss is constant throughout the period the transformer is connected to the line, while the copper loss is a feature which is dependent on the load conditions. Low iron loss should not, however, be carried to the extreme with a consequent high copper loss, as the copper loss varies as the square of the load, and is, therefore, added to the peak load of the line. A high copper loss would necessitate a larger and more costly generating equipment; a kilowatt-hour of copper loss is, therefore, more expensive than a kilowatt-hour of iron loss. The average ratio of losses for a distribution transformer is approximately $2\frac{1}{2}$ watts of copper loss to one watt of iron loss.

The performance of a distribution transformer should not only take in the values of iron loss and copper loss but also should include the regulation at different power factors. This question of regulation becomes of great importance because it often is necessary to install a transformer at a point where the line drop becomes



FIG. 1—THREE DISTRIBUTING TRANSFORMERS

The relative size of 5, 15 and 50 kva. transformers is apparent here. Note the drain plug at the bottom of the 15 kva. transformer for draining oil for test purposes.

*Presented before West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, Huntington, W. Va., Oct. 19 and 20, 1923.

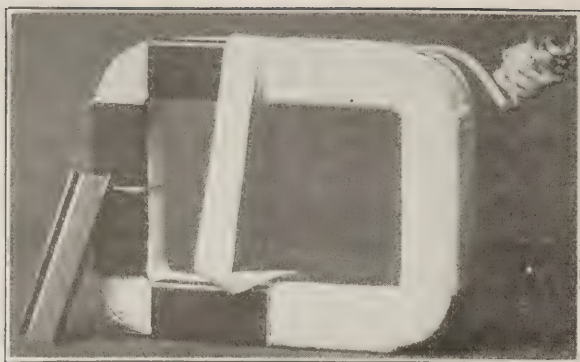


FIG. 2—HIGH-VOLTAGE TRANSFORMER COIL

Heavy micarta channel pieces are taped in position to insulate the winding from adjacent coils and iron.

very great. Under these circumstances, if the drop in the transformer is added to the drop in the line, the voltage may be reduced to a point where it causes unsatisfactory operation of motors and dim illumination of incandescent lamps.

Possibly this factor of regulation is not always given due consideration, but when it is understood that poor regulation means a large drop in voltage under full-load conditions it will be appreciated that just when normal voltage is required, such as during a heavy lighting load or during a heavy motor load, only low voltages are available, resulting, as stated, in the lights burning dim or the motors losing power and heating up.

So far we have dealt with certain major requirements that are essential in a transformer if it is to render good service while in operation; we will now review some of the features in the construction of a line of modern transformers that assure the requisite protection against breakdowns in service.

The construction of distribution transformers presents a far more difficult achievement than is commonly thought to be the case. The difficulty arises not in the actual transformation of a voltage from one value to another but is due to the ever-present desire to approximate a transformation with 100 per cent efficiency. The achievement of 100 per cent efficiency is as impossible as a perpetual-motion machine, but it is possible to reach very close to the 100-per-cent mark; in fact, transformers have been built having 99 per cent efficiency. Compare this with the efficiency of a steam engine or any other electrical apparatus and you will at once realize what care and pains have to be taken by the manufacturers in building this apparently simple piece of apparatus.

High efficiency of transformation is the goal toward which all manufacturers are striving, but this word

efficiency should not be taken only in its electrical sense. An efficient transformer must be one that is absolutely safe, reliable, and at the same time economical to operate. Keeping these three points in mind, the various details of transformer construction will show the very careful attention that is paid to even minor points.

A transformer comprises four essential parts: The iron core, the high- and low-voltage windings, the cooling medium (usually oil in distribution transformers), and the tank.

The method of assembling the coils and core will vary for different manufacturers and for different transformers, but, practically speaking, there are only two general forms of construction—the one being the core type and the other the shell type. In the core type the coils surround the iron, whereas in the shell type the iron forms a shell around the coils.

The same general methods of construction are used in both types and the same care is taken to render each type as efficient and economical as possible. In



FIG. 3—LOW-VOLTAGE TRANSFORMER COIL

This winding is wound on a mica-micarta barrier shaped to conform with the type laminations used.

order to obtain the greatest efficiency it has been found that no one type or form of construction is best suited for all sizes of transformers. For this reason the larger manufacturers use different forms of construction for different capacity ratings and voltage ratings. Distribution transformers may be subdivided into four types: The distributed-shell, rectangular-core, cruciform-core and simple-shell.

The distributed-shell has been found by our company

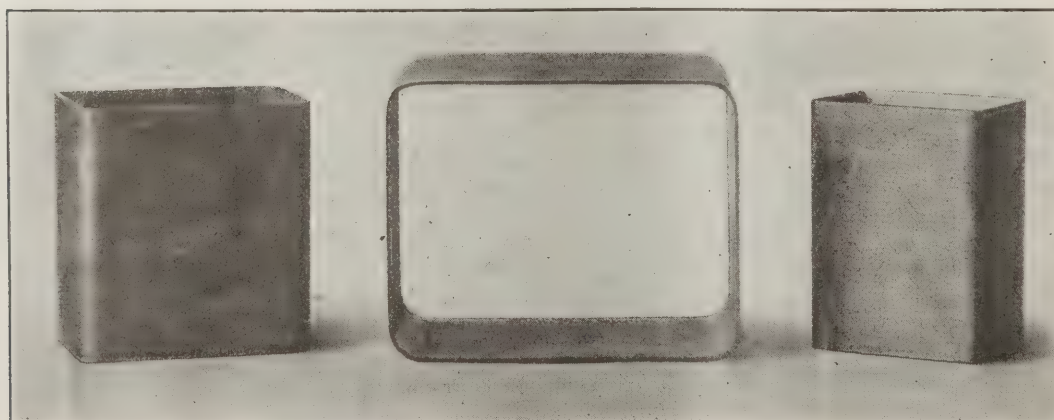


FIG. 4

Micarta Forms

These forms are shaped by machine while warm so as not to crack at the corners.

to be ideal for small-capacity, low-voltage transformers, and for a given weight of material it is possible to obtain lower losses and lower exciting currents than are obtainable by using a core-type construction. This form of construction, however, has its limitations, and because of the lack of cooling ducts and the difficulty in insulating it is not used on capacities larger than 50 kva. or on voltages over 4,600.

The rectangular-core type design is used on higher voltage and larger kva. ratings. On the very high voltage distribution transformers, such as 33,000, 44,000 and 66,000 volts, we use a cruciform core or circular coil design, and for the large kva. capacity distribution transformers, such as 150- and 200-kva., 25-cycle units, the simple-shell construction offers a convenient solution to obtain the necessary cooling, insulation and mechanical strength in as small a space as possible.

The same fundamental methods of assembly are included in all of the above transformers. The coils are wound separately on forms or mounds. The silicon steel laminations are later built in one at a time by hand.

In order to give a better picture of the care and attention paid in building distribution transformers, we will follow through step by step the various operations taken in building a 10-kv. steel-clad unit.

The windings of this type of transformer are built

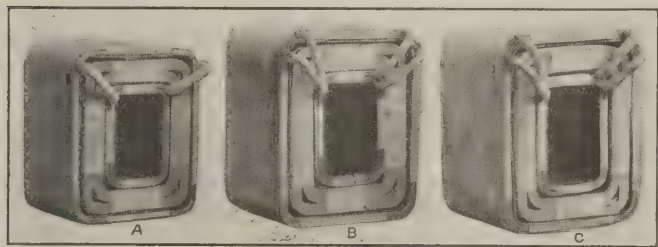


FIG. 5—TRANSFORMER COILS COMPLETE

The coils consist of the high- and low-voltage windings ready for the test.

up of a number of separately wound high- and low-voltage coils; micamicarta barriers form the insulation between the high- and low-voltage windings. These barriers are formed by winding alternate layers of micarta paper coated with a shellac bond and built up with mica sheets on a steel mandrel under heat and pressure.

After winding, the tubes, which are circular in shape, are cut the proper lengths and then while hot are formed by means of expansion molds. Before being formed the tubes are heated to a temperature sufficiently high to soften the binder. This allows the flakes of mica to slide over one another at the corners and prevents cracking. Ideal insulating barriers are obtained by this method.

The low-voltage coils are wound separately on these micamicarta barriers. Micarta collars or fullerboard washers are placed at the edges of the coils to provide insulation and mechanical strength.

After winding, the coils are inspected separately and assembled into groups. Two low-voltage coils and one set of high-voltage coils comprise a complete winding. In the assembled group the high-voltage winding is placed between an inner and an outer low-voltage coil. This arrangement, while intended primarily to reduce the reactance and to improve the regulation of the transformer, also provides separation between the high-

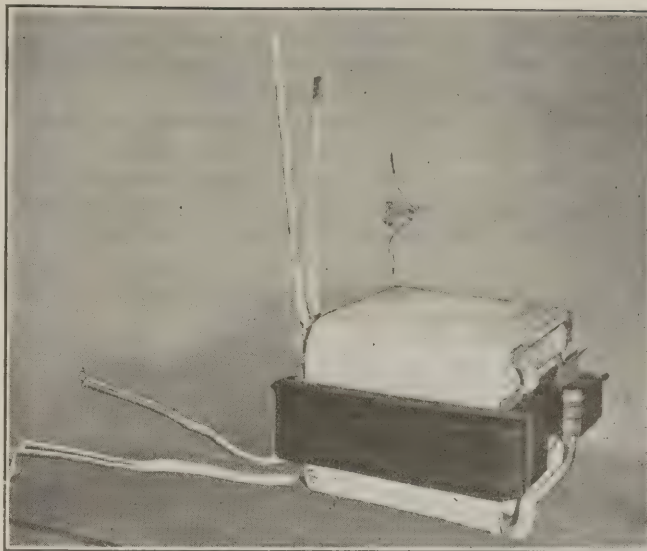


FIG. 6—MAGNETIC CIRCUIT PARTLY ASSEMBLED

The silicon steel laminations are built into the coils and stacked by hand.

voltage winding and the magnetic circuit, and to a certain extent insulates the high-voltage winding from the ground.

The next step is a careful inspection and test of the windings to locate only defects or wrong connections.

The magnetic circuit, which is made up of thin sheets of non-aging silicon steel of a very high grade, is then built into the coil assembly, thus completing the core of this type transformer. The silicon steel used has a low hysteresis loss and conforms to the specifications of research engineers. Samples from each heat are given careful tests and only the highest grade of steel is selected for use in distribution transformers. The laminations are carefully annealed and given a coat of baked-on enamel to reduce eddy-current losses.

The core is now ready for a preliminary test, which is given all Westinghouse distribution transformers before impregnation. These preliminary tests are for the purpose of weeding out any transformers having losses exceeding their guarantees. Those transformers that pass the preliminary tests are then impregnated by the vacuum process, which consists of thoroughly drying out the transformers in ovens and then placing them in large vacuum tanks into which the impregnating compound is forced under high pressure after all the air has been removed from the tank.

The only step remaining is the final assembly of the transformer core into the tank and the final tests. The steel clad tanks used by the Westinghouse company comprise a tank built up by welding together a number of separate stampings. These parts are stamped out by large punches from blank sheets of Arneo rust-resisting iron. The tanks, after being welded together, are then subjected to a sand blasting process. This is done to render the surface more similar to a cast-iron surface and thus better able to hold the coats of paint. It is a well-known fact that a smooth sheet metal surface does not make as good a foundation for paint as a rougher surface, and in order to eliminate any possibility of the paint chipping off the outside of the cases the sandblasting process is used.

The next and final step in the building of a transformer is the testing process. This involves a very careful insulation test, also a test for ratio, polarity,

iron loss and exciting current. Those transformers that pass the limits allowed for these tests are then carefully crated and shipped to the ultimate user. Every transformer receives the same careful tests and the test results are always available for future reference.

The transformer, once it leaves the manufacturer, is often subject to a number of adverse conditions caused by lack of proper care and attention.

There is a wide difference of opinion among users as to the proper care to give distribution transformers. In general, distribution transformers receive very little

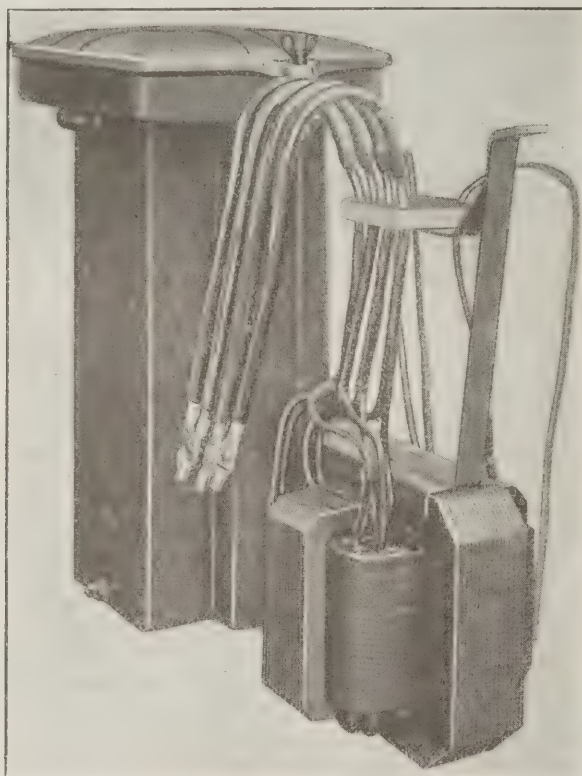


FIG. 7—FINISHED COIL UNIT

The winding and laminations are here shown before being mounted in the tank.

attention at the present time, but this is not an ideal situation and is caused chiefly by lack of man power on the part of the users and because the reliability of the modern transformers makes this possible without disastrous consequences. Periodic inspection, cleaning and testing would well repay its expense.

From a manufacturing point of view it is well known that a distribution transformer will have a much longer life when properly taken care of than when neglected. Detailed records are not always kept on transformers; therefore, there often is no way of determining the actual service various transformers render. The decisions as to the service various makes of transformers render, often are based merely on breakdowns, divided by the number of transformers on their lines. The results thus obtained do not give a correct picture of the conditions of operation, nor would they be entirely fair to all manufacturers.

In making the following recommendations as to the care of distribution transformers, we have taken into consideration the operating facilities of the average transformer user:

Transformers, when received from the manufacturers, should be stored in a dry room having an even temperature, and preferably the tanks should be filled

with oil. This latter precaution will to a large extent prevent moisture damaging the windings. A number of transformer manufacturers at the present time are impregnating their coils and iron as a unit. This tends to render the transformers more impervious to the absorption of moisture, as the impregnating compound effectually seals the windings, laminations and joints.

Before placing a transformer in operation, manufacturers' specifications recommend the drying out of the unit, but from an operating standpoint this drying-out process seldom is adhered to on distribution transformers, 13,000 volts and below, 100 kva. and less, as the users invariably feel that the factors of safety are sufficiently large so that even should there be a slight amount of moisture present, the insulation would be strong enough to withstand the abnormal conditions. The manufacturers, of course, disagree on this procedure, as they feel that every possible step should be taken to enable the transformer to render safe, reliable and economical service, and with moisture present in the windings safety and reliability are uncertain.

DRYING TRANSFORMER TO REDUCE HAZARDS

In those cases where a user desires to dry out a certain transformer, this may be accomplished in either of one or two ways, or by a combination of both. The usual method is to short-circuit one of the windings and supply sufficient voltage on the other winding to heat the transformer to a temperature slightly above the surrounding air temperature, but never above 80 deg. C. Under this heating process the transformers should be connected without oil in the tank, thus allowing the moisture to evaporate readily. The heating process should be continued from 8 to 24 hours, depending upon the size of the transformer. The second method is by the application of external heat, such as by building a fire in close proximity to the transformer and allowing the warm air to blow against the unit. Care should be taken to see that no sparks catch on the windings, which might char the insulation. The quickest way to dry out a transformer is by a combination of the two methods.

A few of the larger central stations at present are giving considerable thought to the care and maintenance of their distribution transformers already in operation, and one company has gone so far as to procure a truck on which is placed a De Laval oil purifying outfit, a complete insulation testing outfit, and a cleaning and repairing outfit. It is the intention of the company to visit every one of its transformers at least once every three to five years. The transformers in their turn will be removed from operation, cleaned and dried out, the oil will be purified and dried, the tanks will be painted, and any other necessary repairs will be made, after which the transformers will again be connected up for further operation.

This scheme seems to be a cheap method of keeping distribution transformers in continuous operation with few breakdowns and presents a far better method than that used heretofore in waiting until a transformer burns out and then bringing it back to a repair shop for repairs. It is, of course, impossible to foretell the savings that will result by the use of such a repair truck, but it is self-evident that the transformers receiving this care will be better able to withstand service conditions, and, furthermore, this truck service will enable the company to replace with larger units any

banks of transformers that may seem to be overloaded.

In so far as smaller companies are concerned, a truck of this nature would not be an economical proposition, but the underlying principles embodied in the use of this truck would apply, and it is recommended that every distribution transformer receive periodic inspection. Even a superficial inspection as to moisture and general conditions would be better than nothing. This can be effected very readily by removing the drain plug at the bottom of the transformer and drawing off any water that may be present. Any rusty spots on the tanks should be repainted and broken bushings should be replaced.

In case there is water present in the tanks immediate steps should be taken to have the oil drained off and replaced with dry oil, and in case the transformers in question have a primary voltage of above 6,600, then the transformers themselves should be dried out. The reason we make this distinction in voltage is that transformers 6,600 volts and below are suitable for star connection on 1.7 times the normal winding voltage, and, therefore, their factor of insulation safety is high. In fact, a number of companies have found that if tests are made, these lower voltage transformers do not show any marked tendency for breaking down even when a

certain amount of moisture is present in the windings.

A new development just brought out by several manufacturers consists of a temperature-indicating device to be installed in the tank of distribution transformers. These temperature indicators will give the average consumer a cheap and convenient method for determining the load conditions on his transformer. Some indicators have an advantage in that their use will enable the operator to pick out an underloaded as well as an overloaded transformer. In the former case the transformer should be replaced with a smaller size unit, saving considerable in transformer losses, whereas in the latter event the transformer should be replaced with a larger size unit, thus eliminating the possible chance of a breakdown with consequent delays and expense.

As time goes on there will be improvements that will render distribution transformers even more efficient and more trustworthy than at present, but in the meantime these suggestions will more than repay the owner of the transformer: The transformer coils and oil should be kept dry and clean, and the tanks should be kept free from rust. With these simple precautions and under normal load conditions distribution transformers should render efficient service for twenty-five to fifty years without replacing.

Cutting Cast Iron by Oxyacetylene Flame

AT ONE of the interesting Open Forum Sessions presided over by J. C. Wilson at the American Mining Congress, H. B. Rice, of the Oxyweld Acetylene Co., delivered an address on oxyacetylene welding which was followed by a discussion in which several questions which had presented themselves to A. J. Hendricks were answered by the author of the paper.

Mr. Hendricks referred to Mr. Rice's statement that only in the last two years had it been possible to cut cast iron with the acetylene torch. He wanted to know if the flame really cut it or melted it down; was it cut like steel as by a saw or was it cut in an uneven line? Mr. Rice replied that the cut was not clean like that made in steel and said that a little more acetylene was used in the cutting of cast iron than in severing steel by the same method. The cutting cannot be kept as well under control as can the cutting of steel, as the metal does not flow so readily. However, the operative can make within 50 per cent as good a cut with cast iron as with steel, but it takes a man with experience in the work to do as well as that. There is slag in gray iron and in consequence there is a tendency to clog. About 50 per cent more gas is used with cast iron than with steel.

The deepest cut he had ever seen made was about 14 in. The cast iron took more time to preheat. A welding torch is needed to remove the surface slag before working that surface with the tool. The hardening on the face of steel is only about $\frac{1}{8}$ in., but with cast iron it is deeper, and, consequently, whereas steel that has been cut with the oxyacetylene torch can readily be worked or welded, cast iron is too hard for working without previous use of the welding torch.

J. H. Edwards said that every mine should have welding equipment, but the first equipment to get was the oxyacetylene for cutting, but every mine should have electric welding equipment because of its greater economy and because with it the strains due to heating were not so severe.

W. P. Bovard, of the Ohio Brass Co., said that in some states it was unlawful to introduce gas into the mines, making it impossible to weld pipe underground. He added that light-weight electric welders can be used on large welds by progressive work. The carbon arc in the cutting of steel, said Mr. Bovard, melts the steel just as the oxyacetylene flame in the cutting of cast iron causes that metal to melt.

Canadian Institute Discusses Coal

At the fifth annual convention of the Southern Saskatchewan branch of the Canadian Mining and Metallurgical Institute, held at Estevan, Sask., on Oct. 3 and 4, coal mining formed the principal topic. Dr. Edgar Stanfield, of the research department of Alberta University, presented a paper showing the importance of a standard method of analyzing coal. Dr. J. A. Allen, of the University of Alberta, stressed the necessity of extensive geological research by the prairie provinces and outlined the plans for the provincial geological survey of the coal basins in Alberta with which the federal government was co-operating.

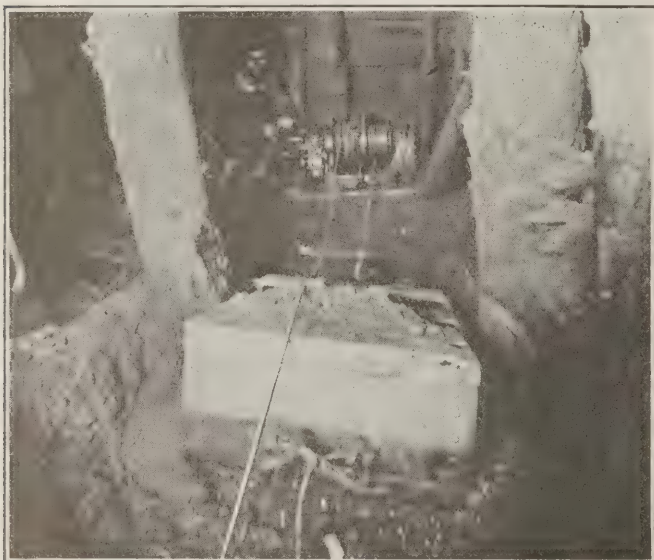
First aid to the injured was the subject dealt with by J. A. Kenny, who stated that the total number of accidents reported to the Workman's Compensation Board of Alberta for 1922 was 7,358 and gave a description of the training of classes for first aid to the injured. John Galloway, mine manager, and J. A. H. Church, mining engineer, of Edmonton, related their experiences in underground fires in coal mines. On the second day the delegates made an automobile trip to Columbus, N. D., and visited the lignite fields there as the guests of the operators. In the evening a banquet was held at Estevan at which the principal speaker was Premier Dunning, of Saskatchewan, who spoke in favor of continuing the lignite briquetting experiments. The results so far obtained would, he considered, warrant the carrying on of the work to a stage where it would be definitely established whether lignite can be briquetted on a commercial basis or otherwise.

IN VIEW OF THE SITUATION in the Ruhr it is difficult to understand how the expression "French leave" ever happened to be invented.—*Detroit News*.

New Equipment

Scraper Hoist Operated on Compressed Air

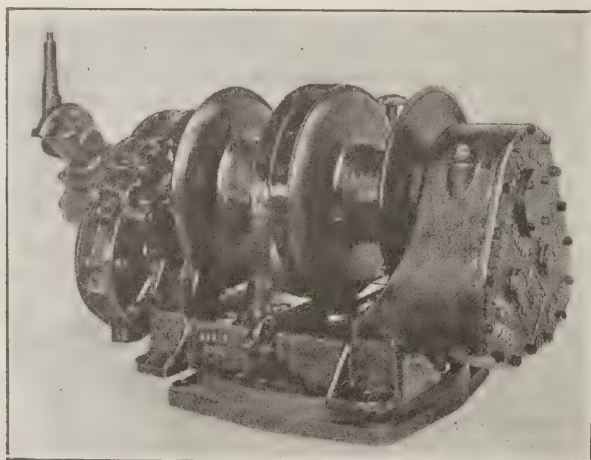
A SCRAPER hoist known as Model 300 Turbo Waughoist has recently been developed by the Denver Rock Drill Manufacturing Co., of Denver, Colo. This hoist operates on compressed air, which is always available in the mines wherever compressed-air rock drills are being used. The hoist is light in weight, well balanced and readily portable. It is very powerful for its size, developing a high starting torque, and is simple



WAUGHOIST IN SERVICE IN THE MINES

As a means of speeding up production scrapers are becoming very popular in many mines. They not only reduce the labor cost but aid greatly in increasing production.

and easy to operate. Safety devices prevent accidental operation and lubrication is practically automatic. High air pressures are not needed for successful operation of the hoist. The recommended air pressure is 50 lb. and with this pressure the average horsepower developed is 10. The maximum horsepower rating is 13.5. At a rope speed of 295 ft. per minute the hoist will develop a rope pull of 1,600 lb. At 118 ft. per minute



MODEL 300 TURBO WAUGHOIST

Compactness, ease of control and safety make possible the more general application of labor-saving devices to assist the miner. This little hoist operates by air.

it will develop a rope pull amounting to 2,200 lb.

This hoist weighs 495 lb. The transmission gears are placed at the end of the hoist opposite the air motor, thereby giving a good distribution of weight. The hoist, being well balanced, can be readily moved from one location to another without danger of damage.

The drum diameter is 6½ in. and gives the hoist the powerful starting torque so important in mining work. This more than compensates for the wear on the ropes that might occur from this small diameter.

The hoist engine is in reality an air turbine consisting of two steel rotors revolving within an airtight compartment. These rotors are carefully balanced and revolve freely, eliminating the vibration so common in other types of hoists. The construction permits no dead center; therefore the hoist will start in any position.

New Electric Solder Pot

A SOLDER pot with automatic heat control has been added to the line of labor-saving devices manufactured by J. D. Wallace & Co., 1401-17 West Jackson Boulevard, Chicago, Ill. This device greatly simplifies the problem of heating babbitt, white metal, wax and other materials which are slow conductors of heat. These materials must be kept at a uniform temperature if satisfactory results are to be obtained, and this new solder pot is designed to automatically maintain the temperature of the material in the pot at 600 deg. F.

The control of the heat is an adaptation of the principle used in the steam gage. A volatile substance which is very sensitive to heat actuates a Bourden tube which makes and breaks the electric circuit, thus controlling the temperature of the contents of the pot. The pot weighs only 13 lb. and will accommodate 15 lb. of solder, which can be heated in from 20 to 25 minutes.

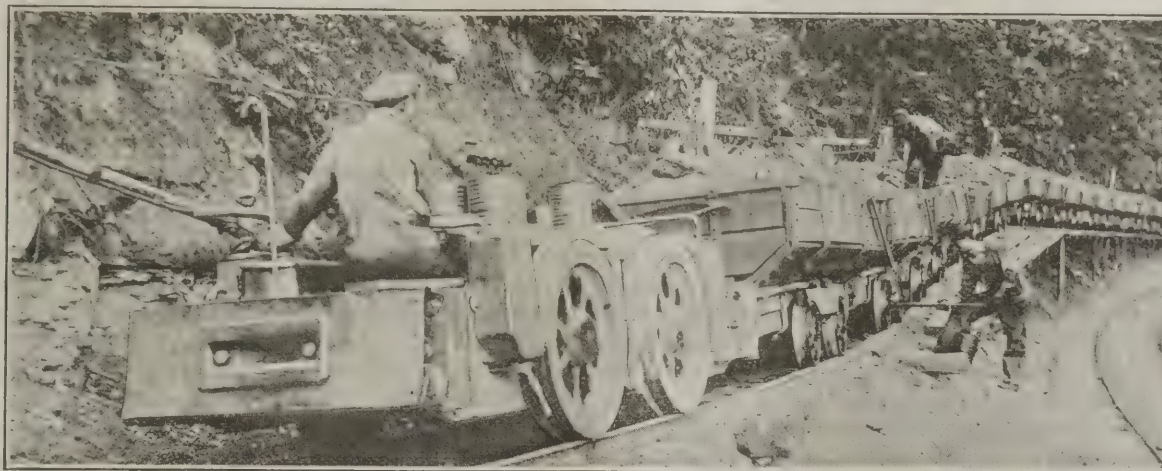


ELECTRIC SOLDER POT WITH AUTOMATIC HEAT CONTROL

The proper temperature of the material being melted in the pot is maintained automatically; no need to spend half the time to do a job watching the melt heat up.

The pot operates on either 110-volt or 220-volt alternating or direct current. The heating element is a 900-watt heater, which is so designed as to apply heat to all parts of the sides and bottom of the container.

This equipment is a great saver of material and time. By properly maintaining the correct temperature, oxidation of the material in the pot is prevented.



*Preparing to Push a Long Trip of Mine Cars**

Safety Council's Mining Section Discusses Industry's Most Burning Question: Safety in Transportation

Large Increase in Membership and in Funds—Three Large Safety Conferences Promoted—Spirited Discussion of Value of Carbon Dioxide in Extinguishing Fire at Bitner Mine

RECORD attendance marked the Twelfth Annual Safety Congress of the National Safety Council held at the Statler Hotel, Buffalo, N. Y., Oct. 15. This was hardly surprising in view of the fact that the membership has increased from 3,060 to 3,321 during the fiscal year commencing July 31, 1922, an advance of 10.8 per cent. The number registering, however, showed an even greater advance, though this year the executive board required a \$2 registration fee from all outside the immediate vicinity of the convention city.

The receipts from the active membership totaled \$164,369.06; additional service, \$574.50; sales of pamphlets, bulletins and miscellaneous literature, \$16,015.14; the calendars, \$63,521.94 (gross revenue); the *National Safety News*, \$16,875.01, and interest earned \$289.23. The total revenue from all sources was over a quarter of a million dollars, or to be exact \$261,644.88.

Just before the last fiscal year ended the Council provided for the setting aside of a reserve of 7 per cent of all membership funds and that reserve is now \$12,629.18. In addition to this the surplus increased during 1922-1923 from \$34,819.78 to \$46,721.75, an addition of \$11,901.97. Thus the Council is \$25,000 to the good as the result of the year's financial operations.

In this substantial increase in surplus nothing can be ascribed to the publication of its *National Safety News*. It cost the Council \$11,502.67 more than it was able to earn. However, in estimating its balance no credit has been given to the dues of members allocated to that purpose, the members being assumed to receive it as a free service of the Council.

At the enthusiastic general session it was stated that the Council had added four new trade sections, two field secretaries, three new safety films and ten new community organizations. A. W. Whitney, speaking to the subject "The Inner Meaning of the Safety Movement, Particularly in Its Application to the Problem of Education," said that an accident etymologically and practically was the falling of something across the path of the normal, that our purpose was to build up the normal condition of life, which the very word "accident" signified was the condition being interfered with. Hence those who would teach safety should not preach a negative but actively urge the choice of the normal, the preference for the good adventure as opposed to that which was inherently bad.

Human nature had built up in the ages a spirit by which danger was circumvented and avoided almost without conscious resistance, but the development of machinery had created dangers against which there were no inherited defenses either mental or physical. The rule of the survival of the fittest might be written as the survival of the safe. In past ages those who were fitted physically and mentally to be safe survived. A new era with new dangers would have to find new resistances to meet new conditions.

L. A. De Blois, in his address on "The Year's Experience with Local Councils," incidentally struck a similar note. Power, said he, had extended from the factories and mines to the streets. It was now entering the homes. To some extent the factories and mines had met the dangers which power had created. Our industrial establishments, in proportion to the degree with which they utilized power, had been termed slaughter houses and shambles. Power, having moved to the streets as typified by automobiles, railroads and street cars had

*Motorman is about to push a long train of cars on to a tipple. Part of these are on an S vertical curve such as would favor derailment. The speed of pushing here, however, is so slow that if a wreck is caused it will not be severe. Boy is oiling the cars while opportunity presents.

turned these into shambles, danger increasing daily instead of decreasing, as in industry, and directing attention to these menaces instead of those of industrial establishments. Could it be that with the development of the home as a power user would come the time when the accident rate within the walls of dwellings would be our greatest concern?

That haulage accidents are in large degree preventable was the keynote of the meeting of the mining section of the National Safety Council commencing Tuesday, Oct. 2, and occupying each morning till Thursday, Oct. 4. The work and standards of the Pennsylvania Coal & Coke Corp. were described by G. F. MacWilliams, electrical engineer of the company, who was able to announce that, "we have had at our mines only one minor accident due to locomotives in three years" and "since we have put our rules in force we have had no locomotive derailments for a whole year."

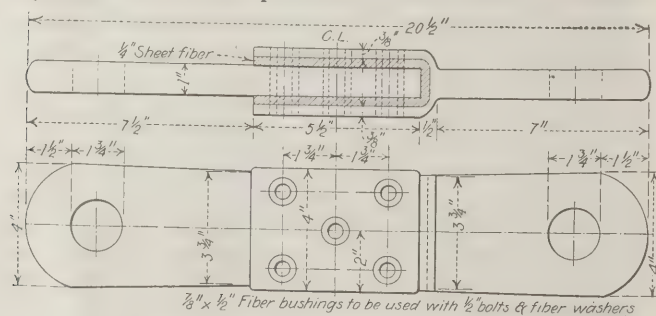
To measure what this declaration means it was necessary to call on Mr. MacWilliams for information as to the size of the company which had thus so greatly reduced accidents. He told those present that the Pennsylvania Coal & Coke Corp. operated thirty-nine mines and 205 locomotives and that in many places coal was hauled as many as five miles from the face to the tippie, the average haul in one mine being 3.8 miles.

In concluding his paper Mr. MacWilliams remarked that "too little attention is paid to fuses on all mine machinery; copper wire, pieces of iron, etc., often replacing fuses. Circuit breakers are jumped or blocked, with the result that the equipment is overheated, insulation is roasted and in consequence in case of short-circuits or other troubles neither machine nor operator has any protection.

"All kinds of mine cars are used, yet, as far as I can learn, little consideration has been given to reducing the friction in plain bearings by properly proportioning them to the speed of the wheels, except possibly in the case of the hollow axle.

"Most couplings are of primitive type and a source of danger. The car in general is seldom designed so that it will haul the largest quantity of coal with the least possible dead weight, due regard having been given to the kind of mine in which it is to be used."

Mr. MacWilliams advocated using a gage to determine at the mine as also at the shop whether the wheels were at right angles to the axle, careful balancing of the weight on the drivers of a locomotive, the turning down of wheels as soon as the false flange is $\frac{1}{4}$ in. deep and the turning of any two wheels of a pair till they are within $\frac{3}{8}$ in. of the same diameter. The care manifested is justified by the results, which are altogether beyond reasonable expectation. Mr. MacWilliams said



INSULATED DRAWBAR COUPLING

This coupling is used at the mines of the Pennsylvania Coal & Coke Corporation for preventing current from running back from the locomotive to the mine cars. Fiber serves as the insulating medium.

that finding 16-lb. rail too light for rooms, they are laying the track in all new rooms with 25-lb. steel.

In a discussion of means whereby current can be prevented from traveling back through the cars, Mr. MacWilliams advocated the use of fiber as the insulating medium. He said that wood tended to split and that fiber gave better results. He offered to provide an illustration of the coupling for use in the transactions. This line drawing appears herewith.

FORMING CONFERENCES, MOST FEASIBLE ACTIVITY

The meetings opened with the Presidential address and the report of C. Lorimer Colburn, whose work since the middle of the year has not been financed in any way by the Council. He is now specifically assigned to the work of forming chapters of the Joseph A. Holmes Safety Association and while he can and is requested by the Bureau of Mines to co-operate with the National Safety Council the work must not be allowed to interfere with his other duties. Consequently he is not able to give that work any more than incidental attention.

In the first year Mr. Colburn visited 78 mines and in the second year, believing that better work could be accomplished by forming conferences which would meet to promote safety, he visited only 49 mines. Mr. Colburn declared that four separate inspections were or could be accorded at any mine—the mine's own inspectors, the state mine inspectors, the insurance inspectors and those of the Bureau of Mines, for the Bureau will inspect a mine if desired. In consequence the single safety engineer of the Council could hardly hope to compete with all these agencies for inspection. Forming conferences, therefore, seemed a more rapid way of promoting safety work.

Byron D. Shove then read his paper "Safety in Underground Transportation—Metal Mines," which clearly reveals how different the problems are in such mines where the grades are made to suit haulage and not to accord with the irregular floor of a coal bed. In metal mines the difficulties are largely connected with overhanging chutes and the trolley wire. At the Gogebic mines of the United States Steel Corporation automatic gongs of the gravity type are placed on all electric locomotives. The gong sounds only when the locomotive is in motion. Mr. Shove remarks, "We feel that any such warning should be automatic so as to remove the personal equation which is always present in hand-operated warning devices. Headlights are placed on both ends of the locomotive and are protected by meshed screen guards placed in front of the open face. A red light is carried on the rear end of the train. After many tests we are using a railroad flagman's lantern manufactured by Adams & Westlake Co., Chicago, Ill. It is similar to a railroad switch light, but much smaller and lighter. It has two red bull's-eyes which are in line with each other. The lamp in the lantern burns signal oil.

"In years past we have had serious accidents to motormen whose feet, hanging outside the locomotive pit, were crushed between the locomotive and the cars or timber trucks it was moving. We have, therefore, made it imperative that the motorman shall, when the locomotive is in motion, keep his feet inside the locomotive pit. As the locomotive goes out to the shaft, the trolley passes over a spring contact switch. This throws on red lights in the drifts and crosscuts [cross and main

entries] from which other locomotives are pulling. When the locomotive returns from the shaft the contact spring switch is automatically thrown by the trolley again but in the opposite direction. This extinguishes the red lights and turns on the green ones, showing that the block is clear.

ONE WHEEL TIGHT AND THE OTHER LOOSE

"Where a drift [cross entry] breaks off a crosscut [main entry] the radius of the curve usually is 30 ft. The axles of the mine cars are $2\frac{1}{2}$ in. in diameter and of cold-rolled polished steel. They are equipped with 16-in. semi-steel wheels, one of which is pressed on to the axle, the other being loose. This loose wheel takes up the slippage when the car is going around a curve. The couplings are of cast steel and the links and pins of wrought iron. The gage of the cars is 24 inches."

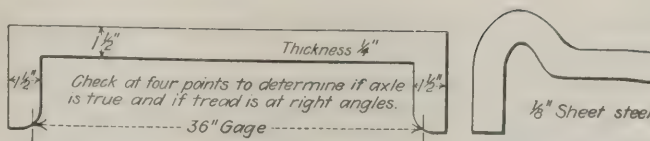
These quotations from Mr. Shove's paper are not arranged exactly in the order in which he placed them, but they are grouped in such a way as to furnish the coal-mining engineer with the information likely to interest him. The loose and the tight wheel, though made more necessary by the sharp curves, would have its advantage when turning into the rooms of a coal mine where the car has a larger gage and the wheels, therefore, more slippage. The lights switched on and off by the trolley are interesting, but they would have to be used in a different manner in a coal mine because usually the distance to the shaft or tippie is greater than on a metal-mine level. The "crosscuts" from the seam to the landing of the level usually are quite short except at considerable depths.

Joseph Reed, safety engineer, Consolidation Coal Co., said that the automatic couplers would become uncoupled at track joints if they were of the Junior type, the pins not being long enough to prevent that action. Another engineer said that he had been obliged to weld shoulders on the coupling, above and below, so as to give the required depth. Later discussion called attention to the difficulty with automatic couplings where cars were pulled over a sharp knuckle, as at the tippie.

In discussing A. F. Brosky's paper "Safety in Underground Transportation in Coal Mines—Tracks," Mr. Reed said that he had found that in a mine where 50- or 60-lb. rail was used and where naturally false flanges wore in the wheels to accord with such rail, the locomotive had little tractive effort on any relatively short or newly installed length of 70-lb. rail because the wheels rested on a surface only about $\frac{1}{4}$ in. wide.

B. F. Tillson said he had used 70- to 80-lb. rail in slope shafts and had obtained a section with extra deep webs so that the rail was practically a girder. The rail rested on piers 10 ft. apart. The skip is hauled at the rate of 4,000 ft. per minute. Mr. MacWilliams said that no little trouble was caused in mines by not using the "suspended joint," which probably is universal practice in railroad work. Such a joint makes travel much easier.

At the second session R. H. Seip read A. F. Hoskin's article entitled "Safety in Underground Transportation in the Coal Mines of Illinois with Special Reference to Derailments." Mr. Hoskin's recommendation that cars be given a longer wheelbase so as to make them more stable did not meet with Mr. Reed's approval. He said that if the wheelbase were made longer, the radius of



WHEEL AND TIRE GAGES USED BY MR. MACWILLIAMS
The Pennsylvania Coal and Coke Corporation is confident that by keeping the axle true and the tread at right angles derailments can be avoided.

the curves into the crosscuts that are driven through the pillars for the recovery of pillar coal would have to be increased and that would make the work of "pillaring" more dangerous. We need flexibility in haulage as much as stability, for with sharp turns the roof is more easily sustained.

It would not improve matters if we saved lives in haulage, only to lose more or even as many in pillar drawing. R. Dawson Hall explained that in Illinois pillars were not drawn and in other sections the pillar was worked entirely off the end, the car standing on the straight room track and the coal being shoveled from a distance to and into the car making a car of longer wheelbase than that now being used permissible. B. F. Tillson said that perhaps scraper loading would fill the requirement and that it might be necessary to make a radical change of that sort to permit a longer wheelbase and afford the needed safety.

LEAVING THE WORK TO THE LOCOMOTIVE BRAKE

The article by G. M. Gillette, general manager, and Joseph W. Reed, safety director, of the Consolidation Coal Co., entitled "Safety in Underground Transportation at Coal Mines—Mine Cars," not only brought up the much discussed question of brakes and no brakes but added the question, "Should neither brakes nor sprags be used on cars?" The opinion of Frank Haas was quoted to the effect that with modern haulage the locomotive was sufficiently fitted with brakes to control a car effectually. Mr. Reed said that it often was necessary for men to move cars by hand as, for instance, before firing a shot. A shot fired when the car was near the face might severely shatter the end. It might be necessary to move a car at the end of the shift for fear that it might be buried under a fall during the night or on an idle day following.

A sprag might serve especially with a block to hold the car, but where brakes have once taken the place of sprags it is hard to find good spraggers, for spragging is one of the decadent fine arts. The relative safety of the end and side brake was discussed, and Mr. Reed said they had only one mine with end brakes. It might not be significant, but the men preferred them and the accidents were fewer. He agreed with Mr. Hall that they seemed the more dangerous even though the snapper barely went between the cars at all in putting on the brake.

One of the coal men present said that he used the end brake, the lever of which was pulled toward the brakeman, and he found it safer than the side brake. The men at his mine were not allowed to push the brake over. Mr. Illsley, of the Bureau of Mines, brought up the question of clean track, but it was suggested that as most of the spragging or braking was done at certain specific places and as the operation causes collisions between the braked portion of the trip and the free-running part it was almost impossible to keep such places clear of fallen coal even with daily cleaning.

Mr. Reed said that at least 75 per cent of the braking occurred at such places.

Following this paper Mr. Gillette's "Safety Practices Pamphlet" entitled "Maintaining Safety Interest" was briefly introduced by Mr. Colburn, and John T. Ryan, president of the Mine Safety Appliances Co., showed how with a tube of Hopcalite a mouse can be protected from the carbon monoxide in the air with which it is furnished. By passing the air with its 1 per cent of carbon monoxide the mouse was soon overcome and being supplied with an atmosphere of 95 per cent oxygen and 5 per cent carbon dioxide was soon revived. Experiments also were made into the Bureau of Mines method of matching with a scale of permanent colors the product of a mixture of blood saturated at different carbon-monoxide concentrations, diluted with water and mixed with pyrogallie and tannic acids.

DEADENING A MINE FIRE WITH CARBON DIOXIDE

By far the most interesting of the sessions was the third and last, at which Charles L. Jones, of the Mellon Institute of Industrial Research, Pittsburgh, Pa., gave his paper on "Fighting Mine Fires by Carbon Dioxide in Liquid Form." It was expected that from this would arise the question as to the availability of carbon dioxide for fighting metal-mine fires, but that possibility was not for a moment brought up. William G. Duncan, of Pennsylvania State College, was present and he took a diametrically opposite view of the situation to that taken by Mr. Jones.

The facts from the contributions of the two opposing parties appear to be as follows: The Bitner mine fire was fought at first by the use of water, without any great progress being made. The season had been extremely dry and water was quite scarce, and all that could be obtained was what was not being used by the coke ovens. This was entirely insufficient for the necessities of the occasion. The official in charge at the mine was Patrick Mullen, a man of recognized ability and long experience, but neither is of much avail without a plentiful supply of water, as any city fireman will tell you.

SHALLOW COVER GREATLY AIDED WATER SCARCITY

Now, Bitner mine had a shallow cover, and many falls had occurred which had broken the surface in such a degree as to permit the entrance of air. In consequence the dry or sealing method did not offer any promising solution. The situation was indeed desperate, and there are many mines which under like circumstances have been allowed to burn for years, in the hope—a vain one in all instances—that the fire would burn itself out. The company wanted to operate the Bitner mine and feared the extension of the fire to others of its valuable properties. In consequence it was decided to use carbon dioxide to save the mine, and the fire speedily decreased in severity, so much so, in fact, that the company decided to reopen the mine.

This was done with much caution. Hot coals were found, and some places where fire was still found to be active were re-sealed so that time would cause the fire to go out. These later were opened and the fire extinguished with water. At the places where the water had reached to the roof the fire was completely extinguished. Many other places which the water had not reached had traces of extinguished fire but no fire or hot coals present. Some places probably had never been the seat of fire, and some others were still so hot that unsealing caused them to blaze.

Every evidence points to the fact that the use of carbon dioxide had a most valuable retarding and extinguishing effect. It doubtless prevented vacua being formed during the cooling process. It is at such times that carbon dioxide has its utmost value, for if a neutral gas is not supplied the fire will find a way to replenish its vacuum and will draw air through walls, ribs and roof rocks, obtaining enough not only to fill up the vacuum but to stimulate combustion. In fact the carbon dioxide is more needed with a cooling than an active fire, for the fiercely burning coal will make its own extinctive atmosphere and its own outward pressures that will preclude the infiltration of air.

After the cessation of the use of carbon dioxide, the fire may cool further and again obtain air. The pressures may not indicate much suction, for if the cooling is slow the air may come in slowly, but in sufficient quantity, nevertheless, to rekindle the fire. As the fire recovers, the suction becomes less, for there is then no reduction in volume. Consequently the administration of carbon dioxide should be continued until unsealing, enough being used to prevent the formation of even a partial vacuum.

It appears that some heated coal still remained in the mine after its reopening. In the time that has elapsed since March 19, 1923 it is not strange that a fire had developed, so that even now, nine men are employed steadily playing water on it with six lines of hose, with about thirty cleaning up slate which fell during the period when the fire was still burning, the work being necessary to restore the haulage roads and put the mine in condition for further operation.

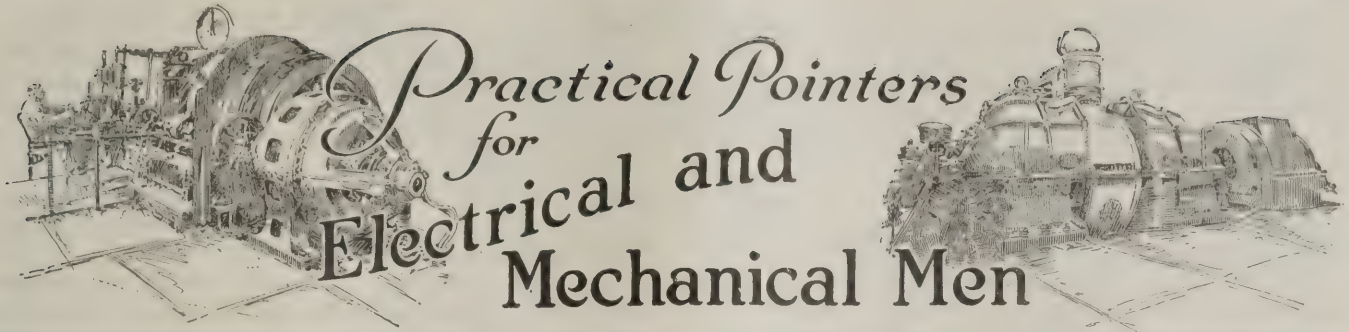
QUESTIONS HOW MUCH AREA FIRE HAD COVERED

Mr. Duncan declared that there were two original fires and that they were separated by a length of 1,200 ft. of unburned coal. He held that the reason why no fire was found in much of the so-called fire area was because it had never been on fire. Mr. Jones said that the fire may have started at several places, but that the main haulageway showed signs of fire throughout the distance between these points.

In the course of his remarks Mr. Jones said that in no place where the air analysis showed continuously for a month less than 5 per cent of oxygen was any sign of fire or hot coals found after unsealing. Mr. Tillson remarked his surprise at this in view of the fact that he had fed a producer working on carbonaceous shale with an atmosphere having only 5 per cent of oxygen and nevertheless maintained rapid combustion. Mr. Jones said that Mr. Tillson was feeding the producer with a good current of air, even though that air was lacking in oxygen. Other conditions also were different.

Mr. Colburn earlier in this session, which commenced an hour before the scheduled time and terminated an hour later than provided, read extensively from the Safety Practices Pamphlet, "Maintaining Safety Interest." A report was made on the specific services of the Mining Section based on inquiries made by the chairman. The articles on "Maintaining Safety Interest" from George C. Hewitt, supervisor of industrial insurance and hospital service, Pacific Coast Coal Co., Seattle, Wash.; Thomas Cowperthwaite and Albert Tallon will be printed in the minutes and duly considered in the final draft of the Safe Practices Pamphlet.

The names of the newly elected officers of the section and of the Council will be found in the Oct. 11 issue of *Coal Age*, page 566.



Coal-Handling Towers Made Portable By Use of Wooden Rollers

BECAUSE of the large shipments of coal and coke coming into San Francisco by steamer, the State Harbor Board has just finished placing six large wooden rollers under each coal tower, so that the towers can be easily and quickly moved to points on the dock convenient to the ship's hatch.

The coal is unloaded from the hold of the steamer into these towers, which is then loaded into trucks or wagons by means of chutes, each tower having two chutes. The towers will soon be equipped with a third chute, by means of which coal or coke can be loaded directly from the tower to a car, as there is a railroad spur paralleling the towers.

Before placing the rollers under the towers it re-

long, with a 10-in. groove in the center. There is an iron bar bearing for each roller which slides on an iron-shod timber, which in turn is bolted to the timbers supporting the tower. A large iron washer placed between two timbers and properly greased, gives a swivel motion, enabling the rollers to be turned at any angle, permitting the towers to be moved in any desired direction along the dock.

CHARLES W. GEIGER.

Brushes for Mine Locomotives

SELECTING the proper grade of carbon brush for an electric machine always is a difficult problem. To obtain the right brush requires a thorough knowledge of the various grades of carbon, backed up by long experience in service. Even with this information the problem is still difficult because loads, qualities of materials in the commutators, vibration, etc., vary greatly even with the same type of machine.

When making a selection of a brush the following fundamentals in connection with operating conditions should be considered: Commutation, life of commutator, life of brushes, frequency of inspection, current density.

The above factors will vary more or less with the design of the motor, the design of the brushholder, the correct spacing of the brushes, vibration, condition of the equipment, condition of the armature bearing, condition of the commutator surface, brush tension, load, speed, service conditions, etc.

Since all of these factors must be taken into consideration, the best and most reliable results are obtained by making tests of recommended grades in service under actual operating conditions. Brush manufacturers generally are willing to assist the operator in making service tests. The following general information regarding brushes will help the operating man more intelligently to select brushes for service tests.

Carbon is a non-metallic element found in both crystalline (made of crystals) and amorphous (non-crystalline or irregular shaped) form. Natural graphite is carbon in a crystalline form, and is mined in many localities. Amorphous or non-crystalline carbon may be obtained in the form of coke or lamp black. Artificial graphite is obtained by heating amorphous or non-crystalline carbon, such as coke, in an electric furnace to change its structure to a crystalline state.

By the use of the above materials the following general classes of brushes are made:

- (1) Carbon brushes—made of crushed coke and binder.
- (2) Graphitized brushes—made of carbon and then electrographitized.
- (3) Graphite brushes—natural graphite and binder.
- (4) Metal graphite brushes—natural graphite with metal powder and binder.

With the modern commutating-pole locomotive motor



LARGE COAL TOWERS MOVED WITH WOODEN ROLLERS

By means of the rollers shown at the base of the towers it is possible to locate any tower in a new position in a short time. These rollers and plates can be turned so as to move the tower in any desired direction.

quired a crew of six men, with two hydraulic jacks and rollers and a motor truck, to move one of the towers. With this equipment it required about two hours to move a tower only a few feet on the dock. Now by means of the rollers placed under the towers any tower may be moved to any new position in five minutes by the ship's tackle.

Each of the rollers is 8 in. in diameter and 3 ft. 6 in.

having commutators undercut, and considering costs per locomotive mile, brush end wear, side wear, breakage, life, commutation, life and maintenance of commutator, etc., these classes of brushes are best suited for locomotive motor service as follows: (1) Graphitized brushes—best all-around results. (2) Carbon brushes—next best all-around results. (3) Graphite brushes—very special and limited uses. (4) Metal graphite brushes—not used at all.

In the process of manufacture the most important operations, depending upon the class of brush being manufactured, are as follows:

- (1) Crushing, carbonizing (if it is done) and cooling.
- (2) Milling, mixing, cooling and remilling.
- (3) Moulding and packing in the furnace.
- (4) Gas baking.
- (5) Electric baking or graphitizing.

The two most common general methods of manufacture are:

Extruded or Squirted.—Where the material in the form of pulp is forced through a metal die under pressure and then cut off to the desired length and baked with a high temperature to carbonize the bond and permanently set the material. This method is used in making the cheaper grades of carbons, which do not have much strength to resist breaking and chipping in service.

Moulded and Machined.—Where the material is moulded into blocks under heavy pressure and baked. The brushes are cut from these blocks and machined to exact size. This method is used in making the high-grade brushes and gives a brush of uniform texture and strength that is best suited for locomotive work.

In the manufacture of various grades of carbon brushes best suited to meet the requirements of operating conditions, the following characteristics of the brush must be considered: Contact drop, hardness, resistance, coefficient of friction, apparent density, abrasiveness, heat conducting, conductivity, toughness.

Length.—For use in the more modern brushholders, the brush should be not over 2 in. long; that is, when new they should not extend above the top of the brush box for the following reasons:

- (1) If longer, they are subjected to a greater side pressure due to the action of the contact tip, which increases the side wear, tends to bind the brush in the box and reduces the direct pressure on the surface of the commutator.
- (2) If longer, they are discarded because of excessive side wear before the added length can be used up in end wear.
- (3) Approximately the same mileage can be secured from the shorter carbon; and hence, since the brushes are bought on a cubic-inch basis, the first cost is less.

The width is not so important; they can have as much as $\frac{1}{8}$ in. clearance in the box without causing any trouble in service.

Thickness is very important, as the initial clearance between brush and brush box should be approximately from 0.006 to 0.008-in. If it is much less the brush will tend to stick in the box and bind, and if greater, it will soon rattle in the box, wearing away the side; it also will tend to chip and break, thus reducing the life of the brush.

When pigtailed were used on brushes, it was considered necessary to copper-plate the brush to provide a good electrical contact for the shunt connection. With the

present design of brushholder having a heavy braided copper shunt from contact tip to brush box, shunted brushes have been discontinued, so the copper plating is unnecessary; in fact, it is objectionable on the higher grades of brushes as it tends to peel off in service and bind the brush in the box.

For locomotive work, pigtailed or shunts on brushes have been practically done away with on account of the following reasons:

(1) First cost—they were used with the cheaper grades of brushes which had a comparatively short life, making renewal of brushes at frequent intervals necessary.

(2) Inspection—the pit men could not be depended upon to maintain shunts during inspection.

(3) Not very reliable—the design was such that shunts became loose, disconnected and were not reliable.

With these conditions greatly improved by the use of a higher grade of brushes with longer life, requiring less frequent inspection, and by improved methods of fastening pigtailed to brushes some advantages can be obtained by their use. In certain specific cases, especially for very heavy current densities, they have been adopted with a saving in maintenance. Foreign practice tends to the more extensive use of shunts than is customary in this country.

Determining Power Transmitted Through Leather Belt Drives

WE HAVE a large fan at one of our mines which has not yet been called upon to develop its ultimate capacity. From time to time we have increased its output to meet our air requirements, but now I believe we have reached the safety limit on the belt. This belt is a double leather one and I would like to know how much power we can safely transmit through it.

SUBSCRIBER.

There are several important factors which determine the amount of power transmitted by a belt. These may be resolved to total effective pull and speed of the belt. The effective pull is the difference between the tension on the tight and loose sides of the belt.

Expressed as a formula, this equation becomes—

$$\text{Horsepower} = \frac{L \times S}{33,000}$$

L = Total effective pull in pounds.

S = Speed of belt in feet per minute.

This effective pull usually is expressed as working tension per inch of belt width and depends upon the grade of material, thickness, and also upon the speed of pulley due to the centrifugal force which tends to throw the belt away from the pulley surface.

Allowing ample factors of safety and taking into account the effect of centrifugal force, average values for effective tension per inch of width for single leather belts are shown in the following table:

Belt Speed Feet Per Minute	Working Tension Pounds Per Inch Of Width
1,000	72
2,000	68
3,000	65
4,000	60
5,000	53
6,000	45

The above values are for 180 deg. arc of contact. For double belts multiply the figures in the table by 1.6 and for triple belts multiply by 2.



Problems of Operating Men

Edited by
James T. Beard



Rules vs. Experience in Regard to Post Timbering

Rules Enforced of More Value Than a World of Experience—Penalty Makes Rules Effective—Systematic Timbering Surest Safeguard

WRITING on the subject of "Posting the Face of the Coal in Driving Rooms," *Coal Age*, Aug. 2, p. 181, George Edwards has enunciated a principle worthy of the most careful consideration. I agree with him that it forms the underlying foundation in mine timbering and as such should be heeded earnestly by every miner.

Nothing can express more forcibly the truth conveyed in the writer's own words, "One post promptly and properly set is a greater safeguard than a world of experience in the mining of coal." Judging from what others have said, on this subject, I believe their experience is in accord with my own conviction that it is far better to enforce strict rules and regulations, in regard to timbering, than to leave the matter to the whim of the miner, notwithstanding his experience.

The practice of miners in regard to when and where they should set timbers to make their places safe for work has clearly demonstrated the unreliability of dependence on their judgment. This is shown by the fact that numerous coal-mining companies have found it necessary to establish timber rules and, in many cases, severe penalties are imposed for any violation of the rules.

PENALTY FOR VIOLATION OF RULES INSURES RESULTS

Even where the rules are strictly enforced, results show that they are of little value, unless each rule carries a suitable penalty for its violation. Many experienced miners become so inured and hardened to danger that they are prone to take wholly unnecessary chances on their lives, in the effort to finish loading a car before setting a post.

It has been my experience that even when an experienced miner uses care and judgment to insure his own safety he cannot always tell when he is in imminent danger from bad-roof conditions. In one district with which I am familiar, the miners are troubled with what they call "blind rolls," that are more like the well-known "pot bottoms" in other localities.

In that district, many of the companies have made stringent rules in respect to the setting of timbers at the working face. The formation overlying the coal is such that the roof slate will give practically no indication of weakness when a stone, from 10 to 20 ft., in diameter, and anywhere from 2 to 6 ft., in thickness, will drop from the roof without warning. Previous to the establishment of the rules, many experienced and inexperienced miners were killed.

When timber rules have once been posted the experienced miner has no argument that he can offer the mine foreman as an excuse for not having timbered his place according to the rules. The foreman is saved much annoyance and embarrassment caused by the persistence of experienced cranks, who protest against doing what they consider unnecessary work in the timbering of their places. The foreman has only to refer them to the rules.

Mr. Edwards has mentioned the supposed difficulty in reference to setting face timbers in machine mining. In Alabama, this is no problem at all. Practically all of our mines have timber rules that are strictly enforced. Each miner sets his props according to rules, without reference to the machine.

ALABAMA LAW FOR MACHINE RUNNERS

The Alabama State Mining Law requires a machine runner to replace all props removed by him in cutting the coal. This does not, as some may suppose, impose a hardship on machinemen. In the instance cited by Mr. Edwards, the claim of the machine runner and the mine foreman, that they must have 14 ft. between the face of the coal and the timbers is wholly false. Such a clearance is quite unnecessary when the work is properly managed.

It is well known that, with continuous coal-cutting machines, after sumping the cutterbar a clearance of only 6 or 7 ft. is required for the machine to pass the timbers, in moving along the face of the coal. A scheme that is often adopted, here, is to let the motor and gear housing lag a little behind the cutterbar. In other words, the machine is kept at a slight angle with the face of the coal.

TIMBERS REMOVED AND RESET AS MACHINE PASSES

In one instance, to my knowledge, the timber rules call for a distance of 4 ft. between the first row of props and the face of the coal. All props are set 4 ft. apart, in every direction. The rooms are 35 ft. wide, and two tracks are laid in each room. The machine enters, say on the left-hand track. At the face, one prop is taken out to allow the machine to be swung around ready for moving across the face. The 4-ft. space, between the first row of props and the coal, is ample for that purpose.

Then, before pulling the machine across the face, the prop on the left is replaced. On reaching the other side of the room, a prop on that side is removed to permit the machine to be again swung around ready for sumping. The cutting then proceeds until the machine reaches the second prop, which is removed after the first prop has been replaced. In this manner, the machine proceeds to cut the coal, each prop in turn being removed and reset as the machine passes.

Finally, on reaching the left-hand side of the room, the machine is withdrawn from the coal and reloaded

ready to be moved to the next place. Under this system, when the miner starts to shoot his place every prop is standing a maximum distance of 4 ft. from the face of the coal. Any props that may be knocked out by the shots are promptly reset, before the work of loading the coal is commenced.

Inasmuch as the props are now quite a distance from the solid coal, the miner is required to load his coal along the entire face, to permit another row of props to be stood, and this must be done before the remaining coal is loaded. A casual examination of the roof in this mine would not seem to demand that these precautions are necessary.

However, systematic timbering is the surest safeguard and this plan was adopted after the occurrence of many accidents proved it to be unwise to depend on the judgment of the miners in making their places safe. The good results obtained have proved the wisdom of the plan.

JOHN WALLS, SR.

Ensley, Ala.

Working Three Continuous Seams of Coal

Many things considered in choice of best method of working—Numerous advantages in longwall method—Value of coal and relative costs of handling waste material the determining factors.

THE discussion following the inquiry that appeared in *Coal Age* some time since, regarding the best method of working three seams of coal separated by thick partings of shale and slate, has interested me greatly. I quite agree with James Gray, whose letter appeared in the issue of Sept. 13, p. 403, regarding his choice of the longwall method of working these seams.

Without inspecting a field and studying the conditions as they exist, it is difficult to arrive at a correct conclusion regarding the best and most profitable method of working any coal seam. There are always many different items to be considered and to disregard any one of these may result in failure. The success of the proposition depends primarily on a thorough knowledge of the situation, in any given case.

In the past, I have conducted operations in the mining of coal seams where the partings would vary from 6 in. to 9 ft., in thickness, making the conditions encountered similar to those described in this inquiry. My experience has convinced me that there is no system of working better adapted to the working of such coal than the longwall method of mining. One strong argument in its favor is that there is no deadwork required, such as is necessary in room-and-pillar work.

ADVANTAGES OF LONGWALL METHOD

The practical advantages presented by the longwall method are numerous. Not only does it lessen the cost of production and afford a larger output from a comparatively small area, giving a greater concentration of work, but there results a more complete extraction of the coal, less explosives are required and less trackage, with a reduced cost of upkeep, and the ventilation of the mine is more easily effected.

From the information given it is not clear whether it is desired, or advisable, to remove the 12 in. of bottom coal, which would involve the handling of the large amount of waste material forming the lower parting. This question can only be determined by the value of the coal and the relative cost of handling the slate parting, which is from 18 to 24 in. thick.

As suggested by Mr. Gray, in order to gain height on the roadways, the lower parting and the bottom coal may be lifted for that purpose, provided the coal is hard enough to resist being crushed by the weight coming on the pillars, as the face is advanced. My preference would be to take down the upper parting to the top coal, using this waste material for building the necessary packwalls to maintain the roads. There will then be less danger of loading dirty coal when taking down the upper seam in retreating.

In planning the work by the longwall method, the slant roads must be laid out so as to cut off the rooms at not too great a depth or length. These slant roads are driven on an angle of 45 deg. with the main road. As each slant road cuts off the rooms, the work of taking down the top coal is started at that point and conducted on the retreating plan.

It is not necessary to wait until the rooms driven in the middle seam have reached their limit, or the boundary line. It is important, however, when that is done to leave sufficient pillars in the top seam to protect the roadways in the seam below.

Taking everything into consideration, I believe the better plan would be to push the work in the middle seam to the boundary, before attempting to extract the top coal on the retreating plan. Then, when retreating use can be made of the same roadways in the middle seam, by building simple inexpensive chutes for loading the top coal into the cars standing on the track below. Wherever practicable, the use of conveyors at the coal face will greatly reduce the cost of production, by requiring a less number of roadways to be kept open and reducing to a minimum the building of the necessary packwalls.

COAL INSPECTOR.

McKeesport, Pa.

Marsaut Type of Safety Lamp

Thousands of this type of lamp in use—Important to know in what respect the lamp is weak or unsafe—What experiments have shown regarding the possibilities of failure.

AMONG the letters that have been contributed regarding the various aspects of the explosion that occurred in the Wakesiah coal mine, Nanaimo, B. C., Nov. 24, 1922, all but one writer assigned the cause of the explosion to the failure of the Wolf-Marsaut, bonneted safety lamp carried by the fireboss.

At the time, the fireboss had almost completed his inspection of the mine, previous to allowing the day-shift to enter for work. Owing to this fact, there were but 13 men at work in the mine. All of these escaped, except two—the pumpman who was standing on the main slope and was killed by flying coal blown from a trip of cars near him, and the unfortunate fireboss whose act was the primary cause of the explosion.

Inasmuch as there are, today, thousands of lamps of the Marsaut type in use in the mines of this country and on the Continent, the question of the safety of the lamp, under all conditions that may arise in coal-mining practice, is one of absorbing interest. Unfortunately, in this case, a certain mystery surrounds the occurrence, in respect to both the conditions and use of the lamp claimed to have failed.

One uncertain feature is the lack of knowing the exact conditions to which the lamp was exposed. From

all accounts, it appears that it was not in the hands of the fireboss and under his control at the supreme moment. While it is said that the fireboss was not seriously burned, his death being due to suffocation in the afterdamp of the explosion, we are told in the report of the disaster that the man's cap was badly burned.

Now, if we assume that the fireboss used his cap in an attempt to smother the flame of the gas burning within the lamp, we must admit that the man himself would have been badly burned. Or, had the cap been on his head, its being burned would point to a similar condition of the man's body.

In view of these conflicting aspects, we are left to surmise only as to the actual manner in which the lamp was handled, or as to what took place at the fatal moment. Evidently, a few seconds elapsed between the fireboss losing his cap close to the lamp, and his reaching the place where his body was found, at a distance of 84 ft. from the lamp.

What is of prime importance, in this matter, is to ascertain the actual conditions that surrounded the lamp. All the witnesses agree that much finely powdered coal dust was present and became a factor in the initiation of the explosion. That the lamp was surrounded by an atmosphere highly charged with fine dust is only natural to assume; but what seems remarkable and, to my mind, quite impossible is the statement that the interior of the lamp gauzes showed signs of being intensely heated, while the outside of the wires gave no such evidence.

WEAK POINT IN THE MARSAUT CONSTRUCTION

To my knowledge, experiments have proved that the safety of lamps of the Marsaut type is seriously reduced by the presence of fine coal dust in the ventilating current; but I know of no experiment having been made, with firedamp burning in a lamp surrounded by a dust-charged atmosphere, when the lamp did not fail.

My conclusion is that such a condition forms the most plausible explanation of this disaster. In the same connection, it is interesting to recall that the eminent French mining engineer, the inventor of the lamp that bears his name, discovered where the peculiar weakness lay in this type of construction. Marsaut found that when the lamp was raised vertically into a quiescent atmosphere of pure or nearly pure methane, so that the sharp gas entered and filled the top of the lamp, the result was an explosion took place within the chimney of sufficient force to drive the flame through the gauze and ignite the gas outside. This has been proved by experiment; and there are a few instances on record showing the failure of this type of lamp under such conditions.

The original Marsaut pattern had no air ring to admit the air below the wick flame, which is one of the features of the Wolf lamp of the Marsaut type. Although this feature adds to the lighting value of the lamp, in my opinion, it has a tendency to reduce the safety value of the lamp and render it less sensitive to the detection of gas. Seeing that this lamp is now used in Vancouver Island coal mines, exclusively for testing purposes by firebosses and not for the purpose of giving them light, I would suggest that there would be an advantage if the air holes admitting the air below the wick flame, were closed, or did not exist, which would make the lamp conform to the original pattern of the bonneted Marsaut safety lamp.

JAMES ASHWORTH,
Mining Engineer.

Cowley, Alberta.

Inquiries Of General Interest

Mechanical Every-Day Problems In Mining Practice

Kinetic Energy of Moving Trip of Cars—
Size of Ventilating Fan and Engine Re-
quired for a Given Circulation in Mine

IN CONNECTION with duties that have fallen to my lot as mine engineer, I have been delving much recently into the intricacies of mechanics, much of which I have found beyond my comprehension and ability to understand and apply, in the practical solution of problems that arise in the mine. *Coal Age* has been a great help to me, in more ways than one, and I want to ask for its assistance in working out two problems that have given me trouble.

First, what is the kinetic energy of a moving trip of six cars, each weighing when loaded 3,500 lb. I want to estimate on a speed of hauling at four miles per hour and compare this with the energy that would be developed should this trip break loose and descend an incline or slope at an estimated speed of 15 miles per hour.

The second problem is to find the size of the fan and engine required for the circulation of an air current of 160,000 cu.ft. per min., against a water gage of 3 in., assuming the fan is direct-connected or belt-driven and running at a speed of 120 r.p.m., taking the steam pressure at the throttle as 120 lb. per sq.in. and supposing the engine cuts off steam at one-third stroke. I want to estimate on a piston speed of 300 ft. per min. If this fan is operated by an electric motor what current will be required at a pressure of, say 500 volts?

Michel, B. C., Canada.

MINE ENGINEER.

Regarding the first question, the kinetic energy of a moving body is the energy it possesses by virtue of its mass and velocity and is expressed by the formula $\frac{1}{2}mv^2$. It is measured by the work given out by the body in bringing it to rest and is expressed in foot-pounds. Calling the weight of a body w , its mass m , the height through which it falls h , and the force of gravity g , we have, for the kinetic energy developed at any given velocity v , since $m = w/g$ and $v^2 = 2gh$

$$\frac{mv^2}{2} = \frac{w}{2g} (2gh) = wh$$

The weight of a trip of six cars weighing 3,500 lb. each, is $6 \times 3,500 = 21,000$ lb. For a speed of 4 mi. per hr., the velocity of the trip is $4 \times 5,280/60 = 352$ ft. per min., or 5.83 ft. per sec. Then since $g = 32.16$ ft. per sec.,

$$\text{Kinetic energy} = \frac{21,000}{2 \times 32.16} (5.83)^2 = 11,237 \text{ ft.-lb.}$$

Again, for a speed of 15 mi. per hr., or $(15 \times 5,280) \div (60 \times 60) = 22$ ft. per sec., the kinetic energy is $(21,000 \times 22^2) \div 64.32 = 158,022$ ft.-lb.

In determining the dimensions of a fan for any required circulation, it is first necessary to estimate the

potential factor of the circulation, as expressed by the ratio of the quantity of air passing, to the square root of the pressure in the fan drift. Thus, to pass 160,000 cu.ft. per min., against a 3-in. gage, this potential factor is $X = 160,000/\sqrt{5.2 \times 3} = 40,510$.

The outer diameter (D) of a fan required to circulate a quantity of air (Q), against a potential factor (X), at a speed of n revolutions per minute, may be found by the formula

$$D = 467 \frac{Q}{Xn} = \frac{467 \times 160,000}{40,510 \times 120} = 15.37 \text{ ft.}$$

The same result may be reached in another way. For example, general fan practice has shown that the best results are obtained when the fan is capable of producing a theoretical water gage that is 40 per cent in excess of the gage required in the fan drift. Or, calling the theoretical water gage I , we have in this case $I = 1.40 \times 3 = 4.2$ in. On this basis, the outer diameter of a fan capable of producing a theoretical water gage $I = 4.2$ in., at a speed $n = 120$ r.p.m. is

$$D = 900 \frac{\sqrt{I}}{n} = \frac{900 \sqrt{4.2}}{120} = 15.37 \text{ ft.}$$

Assuming an efficiency of the steam engine driving the fan as, say 85 per cent, the required indicated horsepower of the engines is

$$H = \frac{160,000 \times 5.2 \times 3}{0.85 \times 33,000} = 89, \text{ say } 90 \text{ hp.}$$

Then, taking the steam pressure at the throttle as 120 lb. per sq.in., the engine cutting off steam at one-third stroke, gives for the mean effective pressure in the cylinder,

$$0.9[0.743(120 + 14.7) - 17] = \text{say } 75 \text{ lb. per sq.in.}$$

Finally, estimating on a development of 90 hp. in a single cylinder, a mean effective pressure of 75 lb. per sq.in. and a piston speed of 300 ft. per min., gives for the diameter (d) of the steam cylinder

$$d = \sqrt{\frac{33,000 \times 90}{0.7854 \times 75 \times 300}} = 12.96, \text{ say } 13 \text{ in.}$$

For direct connection or belt-drive, the fan making 120 r.p.m. and the engine 240 strokes per minute, the length of stroke is $300/240 = 1.25$ ft., or 15 in., which makes the required size of the engine 13x15 in.

To develop 90 hp. electrically, under 500 volts pressure, will require a current of $(746 \times 90) \div 500 = \text{say } 135$ amp.

Examination Questions Answered

Examination for Mine Foremen, Olympia, Wash., Aug. 1, 1923

(Selected 1st-Class Questions)

QUESTION—*Explain the constant 5.2, used in connection with water-gage calculations.*

ANSWER—The constant 5.2 represents the pressure per square foot due to a water column 1 in. in height. Since the weight of 1 cu.ft. of water is 62.5 lb., the weight of a layer of water covering 1 sq.ft. of surface and 1 in. in depth is $62.5 \div 12 = 5.2$ lb. The pressure exerted on any given surface being measured by the depth of the water and the surface pressed, 1 in. of water column always represents a pressure of 5.2 lb. per sq.ft.

QUESTION—*State what systems of ventilation you are familiar with. Give the advantages and disadvantages of each.*

ANSWER—The two common systems of ventilation are known as the "blowing" and the "exhaust system," respectively. In the blowing system the air is forced into the mine under a pressure greater than that of the atmosphere, by means of a fan or other device capable of creating a pressure. The particular advantage of the blowing system is that any gas generated in the roof or overlying strata, or accumulated in abandoned areas, is forced back and often escapes through fissures reaching to the surface. If the system has any disadvantage, it lies in the fact that in case of a breakdown of the fan the resulting drop in pressure will be accompanied by an increased outflow of gas from the strata and abandoned places.

In the exhaust system of ventilation, the mine is

ventilated under a pressure less than that of the atmosphere. This is accomplished by connecting the fan drift with the intake opening of the ventilator. The action of the fan then creates a depression in the fan drift, and the atmospheric pressure on the intake opening of the mine forces the air into the mine against that depression. The advantage, in the application of the exhaust system, is that the hoisting shaft and main haulage road are the downcast and intake airway, respectively, which keeps them free from gas.

The exhaust system is particularly adapted to the ventilation of a gassy mine. In either system, however, it is assumed that the fan is installed at a separate air shaft, which becomes the downcast shaft in the blowing system but is an upcast shaft in the exhaust system of ventilation. The disadvantage of the exhaust system lies in the fact that, the mine being ventilated under a pressure less than that of the atmosphere, there is a tendency for any gas generated in the adjoining strata, or accumulated in abandoned areas, to flow into the mine workings. Again, the movement of the loaded cars passing out of the mine offers an increased obstruction to the intake current and, to that extent, increases the mine resistance and the power required for ventilation. Also, all the dust of the main haulage road is carried into the workings.

QUESTION—*How would you retimber a gangway that had caved, if three sets of timber were broken down and the case liable to run?*

ANSWER—This condition requires extra precaution being taken to avoid accidents. After a careful examination of the timbers and before disturbing the old sets, temporary timbers should be stood to guard against the fall of the loose material when the broken timbers are removed. It may be possible to stand new sets of timbers between the old ones, as permanent timbers. When this has been done one of the old timber sets should be carefully removed, taking care to avoid the men being caught by a possible fall of the loose slate above. As one old set is removed a new set of timbers should be inserted in its place. In this manner, the work should proceed, taking down one set at a time and standing new timbers in their places.

U. S. Coal Commission Arraigns Jobbers in Report on Distribution; Suggests Regulation in Emergency

Wholesalers' Margins Said to Have Risen 200 Per Cent from Pre-War Figures—Too Many Handlers and Pyramiding During Shortages Blamed for High Prices—Retailers Dealt with Gently

Wholesale dealers in coal during recent years have been exacting profits in some instances 200 per cent above their earnings in pre-war years, according to the report of the U. S. Coal Commission on the wholesale and retail coal trade, made public Oct. 21. The retail coal dealer is practically exonerated of responsibility for high prices. The report, which relates to both anthracite and bituminous coal, is a bulky one, comprising about 50,000 words, with numerous tables covering margins, expenses, profits, investments and tonnage handled.

Among the causes of the high price of fuel, the commission says that it found an unnecessary duplication of service with too many handlers in the industry between the mine and the retailer. Coal was sold from wholesaler to wholesaler before it ever reached the retailer. Sometimes this reselling would take place twice or three times. The maximum number of resales discovered was four.

The Commission attacked this extravagance in the industry in its recommendations to President Coolidge and Congress that the government be given power to regulate the distribution of fuel in times of shortage.

Dealing with ninety wholesalers who made reports, the Commission finds that profits have mounted each year. In this connection the report says:

"The showing made for the trade as a whole for the entire United States is that with a total profit of 3.6c. in 1913, the ninety concerns reporting made a return on total capital of 19 per cent, and on net proprietor's equity, after paying interest on borrowed money, 24.1 per cent, and, in 1922, the 424 wholesalers reporting with a total profit of 7.3c. per ton, made returns of 21.8 per cent on total investment, and 25.6 per cent on proprietor's equity.

"In 1917 with a profit of 10.9c., the 182 firms reporting made 45.4 per cent on total investment and 54.8 per cent on proprietor's equity. In 1920, the banner year, the 333 wholesalers covered, with a net profit of 15c. per ton, realized 55.2 per cent on total investment, and 66.6 per cent on net proprietor's equity. In every year except 1921 the return on total investment was greater than 15 per cent and that on proprietor's equity was greater than 18 per cent."

TOO MANY WHOLESALERS IN ANTHRACITE TRADE

The Commission concludes that in the anthracite trade there are too many wholesalers. "The explanation of this undue attraction of new capital to the trade," it says, "is to be found in the high profits on investment realized in the business."

Discussing gross margins and profit per ton and on investment the report has this to say:

"The years 1917 and 1920 were the years of highest margins and profits per ton in all groups. The large profits per ton were reflected in high earnings on investment in those years for all groups. The year 1921, although a year of relatively high margins, was a year of depression in the wholesale trade in all groups; expenses were high and profits were low. One group in 1921 showed a small loss of 2c. per ton on coal handled, but other income changed this loss into a small gain. In this year the rates of earnings shown by the different groups were the lowest shown for the ten-year period.

"In general, the earnings of the ten-year period were large for all groups. Rates of return on total investment of 40 per cent or more were made by every group in one or more years. The lowest rate was 1.5 per cent by the anthracite-less-than-50-per-cent group in 1921.

"With the one exception of the dull year 1921, the total investment would be returned in profit, at the rates shown,

in periods ranging from about one and two-thirds to eight years for the different groups, with from two and one-half to four years or five years as the period most often required. On net proprietor's equity, representing what the owners have in the business, the rates of return were greater, and the periods required to return the total proprietor's equity correspondingly less. Here again 1921 was, of course, the poorest year for all groups."

In summarizing its findings in regard to wholesalers the commission makes these observations:

"Although the independent wholesaler occupies a necessary place in the distribution machinery for coal, the nature of the business is such as to make possible undesirable speculative activities on the part of wholesalers in times of shortage. Coal, both for industrial and household purposes, is a prime public necessity. Recurring shortages, with their periods of wild speculation, tend to attract too much capital into the wholesale trade. The result is more wholesalers than are necessary to conduct the business. In times of shortage, speculative buying and selling among the excessive number of concerns results in great duplication of function and enhanced prices to the consumer.

ANTHRACITE MAKES FERTILE FIELD FOR SPECULATOR

"Anthracite, because it is a limited natural resource, the demand for which in recent years has pressed closely upon production at all times, with limited possibility of substitution of any other fuel equally satisfactory for household use, occupies the position of a necessity of life in many communities habituated to its use and therefore yields readily to the speculative activities of the wholesaler.

"The Commission's study indicates that there are altogether too many wholesalers, but that, notwithstanding this fact, the wholesale trade has made large profits in most of the ten-year period from 1913 to 1922, inclusive, and excessive profits in the panic years 1917 and 1920. The year 1922 generally showed more moderate and even small earnings, due to curtailment of tonnage on account of the strike.

"The Commission's study also indicates that in times of shortage the pyramiding of wholesale margins through the speculative activities of wholesalers results in the enhancement of prices, without furnishing the public an equivalent in distribution service.

"Recurring periods of shortage with wild wholesale speculation point to the need of a public service viewpoint respecting the entire coal trade, backed by legislation providing for strict regulatory powers, on the part of the federal government over the entire production and interstate distribution of coal in order that American industries and households shall at all times be assured of continuous and adequate supply of coal at reasonable prices. The exercise of such regulation is especially good in times of shortage and wildly fluctuating prices.

"When real competition for the purchaser's tonnage exists, such competition is probably the cheapest and most efficient regulator of wholesale margins, but in times of shortage it fails entirely. It may therefore be desirable to set up skeleton regulative machinery which shall be put into operation when, and only when, in the judgment of the President an emergency exists, thus limiting active regulation to periods of national emergency.

URGES LIMITATION OF PROFITS

"The power to regulate should include the power to limit, to a definite maximum amount per ton, the margins that may be taken by one or more wholesalers between the mine and the retailer or consumer, thus limiting speculative

wholesaling. The maximum amount of margin should be the same whether taken by one or by two or more wholesalers.

"The experience and practice of the Federal Fuel Administration along this line furnishes basic information of great value, both as to method and workability of such regulation. All regulatory powers should be backed by adequate penalties for violation of regulations promulgated by the government or its regulatory agency, with necessary outlining of court jurisdiction for their enforcement in cases of violations and of review in cases of aggrievements arising out of regulations promulgated.

"Regulation of wholesale margins to a definite maximum amount per ton would go far toward eliminating the abuse of the reconsignment privilege by which unscrupulous wholesalers, after selling a car of coal to one retailer or consumer, finally sell it to some other who will pay a higher price for it.

"Greater publicity should be given to the inter-relations of nominally independent wholesalers and operators through interlocking stock ownership and officers. Such information should be in the hands of the government agency charged with the duty of regulation of both the production and distribution of coal, to serve as a basis for intelligent decision as to whether a given wholesaler is entitled to pose as independent of the operators from whom coal is purchased.

"In the case of anthracite coal, the Commission's inquiry indicates that during the past year the passing of coal through the hands of wholesalers, with arrangements to split commissions back to the operator, was used by some operators as a means of obtaining higher prices on interstate commerce shipments than those approved by the Fair Practices Committee of the Pennsylvania Fuel Commission."

MUCH CRITICISM OF RETAILERS UNJUST

Dealing with the retail coal trade, after stating that the retail trade presents problems distinctly its own, and mentioning the frequent great public dissatisfaction with the prices charged and the general conduct of the business, the Commission says:

"In some cases such criticism is undoubtedly well founded, but in others it is based on lack of knowledge on the part of the public that the causes of the high prices and shortages of coal felt by the consumer are beyond the control of the retailer. Frequently, public opinion is unjustly aroused against the retailer by inflammatory newspaper articles. On the whole it would seem that what is needed is a better understanding of the trade and its problems on the part of those whom it serves, and more discriminating criticism.

"Recent high prices have encouraged co-operative buying experiments and municipal coal yards as attempts to cut the costs of fuel to the consumer. This is a part of the general trend of public opinion toward a public service viewpoint regarding the production and distribution of coal. The organized retail trade generally opposes such experiments, as they jeopardize the position of the established retailer wherever they are successful. Such movements should be given a fair trial to demonstrate whether they can furnish the same service to the public at a less cost than the estab-

lished retailer. If they can do so they will survive. If they cannot the established retailer will survive as the most efficient method of retail distribution.

"The results of the Commission's inquiries regarding the retail trade indicate that it is generally conducted on a competitive basis. Prices and margins have increased sharply in all sections of the country since 1918. Expenses, also, especially in the last two years, have increased so that net profits per ton and on investments have shown a tendency to decrease.

"During the five-year period, 1918 to 1922, the average rates of profit of retail dealers throughout the country have generally been moderate, and much less than those of wholesalers. In some sections of the country they have been small, while in others they have been fairly large. For the country as a whole, the earnings of 273 identical companies ranged from 11.6 per cent to approximately 23 per cent on total investment, and from 12 to 25 per cent on owner's investment in different years.

"The effect of premium anthracite coal on the retail trade is to make direct business connection with one or more of the big companies which do not sell their product at premium prices of prime importance to a successful retailer. In fact, such direct connection has, during recent years, been more important than real efficiency in retailing in determining what retailers in the anthracite territory will be able to stay in the business. So long as such conditions continue, competition based on real efficiency of retailing can have but little effect in eliminating the really inefficient dealer from the trade.

"The forcing of small sizes upon the retailer by both operators and wholesalers is a practice that works hardship upon the retailer whose trade is not equipped to absorb steam sizes.

"In general, the competitive nature of the retail trade makes regulation of margins and prices unnecessary, except in cases of emergency shortage. In case such emergency regulation is necessary, it should be a part of a fully co-ordinated scheme of regulation covering the production, wholesale distribution and retail distribution of coal.

"In case price regulation is attempted, it, in fairness to the retailer and the public, should take the form of regulation of margins, other than the fixing of definite prices. Such regulation of margin permits the setting of different maximum margins to cover different types of trade, and different amounts of service rendered by city and country dealers.

"This Commission is firmly of the opinion that the solution of the problem of extortionate charge for retail coal, where it exists, is largely in the hands of the communities themselves and that where the public is alert to its rights and ready to apply the remedy no such problem will exist."

THE ADVISORY COMMITTEE which is being set up to co-operate with the coal division of the Department of Commerce will be composed of fifteen members. Three members will represent each of the following branches of the industry; bituminous operators, anthracite operators; wholesalers, retailers and transportation. The personnel of the committee has not been determined as yet.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of September*

		(In Net Tons)								
		1923			1922			1921		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo	Hocking Valley	3,584,242	108,355	3,692,597	2,338,742	65,804	2,404,546	3,392,526	90,626	3,483,152
	N. Y. C.-Ohio Central Lines	1,084,724	33,778	1,118,502	363,417	10,194	373,611	912,039	25,463	937,502
	Baltimore & Ohio	2,161,529	62,473	2,224,002	2,110,904	54,083	2,164,987	2,019,800	59,071	2,078,871
Sandusky	Pennsylvania	2,295,788	72,405	2,368,193	1,689,727	64,397	1,754,124	1,221,981	35,303	1,257,284
Huron	Wheeling & Lake Erie	1,113,192	43,238	1,156,430	162,483	7,958	170,441	1,418,326	40,134	1,458,460
Lorain	Baltimore & Ohio	2,537,212	141,950	2,679,162	576,243	42,223	618,466	2,176,645	87,837	2,264,482
Cleveland	Pennsylvania	1,400,296	151,749	1,552,045	383,651	64,285	447,936	1,768,313	73,258	1,841,571
	Erie	590,203	26,781	616,984	106,874	4,295	111,169	355,964	12,071	368,035
Fairport	Baltimore & Ohio	586,570	56,185	642,755						
Ashtabula	New York Central	2,568,081	198,358	2,766,439	615,853	45,361	661,214	959,835	52,381	1,012,216
	Pennsylvania	1,564,206	69,647	1,633,853	583,253	56,028	639,281	1,922,167	63,910	1,986,077
Conneaut	Bessemer & Lake Erie	2,099,299	178,745	2,278,044	544,240	26,333	570,573	1,090,156	14,732	1,104,888
Erie	Pennsylvania	475,659	63,970	539,629	82,115	49,849	131,964	910,484	51,829	962,313
Totals		22,061,001	1,207,634	23,268,635	9,557,502	490,810	10,048,312	18,148,236	606,615	18,754,851

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

Trade Commission Charges Conspiracy to Enhance Anthracite Prices

As a result of an inquiry, instituted at the direction of President Coolidge, into alleged unfair practices in the anthracite business the Federal Trade Commission has filed a complaint against the operating firm of Madeira, Hill & Co., of Philadelphia, and the following wholesalers: Pattison & Bowns, of New York; the Titan Fuel Corporation, of New York; Hartwell & Lester, Inc., of New York and Massachusetts; Clement P. Brodhead, of New York, and Lynn M. Rainger, of Boston.

The Trade Commission alleges that Madeira, Hill & Co. exacted a rebate from wholesalers varying from 50c. to \$2.50 per ton. The defendants have been summoned to appear before the Commission Nov. 19, when a hearing will be held on the charges.

Charles E. Lester, president of Hartwell & Lester, Inc., in a letter to *Coal Age*, says: "We have not, subsequent to Oct. 23, 1922, the date mentioned by the Commission, purchased from Madeira, Hill & Co. any of either of the two sizes of anthracite referred to, with the exception of four cars of washery chestnut, which were both purchased and resold by us at a price less than \$10.50 per gross ton at the mines. We have never entered into any secret understandings or agreements, such as charged by the Federal Trade Commission, either directly or indirectly, with Madeira, Hill & Co., nor have we ever rebated, refunded or paid in any manner, either directly or indirectly, any moneys in excess of the price at which coal was purchased and orders confirmed by us."

C. P. Brodhead, president of the firm which bears his name, said: "We have never been a party to any secret rebates, nor have we been engaged in any conspiracy, nor have we ever adopted illegitimate methods in our business."

Gardner Pattison, of Pattison & Browns, characterized the Trade Commission's investigation as "a fishing expedition." "In common with other prominent coal firms," he said, "we have always conducted our business in a perfectly open-handed manner. I shall be very pleased to meet any charges which the commission lays before me, and I am quite certain that after representations have been made at Washington these absurd complaints will be dropped."

The Titan Fuel Corporation "denies that they ever entered into any secret condition, understanding or agreement, in writing or verbally, either directly or indirectly, with Madeira, Hill & Co. to rebate or refund to them directly or indirectly, any part of the margin or profit realized over and above the price the coal was purchased for."

Special Government Prosecutors Major David A. L'Esperance and Rush Williamson, who at the direction of Colonel William Hayward, United States Attorney at New York, are conducting an investigation into the matter of the alleged scarcity and high price of anthracite, interrogated a number of hard-coal dealers Oct. 17. As the inquiry was not yet fully under way, the officials declined to discuss the information they had obtained.

Kanawha Operators in Big Annual Meeting

The meeting of the Kanawha Coal Operators' Association at Charleston last week was better attended than any previous gathering of that association. New membership representing more than three million tons was enrolled. The election of officers resulted as follows: John Laing, president; H. D. Morton, vice-president; John L. Dickinson, treasurer. D. C. Kennedy was re-elected secretary. Directors were named as follows: E. O. Dana, F. O. Harris, W. M. Wiley, H. L. Warner, W. C. Mitchell, C. A. Cabell, F. H. Morton, H. D. Morton, John Laing.

One of the features of the meeting was a luncheon at the Kanawha Hotel. Colonel Quinn Morton acted as toastmaster. When President Laing was introduced he was given an ovation. In his remarks he stressed the necessity of co-operation among operators to meet the crisis through which the coal industry is passing. Harry L. Gandy, secretary of the National Coal Association, reviewed the conditions which led to the creation of the Coal Commission

and discussed the plans of the Bituminous Operators' Special Committee. Colonel Chris Hetzel spoke in a humorous vein and urged co-operation. Other speakers were H. D. Morton and E. O. Dana.

N. C. A. to Have Full-Time President?

Whether or not the presidency of the National Coal Association will be given a salary status will be determined in the near future by the Bituminous Operators' Special Committee. It has been recognized since the organization of the association that a great sacrifice was required of the man elected to the presidency. The duties of that office are such as to require a considerable portion of the time of the incumbent. This has been the case particularly during the trying times of the last two administrations.

The committee is to determine whether or not a salary should be paid for part-time work—sufficient to equalize the loss of time from the president's private business—or to place the salary at a figure sufficiently attractive to justify the president in giving his entire time to the affairs of the association. Some of the members of the organization are anxious to see the president of the National Coal Association made a sort of high priest of the bituminous industry, a position comparable to that occupied by Will Hays in the motion-picture industry.

It is not the idea to give the president a permanent status, it is understood. Even if it should be decided to attach a salary to the presidency it is probable that re-election would be necessary each year in conformity with the constitution of the association. If some such proposal were to be made effective, it is practically certain that the membership of the association will insist on the acceptance of the place by J. C. Brydon.

O'Malley Orders Gouging Inquiry

Edwin J. O'Malley, Commissioner of Public Markets of New York City, made the charge Oct. 20 that the "old-line coal companies," which at present claim to be offering coal to consumers at the lowest prices, are resorting to unfair methods and sending most of their production to independents at increased rates, and asked his Deputy Commissioner, Mrs. Louis Reed Welzmler, to investigate.

Mr. O'Malley said he had been told that while the companies which control 80 per cent of the anthracite advertise coal at low prices, and actually send out a certain quantity at these prices, the balance of their production is sold to the independents at an increased rate. This, he said, was characterized as "backdoor coal."

"In order to control the entire coal situation," said O'Malley, "the old-line companies sell only a limited quantity to a favored few retailers. The retailers out of the ring are not permitted to buy of the old-line companies and are therefore forced to purchase coal of the high-priced independents, to whom the old-line companies have sold by way of the 'back door.' These unfortunate retailers are obliged to charge the consumer what are apparently exorbitant prices."

Dr. E. W. Parker, director of the Anthracite Bureau of Information at Philadelphia, reported Oct. 20 that between April 1 and Aug. 31 this year 2,914,873 tons of domestic anthracite were shipped into New York and its environs, against 2,455,416 tons in the same period in 1921.

The coal survey of New York ordered by Police Commissioner Enright was completed Oct. 20 and showed a total of 183,230 tons of all kinds of coal and substitutes on hand by dealers. The report showed that there is no great surplus of coal in the city, and most of the 129 dealers interviewed said there is no certainty as to the amount they can obtain from one week to another. The supply at present is just about enough to meet the demand for domestic coal.

Commissioner Enright's survey revealed that prices range from \$14.25 to \$15.25 per ton. All dealers agree that there is no fear of a coal famine.

GERMANY HAS MORE DESTITUTE MILLIONAIRES than were ever known in history.—*Birmingham Age-Herald*.

Trade Commission Issues First Report on Anthracite Wholesalers' Margins

Margins realized on individual cars by wholesalers of anthracite who purchase and sell in carload lots "without physically handling the coal" ranged during the week ended Sept. 22 from 10c. to \$1.50 per ton, while on steam sizes it ranged from a loss of 15c. per ton to gains of 70c. per ton, according to the Federal Trade Commission, which has just issued the first of a series of weekly reports. The margins realized on over 50 per cent of the sales reported of anthracite steam coal, the Commission says, were 10c. or 25c. per ton, while nearly 78 per cent was at 10c., 15c., 20c., and 25c. per ton.

President Coolidge requested the Federal Trade Commission to examine the findings of fact of the U. S. Coal Commission to ascertain whether the passing of anthracite, especially, through numerous hands before it reaches the consumer is really a device by which the price is unduly raised and, perhaps, constitutes an unfair trade practice. The Trade Commission is continuing the reporting plan formerly used by the Coal Commission in order to obtain first-hand information currently regarding the margins taken and the number of wholesalers intervening between the mine and the retailer.

"Sixty per cent of the total number of cars of domestic sizes of coal reported for the week ended Sept. 22," the Trade Commission says, "were purchased by the reporting wholesaler from a producer and sold to a retailer or consumer, thus passing through the hands of but one wholesaler. Thirty-two per cent were purchased by the reporting wholesaler from a wholesaler and sold to a retailer, thus interposing at least two and possibly more wholesalers between the mine and the consumer. Six per cent were bought by the reporting wholesaler from a producer and sold to a wholesaler, thus interposing at least two wholesalers, and 2 per cent were bought by the reporting wholesaler from a wholesaler and sold to a wholesaler, thus interposing at least three wholesalers between the mine and the consumer. Thus 40 per cent of the carloads of domestic sizes reported were handled by two or more wholesalers."

Chemical Engineers Preparing Program

The tentative program for the sixteenth annual meeting of the American Institute of Chemical Engineers, which will be held in Washington, Dec. 5, 6 and 7, has been drawn up. As the auditoriums at the various bureaus are not large enough to accommodate all those who will be in attendance at the meeting, it has been decided that all sessions will be at the Willard Hotel. This will in no way interfere with the plan to make tours of the bureaus in which chemists are particularly interested. The tentative program includes a paper on "Combustion of Coke, a Typical Bureau of Mines Problem of Importance to the Chemical Engineer," by A. C. Fieldner; one on "Testing of Explosives for Governmental and Commercial Use," by J. W. Paul, and one on "Fuel Research of the Bureau of Mines," by O. P. Hood, as well as addresses by Dr. George Otis Smith, director of the Geological Survey; H. Foster Bain, chief of the Bureau of Mines, and others.

German Export of Coal Crippled by Loss of Upper Silesia

Exports of coal and coke from Germany, according to reports of the German Bureau of Statistics, during the first half of this year, in comparison with the corresponding months of 1922 and 1913, are shown in the following table, in metric tons:

	1923	1922	1913
Bituminous coal.....	556,080	4,243,620	16,368,690
Brown coal.....	785	9,170	3,502,911
Coke.....	134,595	558,324	3,405,202

The decline in exports of bituminous coal is accounted for by the partition of Upper Silesia from Germany to Poland. Holland as the only remaining large buyer of

German coal received from January to June, 1923, 448,000 tons out of the total of 556,000 tons of bituminous coal exported. Smaller quantities were shipped to Switzerland, Austria and Czechoslovakia.

Leading Engineers Attend Mine, Mechanical And Electrical Engineers' Meeting

Members of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers met for their third annual convention at Huntington, W. Va., Oct. 19 and 20.

The meeting this year was the largest held by the association, many new members having been added within the last year. Papers were presented on several of the vital questions on mine application of electrical and mechanical engineering. The papers were discussed by prominent mine electrical engineers of the country, many of whom have been attracted to the society by the important work it has accomplished within the short time it has been in existence.

Two of the papers presented at the convention appeared in the Oct. 18 issue of *Coal Age*, and another appears in this issue.

Considerable discussion took place on the following papers: "Hoisting Equipment," by M. A. Maxwell; "Equipment Records," by J. H. Edwards, and "Manufacturer's Service in Supplying Repair Parts," by F. M. Reigher. Deep interest was taken in an informal discussion on the subject of Motor-Generator Sets vs. Rotary Converters for Mine Service. This question was ably discussed from many angles by leading representatives of the mining manufacturing, consulting and power companies' engineers.

The convention was concluded with the election of new officers and a dinner. R. R. Webster, of the Elkhorn Piney Coal Mining Co., of Weeksbury, Ky., was elected president; F. M. Reigher, electrical engineer, American Coal Co., of Bluefield, W. Va., vice-president, and Herbert Smith, of Huntington, W. Va., was re-elected secretary-treasurer.

Cement Output and Shipments Drop

Production of portland cement during September, 1923, according to the Geological Survey, totaled 13,109,000 barrels, as compared with 11,424,000 barrels in the corresponding month of 1922, and 12,967,000 barrels in August, 1923. Shipments for the month were 13,698,000 barrels as compared with 12,444,000 barrels in September, 1922, and 13,971,000 barrels in August, 1923. Stocks at the end of September amounted to 5,492,000 barrels, as compared with 4,724,000 in September, 1922, and 6,080,000 barrels in August of this year.

REMARKABLE EXAMPLES of human endurance and perseverance are recorded in connection with the flooding of the Redding coal mine near Glasgow, Scotland. Five men were rescued alive after 214 hours imprisonment. None of the men was the worse for his nine-day fast. The incident parallels the rescue of five Welsh miners after nine days imprisonment in 1877 in a Rhondda Valley coal mine. While the men in the Scottish mine had no food, they were trapped in a part of the mine where potable water was available, and where fresh air could be had. Great credit is being given the rescuers for the tireless, night-and-day effort they made to reach the entombed men.

FRED R. LOW, editor of *Power*, has been elected president of the American Society of Mechanical Engineers for the coming year. He will succeed John L. Harrington, of Kansas City, Mo. The election was conducted from the national headquarters of the society, in New York City, by mail ballot, more than 18,000 members participating.

REHEARING OF THE ASSIGNED-CAR CASE began in Washington Oct. 22 before Commissioner Aitchison and William Bartel, director of service of the Interstate Commerce Commission. The first day was devoted to testimony by the railroads, which argued for retention of the assigned-car rule as necessary to obtain adequate supplies of fuel for their requirements.

Soft-Coal Industry to Demonstrate That It Can Improve Its Own Practices

Bituminous Operators' Special Committee Will Make Close Study of Findings of Coal Commission and Voluntarily Put Into Effect Practical Suggestions—To Publish Figures on Costs, Earnings and Wages

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

The Bituminous Operators' Special Committee, which now has become a permanent institution, is going to take full advantage of the interim prior to the convening of Congress to demonstrate that the industry is capable of improving its own practices. It is in no way an admission on the part of the operators of any outstanding and flagrant delinquencies on their part. If they can be rid of strikes and governmental interference, they point out, the country will be supplied with all the coal that it can use at reasonable prices. Nevertheless it is recognized that a public demand exists for basic figures and these are going to be furnished on a voluntary basis. Mr. Brydon was in Washington last week, conferring with government officials.

A detailed study is being made of the reports of the Harding Coal Commission, with the idea of carrying into effect voluntarily any practical suggestion made by the Commission. This is subject, of course, to the committee's ability to finance the work involved. Incidentally it may be mentioned that the matter of financing such activities is becoming increasingly difficult in the period when a considerable portion of the tonnage is being sold with little or no margin of profit.

In view of the fact that the committee has enjoyed only a week of life under its new status, plans have not advanced very far. At this time all activities are being concentrated on plans for publishing figures on costs, earnings and wages. If this movement has the support of operators generally it may head off legislation providing compulsory returns to the Interstate Commerce Commission.

If the plan is successful it must furnish the information in which the public is most interested. It happens that the fields in which the public has the greatest interest are those less likely to make voluntary returns.

WAGE RETURNS A SUBJECT OF WIDESPREAD INTEREST

Returns on wages would seem to be among the more important things which the operators could do in their own interest. This is particularly true of wages paid in the non-union fields. If it could be brought home to the public that earnings of \$500 per month on the part of an individual coal miner is not the exceptional performance of an exceptional man and that literally scores of men earn that much, the public might make its influence felt when the men come forward with requests for an increase of 15 or 20 per cent, as they probably will do next spring. While the public is fairly familiar with the wage rates in the union field, there is much opportunity to point out to them just how this wage scale works out. There is comparatively little knowledge of wage rates in the non-union fields and since they change frequently there is greater need for basic information concerning them.

Perhaps this is a good time for the Bituminous Operators' Special Committee or the National Coal Association as such to enter upon the consideration of technical matters. Practically every other large national association undertakes work of that character. The need is greater in coal mining than in nearly any other industry. None disputes that coal-mining properties are poorly managed from an engineering standpoint. There are great wastes which could be eliminated and it even might be to the interest of the industry were the national association to undertake to instruct consumers how to get the most out of their coal rather than have them convert their power plants to use oil.

Since the public is demanding more than the figures which operators can furnish it might be advisable for the National, as the most powerful association within the industry, to take the initiative in formulating a program in which the wholesalers and retailers would participate.

In the whole gamut of questions arising in industrial relations, other than wages and hours, a fertile field is offered to the National Coal Association. The opportunity for doing something constructive in the matter of housing alone is great.

Statistics covering production, distribution and stocks are inadequate. There is no thought that this activity should not remain where it is, in the Geological Survey. The service should be expanded, particularly in regard to distribution of stocks. The only way that can be done is to bring the need forcibly before Congress so that the necessary funds may be appropriated.

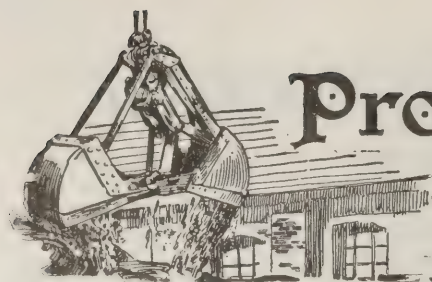
STILL MUCH ROOM FOR IMPROVEMENT

This does not pretend to be a full list of the many things which the industry can do to improve itself. There are literally thousands of things, statistical and otherwise, which would contribute in no small way to the industry's improvement. A golden opportunity exists to demonstrate, prior to the convening of Congress, what can be done in the public interest and in the interest of all branches of the coal trade.

The question may be asked as to the probability of the acceptance by the public of data put out by an interested source. All that is necessary to answer such a question is to point to the American Iron and Steel Institute, the American Railway Association, the National Lumber Manufacturers' Association or any one of many other organizations. Their figures are accepted by the public at their face value. No one thinks of questioning the figures covering the production of steel ingots. Financial operations of great magnitude are influenced by the Iron and Steel Institute's figures on unfilled orders. The National Lumber Manufacturers' Association gathers by telegraph each week and distributes at great expense figures as to lumber productions, shipments and orders. Business accepts them and so does the public. They would be willing to repose the same confidence in the National Coal Association. The coal operators filed good briefs with the Coal Commission. They now have an opportunity, and it may head off adverse legislation if they demonstrate their ability to do voluntarily some of the things which otherwise might be made a legal obligation.

Government Fuel Yard Seeks Coal Bids

The Government Fuel Yard, Washington, D. C., seeks the submission of bids on 14,700 gross tons of low-volatile bituminous run-of-mine coal to cover its fuel requirements for the period from Nov. 15 to March 31, next. The tonnage called for is for use in plants located on the Baltimore & Ohio R.R. only. "A consideration of freight rates limits, therefore," it is announced, "bids on this tonnage to coal from mines on the B. & O. or connecting lines." Sealed proposals to supply the tonnage will be received by George S. Pope, Chief Engineer, Government Fuel Yard, Room 1139, Interior Department, up to 2 p.m. Oct. 31 and then publicly opened.



Production and the Market



Weekly Review

The soft-coal market continues to show practically the same conditions that have prevailed for several weeks. Demand continues slow. Production took a slight upturn but a decline is indicated for last week. Steam coals are moving slowly, while domestic coals show a slightly better demand in some parts. The railroads are reported by the American Railway Association to hold 17,663,448 tons of bituminous coal, of which 15,605,415 tons is in stockpiles and 2,058,033 tons is in cars. This total compares with 16,365,693 tons in reserve on Sept. 1 and 6,756,886 tons on Jan. 1. Spot prices in some districts show a slight advance but these are almost offset by declines in others.

Coal Age Index for the first time in seven weeks shows an advance, registering 186 on Oct. 22, an increase of one point from the previous week, with an average price of \$2.25. Increases in southern Illinois, Springfield, Standard and Kanawha coals were practically offset by declines in eastern and western Kentucky, Clearfield, Cambria, Somerset and Pocahontas fields.

Production of soft coal during the week ended Oct. 13 is estimated by the Geological Survey at 10,771,000 net tons, an increase of 71,000 tons over the previous week, but an appreciable decrease is indicated for last week.

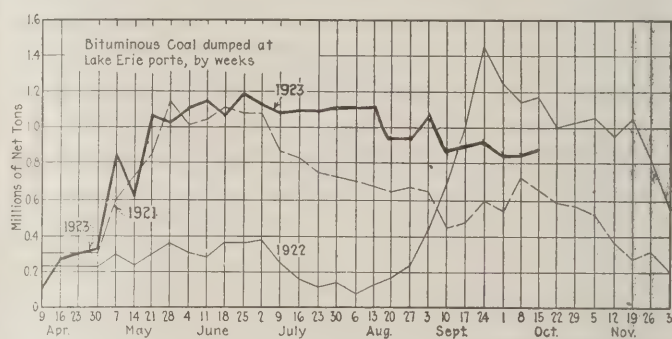
CONSUMERS RELUCTANT TO BUY

Market dullness is reported in nearly all sections. Consumers are reluctant to buy, as they are well stocked. A slight improvement in spot buying is reported from the Middle West, particularly for domestic coals, due to slightly lower temperatures, while domestic business in St. Louis is tied up because of mild weather, and there is no demand for anthracite, coke or smokeless coal. The Kentucky markets are in bad shape, while the situation in the Northwest is not at all satisfactory.

The Ohio markets are quiet, with no change reported

from the Pittsburgh field. Dullness in the textile industry, with heavy reserve stocks of coal on hand continue to dominate the New England situation. Prices are at low levels.

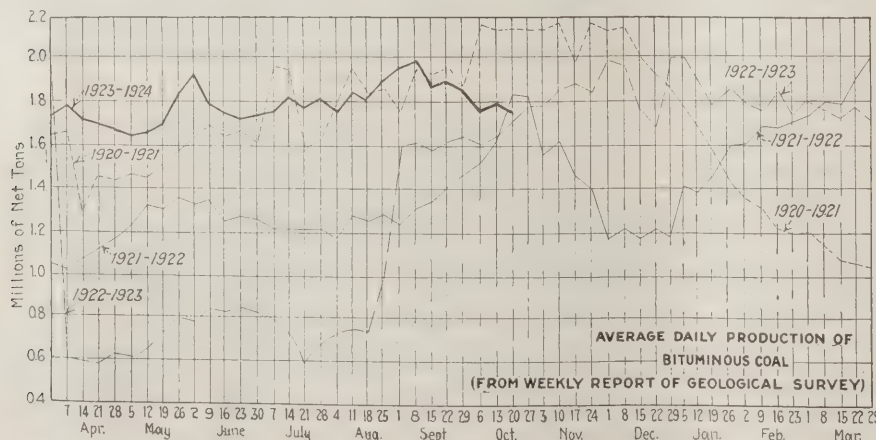
Production of anthracite for the week ended Oct. 13 amounted to 2,009,000 net tons, according to the report of the Geological Survey. In the previous week it was 2,015,000 tons, which was a drop of 10,000 tons from



	Week Ended Oct. 15	Season to Oct. 15
Cargo	817,044	23,616,366
Fuel	40,559	1,286,398
Totals	857,603	24,902,764

the week of Sept. 29. Final returns of anthracite shipments in September place the total output for that month at 2,917,000 tons, which was 5,951,000 tons less than production in August, the loss being attributed to the miner's strike. Despite this loss of production during the strike, however, the cumulative output during the first nine months of 1923 compares favorably with that in years of large production. Domestic coals continue in heavy demand, while steam coals move slowly.

All-rail shipments of bituminous coal into New England during the period April 7-Sept. 29 amounted to



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Sept. 29	9,822,000	11,347,000
Oct. 6 (a)	9,736,000	10,700,000
Oct. 13 (b)	10,110,000	10,771,000
Daily average	1,685,000	1,795,000
Calendar year	290,861,000	434,945,000
Daily av. cal. year	1,198,000	1,795,000

ANTHRACITE

Sept. 29	1,982,000	2,025,000
Oct. 6	1,994,000	2,015,000
Oct. 13	2,112,000	2,009,000

COKE

Oct. 6 (b)	173,000	313,000
Oct. 13 (a)	185,000	284,000
Calendar year	5,144,000	15,099,000

(a) Subject to revision. (b) Revised from last report.

111,497 cars, according to a survey of the coal industry issued by F. R. Wadleigh, Chief, Coal Division, Department of Commerce. During the corresponding periods of 1922 and 1921 the shipments were 28,601 and 73,100 cars, respectively. All-rail shipments of anthracite into the same territory during the same period were 83,273 cars in 1923, 17,801 cars in 1922 and 82,081 cars in 1921. During the five months April-August bituminous coal dumped into vessels at North Atlantic ports destined for New England amounted to 5,192,036 tons.

Export demand is slow and the outlook is not encouraging; the German situation is being watched closely.

Midwest Market Improves

A slight strengthening of the market in spots was felt throughout the Middle West during the last two days of last week. Cool weather made an almost imperceptible impression on domestic demand. Even slight changes are

noticeable in a season when the market is as flat as it is now. Southern Illinois lump holds up fairly well to the association circular of \$4.35 with little selling under \$4, but the volume shipped is low. A number of mines are down. It is said in St. Louis that there has never been a time since southern Illinois coal became a factor in that city's market when so little Franklin County coal has been offered there. The southern field has a good many "no bills" in middle-sized coal.

Central Illinois commercial mines also are running slowly so as to avoid "no bills" as much as possible. The best lump produced there holds up above \$3 with a top price of \$3.25. Standard district lump has toned up in price a little. An average increase of about 15c. a ton raises it to \$3@3.25. Screenings are not on hand in such huge quantities nowadays. The result is Southern Illinois operators place theirs at \$1.40@1.50 and central edges up about 10c. to 85c.@1. However, Standard operators suffer a slight lowering on screenings to compensate for their fairly good lump market. The price is 45c.@50c. Western Kentucky screenings are as low, but they do not find eager acceptance. Evidently steam buyers

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Oct. 23 1922	Oct. 8 1923	Oct. 15 1923	Oct. 22 1923†	Midwest		Market Quoted	Oct. 23 1922	Oct. 8 1923	Oct. 15 1923	Oct. 22 1923†
Smokeless lump.....	Columbus....	\$7.10	\$6.10	\$6.35	\$6.25@	\$6.50	Franklin, Ill. lump.....	Chicago....	\$5.30	\$4.05	\$4.05	\$3.90@	\$4.75
Smokeless mine run.....	Columbus....	6.25	3.05	3.05	2.85@	3.25	Franklin, Ill. mine run.....	Chicago....	4.50	2.60	2.60	2.25@	3.00
Smokeless screenings.....	Columbus....	6.00	2.25	2.25	1.85@	1.50	Franklin, Ill. screenings.....	Chicago....	3.25	1.25	1.35	1.40@	1.50
Smokeless lump.....	Chicago....	6.30	6.10	6.10	6.00@	6.25	Central, Ill. lump.....	Chicago....	5.10	3.10	3.10	3.00@	3.25
Smokeless mine run.....	Chicago....	6.00	2.85	2.85	2.75@	3.00	Central, Ill. mine run.....	Chicago....	3.60	2.10	2.10	2.00@	2.25
Smokeless lump.....	Cincinnati....	6.30	6.10	5.85	5.75@	6.00	Central, Ill. screenings.....	Chicago....	2.00	.70	.80	.85@	1.00
Smokeless mine run.....	Cincinnati....	5.55	2.75	2.50	2.00@	3.00	Ind. 4th Vein lump.....	Chicago....	5.10	3.35	3.35	3.25@	3.50
Smokeless screenings.....	Cincinnati....	5.30	1.60	1.60	1.25@	2.25	Ind. 4th Vein mine run.....	Chicago....	4.35	2.60	2.60	2.50@	2.75
*Smokeless mine run.....	Boston.....	7.10	4.80	4.65	4.50@	4.65	Ind. 4th Vein screenings.....	Chicago....	2.75	1.20	1.20	1.15@	1.30
Clearfield mine run.....	Boston.....	3.75	2.15	2.00	1.50@	2.40	Ind. 5th Vein lump.....	Chicago....	4.75	2.50	2.50	2.25@	2.75
Cambria mine run.....	Boston.....	4.25	2.75	2.60	2.00@	3.00	Ind. 5th Vein mine run.....	Chicago....	3.75	2.10	2.10	2.00@	2.25
Somerset mine run.....	Boston.....	3.95	2.35	2.35	1.75@	2.75	Ind. 5th Vein screenings.....	Chicago....	2.75	.80	.80	.75@	.90
Pool 1 (Navy Standard).....	New York....	5.00	3.10	3.10	2.85@	3.25	Mt. Olive lump.....	St. Louis....	.....	3.10	3.10	3.00@	3.25
Pool 1 (Navy Standard).....	Philadelphia..	.....	3.20	3.15	3.00@	3.30	Mt. Olive mine run.....	St. Louis....	.....	2.25	2.25	2.20@	2.30
Pool 1 (Navy Standard).....	Baltimore....	5.00	.....	.....	.....	.....	Mt. Olive screenings.....	St. Louis....	.....	1.25	1.25	1.20@	1.30
Pool 9 (Super. Low Vol.).....	New York....	4.25	2.35	2.35	2.15@	2.60	Standard lump.....	St. Louis....	4.35	3.00	3.00	3.00@	3.25
Pool 9 (Super. Low Vol.).....	Philadelphia..	4.35	2.55	2.45	2.30@	2.60	Standard mine run.....	St. Louis....	2.75	2.05	2.05	1.80@	2.30
Pool 9 (Super. Low Vol.).....	Baltimore....	4.35	2.40	2.25	2.15	.....	Standard screenings.....	St. Louis....	2.10	.55	.55	.45@	.60
Pool 10 (H.Gr.Low Vol.).....	New York....	3.85	2.05	2.05	1.90@	2.25	West Ky. lump.....	Louisville..	5.00	2.55	2.55	2.35@	2.50
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	3.60	2.10	2.05	1.85@	2.15	West Ky. mine run.....	Louisville..	2.45	1.75	1.75	1.50@	1.85
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	3.90	2.25	2.15	2.10	.....	West Ky. screenings.....	Louisville..	2.10	.55	.55	.45@	.60
Pool 11 (Low Vol.).....	New York....	3.30	1.85	1.85	1.75@	2.00	West Ky. lump.....	Chicago....	4.10	2.60	2.60	2.50@	2.75
Pool 11 (Low Vol.).....	Philadelphia..	3.25	1.85	1.75	1.65@	1.80	West Ky. mine run.....	Chicago....	3.25	1.75	1.75	1.50@	2.00
Pool 11 (Low Vol.).....	Baltimore....	3.55	2.00	1.80	1.80@	2.00							
High-Volatile, Eastern							South and Southwest						
Pool 54-64 (Gas and St.).....	New York....	3.50	1.65	1.65	1.60@	1.75	Big Seam lump.....	Birmingham..	3.95	3.75	3.75	3.65@	3.90
Pool 54-64 (Gas and St.).....	Philadelphia..	3.75	1.70	1.65	1.60@	1.75	Big Seam mine run.....	Birmingham..	2.60	1.95	1.95	1.75@	2.15
Pool 54-64 (Gas and St.).....	Baltimore....	3.60	1.60	1.75	1.75	.....	Big Seam (washed).....	Birmingham..	2.75	2.35	2.35	2.25@	2.50
Pittsburgh se'd gas.....	Pittsburgh....	5.05	2.55	2.55	2.50@	2.60	S. E. Ky. lump.....	Chicago....	5.50	3.35	3.35	2.75@	3.25
Pittsburgh gas mine run.....	Pittsburgh....	.....	2.20	2.20	2.20@	2.30	S. E. Ky. mine run.....	Chicago....	4.25	2.25	2.25	2.00@	2.50
Pittsburgh mine run (St.).....	Pittsburgh....	3.25	1.85	1.85	1.75@	2.00	S. E. Ky. lump.....	Louisville..	6.50	3.25	3.10	2.75@	3.25
Pittsburgh slack (Gas).....	Pittsburgh....	3.60	1.20	1.20	1.15@	1.30	S. E. Ky. mine run.....	Louisville..	3.85	2.00	2.00	1.60@	2.00
Kanawha lump.....	Columbus....	6.25	3.15	3.15	2.85@	3.50	S. E. Ky. screenings.....	Louisville..	4.10	.85	.85	.70@	.85
Kanawha mine run.....	Columbus....	4.50	1.85	1.85	1.75@	2.00	S. E. Ky. lump.....	Cincinnati..	6.75	3.25	3.10	3.25@	4.00
Kanawha screenings.....	Columbus....	3.75	.95	.95	.80@	1.00	S. E. Ky. mine run.....	Cincinnati..	3.85	1.35	1.55	1.25@	1.85
W. Va. lump.....	Cincinnati..	6.10	3.35	3.35	3.00@	4.00	S. E. Ky. screenings.....	Cincinnati..	3.60	.85	.80	.60@	1.25
W. Va. Gas mine run.....	Cincinnati..	4.35	1.35	1.65	1.85@	2.00	Kansas lump.....	Kansas City..	5.75	5.00	5.00	5.00	5.00
W. Va. Steam mine run.....	Cincinnati..	3.35	1.35	1.65	1.85@	2.00	Kansas mine run.....	Kansas City..	3.75	3.50	3.50	3.50	3.50
W. Va. screenings.....	Cincinnati..	3.65	.85	.80	.75@	1.25	Kansas screenings.....	Kansas City..	2.50	2.25	2.25	2.25	2.25
Hocking lump.....	Columbus....	5.25	3.10	3.05	2.85@	3.25							
Hocking mine run.....	Columbus....	3.50	1.85	1.85	1.75@	2.00							
Hocking screenings.....	Columbus....	3.25	.95	.95	.80@	1.00							
Pitts. No. 8 lump.....	Cleveland....	3.81	2.60	2.55	2.20@	3.00							
Pitts. No. 8 mine run.....	Cleveland....	3.56	1.95	1.90	1.80@	1.90							
Pitts. No. 8 screenings.....	Cleveland....	3.25	1.10	1.05	.90@	1.10							

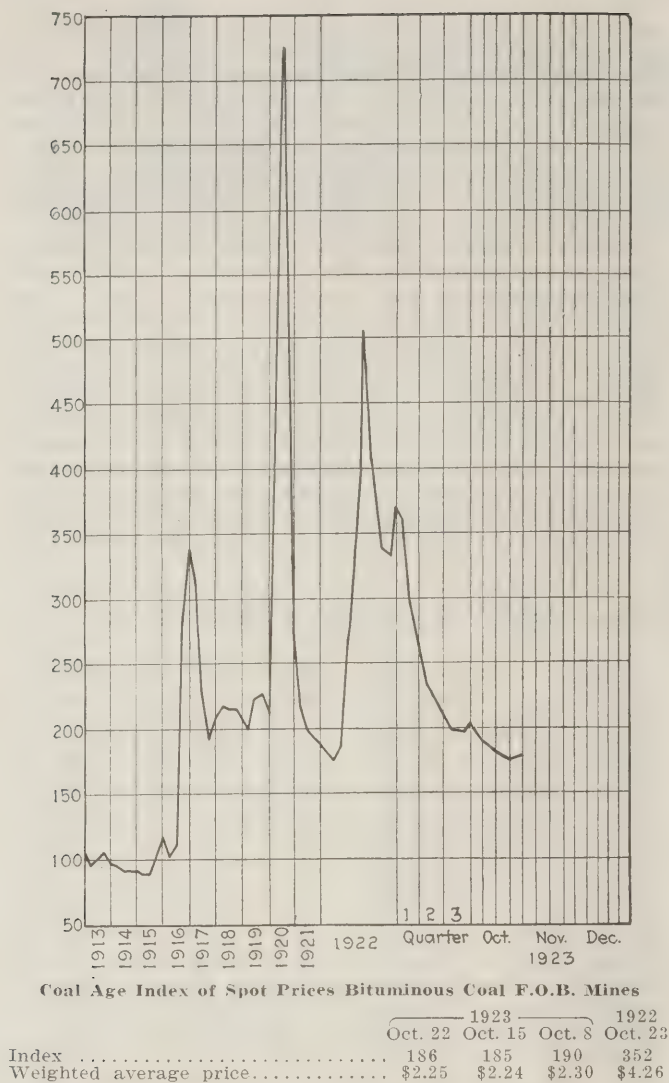
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Oct. 15, 1923		Oct. 22, 1923†						
				Independent	Company	Independent	Company	Independent	Company					
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@	\$8.25	\$9.60@	\$9.25	\$9.60	\$9.25					
Broken.....	Philadelphia..	2.39		7.90@	8.10									
Egg.....	New York.....	2.34	9.25@	12.00	8.00@	8.35	9.85@	9.25	\$9.85@	12.25	8.75@	9.25		
Egg.....	Philadelphia..	2.39	9.25@	11.00	8.10@	8.35	9.85@	12.20	8.75@	9.25	9.85@	12.20	8.75@	9.25
Egg.....	Chicago*.....	5.06	12.50@	13.00	7.20@	8.25	9.60@	12.50	8.00@	8.35	9.60@	12.50	8.00@	8.35
Stove.....	New York.....	2.34	9.25@	12.00	8.00@	8.35	9.85@	12.25	8.75@	9.25	9.85@	12.25	8.75@	9.25
Stove.....	Philadelphia..	2.39	9.25@	11.00	8.15@	8.35	9.85@	12.20	8.90@	9.25	9.85@	12.20	8.90@	9.25
Stove.....	Chicago*.....	5.06	12.50@	13.00	7.35@	8.25	9.60@	12.50	8.00@	8.35	9.60@	12.50	8.00@	8.35
Chestnut.....	New York.....	2.34	9.25@	12.00	8.00@	8.35	9.85@	12.25	8.75@	9.25	9.85@	12.25	8.75@	9.25
Chestnut.....	Philadelphia..	2.39	9.25@	11.00	8.15@	8.35	9.85@	12.20	8.90@	9.25	9.85@	12.20	8.90@	9.25
Chestnut.....	Chicago*.....	5.06	12.50@	13.00	7.35@	8.35	9.60@	12.50	8.00@	8.35	9.60@	12.50	8.00@	8.35
Ranges.....	New York.....	2.34			8.25		9.00		9.00				9.00	
Pea.....	New York.....	2.22	7.00@	11.00	6.15@	6.30	6.75@	8.25	6.15@	6.65	6.75@	8.25	6.15@	6.65
Pea.....	Philadelphia..	2.14	7.00@	8.00	6.15@	6.20	6.75@	9.00	6.35@	6.60	6.75@	9.00	6.35@	6.60
Pea.....	Chicago*.....	4.79	7.00@	8.00	5.49@	6.03	6.00@	6.75	5.40@	6.05	6.00@	6.75	5.40@	6.05
Buckwheat No. 1.....	New York.....	2.22	4.00@	5.00	4.00@	4.10	2.50@	3.50	3.50		2.50@	3.50	3.50	
Buckwheat No. 1.....	Philadelphia..	2.14	5.00		4.00		3.00@	3.50	3.50		3.00@	3.50	3.50	
Rice.....	New York.....	2.22	3.00@	3.25	2.75@	3.00	2.00@	2.50	2.50		1.85@	2.50	2.50	
Rice.....	Philadelphia..	2.14	2.50@	2.75	2.75@	3.00	2.00@	2.50	2.50		2.00@	2.50	2.50	
Barley.....	New York.....	2.22	1.75@	2.00	1.50@	2.00	1.15@	1.50	1.50		1.15@	1.50	1.50	
Barley.....	Philadelphia..	2.14	1.00@	1.75	2.00		1.25@	1.50	1.50		1.25@	1.50	1.50	
Birdseye.....	New York.....	2.22			2.10		1.60		1.60				1.60	

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

feel they can afford to wait for another slump in higher grade screenings.

St. Louis Remains Dull

Mild weather continues to tie up domestic business in St. Louis and while a little is moving it is in small quantities and of the cheaper grades. Dealers have their yards full and reports show that there is no demand for anthracite, smokeless or coke. Country domestic calls show that the demand is mostly for middle-priced coals and almost universally the lump size in spite of efforts on the part of shippers to move egg and nut.

Wagonload steam has picked up during the last few days on account of wet weather, but carload is still lagging, with no country call at all and practically nothing moving to the Northwestern or Chicago markets. Railroad tonnage also has dropped off.

The Kentucky coal market is in poor shape. While a considerable amount of tonnage is being moved, it is not on a profitable basis for the operator or the jobber. Some operators selling direct are quoting prices which the jobber can meet only by cutting his commission down to practically nothing. There is too much coal being offered for the market to absorb. Retailers in some instances have fair yard stocks, but others are buying merely as they need coal, and playing for a lower market later in the fall.

Some ridiculously low prices have been reported in the local market during the week. A jobber reported inability to sell a car of Elkhorn mine-run, representing distress fuel, at 85c. Some good mine-run has been quoted as low as \$1.25 from eastern Kentucky. Harlan County is asking \$2@ \$2.25 for gas mine-run, but jobbers report that it is being offered at \$1.50 and up by some mines, and the situation in the Hazard field is much the same.

Northwestern Trade Still Sluggish

The warmth of the past week was sufficient to keep the Northwestern coal trade in the dumps. A decline in domestic demand in Duluth did not cause much worry, however, for dealers were confident that the colder weather promised for this week would snap things up. They are laying in all the anthracite they can handle. However, movement of both hard and soft coal to the upper lake docks was small during the week. Only thirty-one cargoes reached the Head-of-the-Lakes, of which but two were of anthracite. At Duluth prices held firm, in spite of slack trade, on everything but Kentucky, splint and Pocahontas screenings. These coals are off because of excess supply and because dock owners want to unload them before a freeze-up.

"No demand; little doing," is the laconic market opinion in Milwaukee. The recent 70c.@80c. advance in hard coal has damped out all keenness in demand for anthracite and even the low prices at which Pocahontas, as a hard-coal substitute, is offered has not stimulated buying much. Docks appear to be trying to get all the hard coal they can, however.

Milwaukee receipts during the first half of October aggregated 79,986 tons, making the season's receipts of hard coal since the opening of navigation 713,625 tons. October receipts of soft coal thus far total 233,772 tons, making the season's receipts 2,319,121 tons. These figures bring the total receipts of both hard and soft coal since navigation opened up to 3,032,746 tons.

Trade at Minneapolis has been low. The market on soft coals has steadied somewhat as the vast excess of coal available a couple of weeks ago thinned out a little, but nobody is buying in quantity and competition continues sharp. Hard coal has moved readily enough into the country but the cities still are partly unsupplied and will have to buy at the new increased price since pre-strike coal is exhausted.

West Does Little

There is little to relieve the drabness of the market condition in the West and Southwest. Around Kansas City steam demand continues light and screenings continue to back up on the mines. Demand for domestic sizes of both Arkansas smokeless and Kansas coals is fair. In Colorado demand is so small that nothing moves readily and mine running time has fallen off still further. The September output was 863,500 tons, which was 26,400 tons under September of 1922.

In Utah the little flurry of trade brought on by the recent changes in price lists has about blown over and business is slowing up. A car shortage is making itself felt. While the Pacific coast and Northwestern markets remain dull, Utah and Idaho are taking a good deal of domestic coal. Steam demand seems to be off.

Ohio Market Sluggish

Rejections, coal on commission, coal in distress and a demand that is even more sluggish than draggy are the high lights in the Cincinnati market. There is a certain amount of firmness in the domestic coal market. Southeastern Kentucky mines and the smaller operations on the Big Sandy are beginning to feel the pinch of high costs and low returns and there are a number of the mines there that have closed down or are contemplating doing so as a means of stopping their losses. There has been no great change in the low-volatile situation except that some brokers are offering smokeless lump and egg now at \$6. Retail prices are unchanged.

Warm weather together with heavy stocks on the part of steam-coal users has tended to reduce demand in the Columbus market. Little hope is held out for the present.

Retail dealers are buying for immediate needs generally and some of them have some demand for Pocahontas and other smokeless grades, but the majority are delivering only a small tonnage. Ohio-mined coals are not selling as well as formerly for domestic purposes although some tonnage is moving both from the Hocking Valley and Pomeroy Bend fields. Purchasing agents are showing no interest in the steam-coal situation. Reserves are sufficient for from sixty to ninety days and at present utilities are the best customers, with the railroads taking a fair-sized tonnage. Screenings are the weakest, with prices low.

The Cleveland market is in the doldrums, operators and jobbers asserting that it is duller now than for many years. Distress coal continues to move into industrial centers, with the result that in many instances sales of this coal are made from 10c. to 15c. per ton below what might be considered the spot range. Public utilities are not storing as much coal this fall as they have in the past.

The Pittsburgh coal market does not seem to have lost any more ground last week, but it has not improved either. Consumption is large, but consumers are not in the market to any extent, being supplied either by regular contracts or by arrangements whereby prices are adjusted or agreed upon weekly or monthly. The open market demand for coal is very light and there are no indications at present that it will improve. The market for Pittsburgh district coals is disturbed also by the greater competition of non-union fields, the low prices quoted for some of this product having an influence on the market.

In order to keep their mines in operation it is reported that coal operators in the central Pennsylvania district are loading cars and holding them on the sidings. The daily loadings in September averaged 3,101 cars as compared with 3,200 cars in August, while the daily loadings during the first fourteen days of October averaged 2,342 cars.

No Improvement in New England

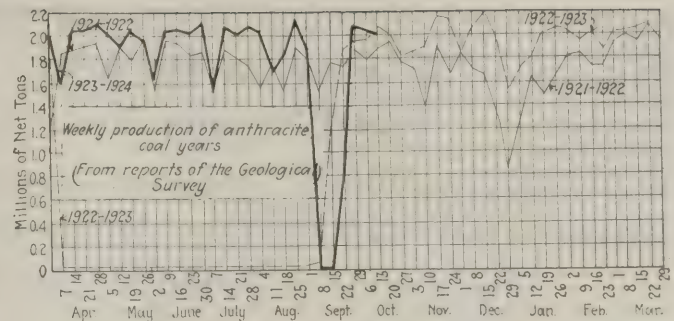
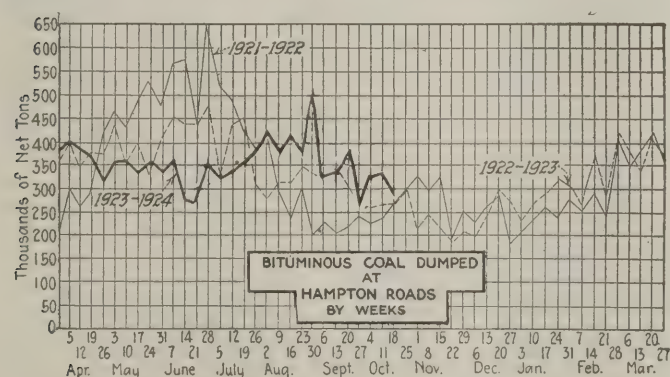
In New England the steam trade is still very much in the doldrums. Prices are at low levels whether all rail or by water and there are no signs of improvement. The textile industry is still under heavy restriction and those mills that still use coal have large stocks that will meet probable requirements for months to come.

At Hampton Roads there continue large accumulations and quotations have eased off to \$4.50 per gross ton f.o.b. vessel for No. 1 navy standard grades. On cars at Boston and Providence sales have been made at as low as \$5.75 per gross ton and there are still cargoes afloat that factors are trying to force on the market.

Receipts all-rail have diminished materially. Even the railroads are taking less tonnage than was the case during August and September. All the agencies are combing over consuming territory, but their efforts meet with only light response. What scattering purchases are made are of coals from low-cost mines where operators have scaled quotations down to a minimum.

Little Change in Atlantic Seaboard Markets

There is no appreciable change in the soft-coal markets along the Atlantic seaboard. At New York demand is light and prices easy. Spot coal moves slowly. In the



Philadelphia market nothing has developed to encourage the producer and the situation last week was quieter than during the previous week. Changed weather conditions, it is believed, will be necessary before there is a change in the situation. The Baltimore market is usually flat and prices are low. Although there is not much demand for either high- or low-volatile coals, says a report from West Virginia, there has been no appreciable reduction in the output. "No market" losses in the Virginia territory are not so heavy.

The market at Birmingham is weak and featured by the smallest volume of new business so far recorded this year. No interest is being shown by buyers beyond obtaining immediate requirements, and these are either very small or are taken care of by reserve stocks. The domestic market, which has held up satisfactorily until recently, is now sluggish. The small amount of new business offered is placed in many instances with the smaller producers at somewhat shaded figures. Furnace mines are operating three to five days a week and commercial mines with few exceptions not over three days.

Movement of soft coal through the lower Lake ports amounted to 857,603 net tons during the week ended Oct. 14, an increase of 19,093 tons when compared with the previous week. Lake shipments of anthracite during the second week in October totaled 125,610 net tons, and were confined to Buffalo, there being no shipments through Erie. Cumulative shipments of anthracite in 1923 amount to 2,633,909 tons.

Domestic Anthracite Market Brisk

The anthracite market for domestic coals continues brisk, but the steam sizes are moving slowly. Most retail dealers are anxious for heavier shipments of the larger coals, particularly stove. In the territory served by the New York market strong efforts are necessary to move steam coals and some producers and shippers are offering inducements to buyers. Most of the larger companies find it necessary to store these coals because of the small demand. There is no appreciable change in the Philadelphia market, most dealers continuing to be short of the most-wanted coals. Consumers persist in their preference for stove and chestnut sizes, the latter size being in stronger demand than the former. The steam coals are draggy, with the companies making strong efforts to dispose of these coals. The arrival of 631 cars of anthracite at Baltimore during the first two weeks in October resulted in easier conditions there and enabled the retail dealers to catch up with their orders.

Production of beehive coke continues downward, says the Geological Survey, reports for the week ended Oct. 13 showing an estimated output of 284,000 net tons as compared with 312,000 tons during the previous week.

Car Loadings, Surpluses and Shortages

	Cars Loaded—		Surplus Cars—		Car Shortage
	All Cars	Coal Cars	All Cars	Coal Cars	
Week ended Oct. 6, 1923	1,079,690	191,741			
Previous week	1,097,274	200,970			
Same week in 1922	953,952	185,774			
Oct. 7, 1923	34,138	7,098			16,160
Same date in 1922	5,500	3,024			4,600
Sept. 29, 1923	41,745	5,651			15,331

Foreign Market And Export News

Buyers in Welsh Market Adopt Bear Tactics; Improvement Noted at Newcastle

Production of coal in Great Britain's mines during the week ended Oct. 6 amounted to 5,528,000 tons, says a cable to *Coal Age*. This is a decline of 47,000 tons from the previous week, but an increase of 319,000 tons when compared with the output of the corresponding week of last year.

The condition of the Welsh coal market is little if any better than a week ago. Business is mainly of a hand-to-mouth character and demands are being met from the accumulated stocks. Buyers, in hope of improvements in reparation deliveries, are adopting bear tactics and operators are forced to sell at cut prices. Purchases are being kept to the minimum and the outlook for the future is causing nervousness among consumers. Operators refuse to sell for future delivery on the basis of current prices.

The Newcastle market has improved. Prices have changed very little, but the undertone is stronger and operators are more confident. Inquiries have expanded, are more varied and practically all classes of coal are selling well. Business with Germany, France and the Baltic has increased. It is anticipated that in the event of a settlement of the Ruhr problem, French purchases will diminish but that Germany must buy British coal for some months to come.

There is something of the nature of a slump in the Swansea anthracite market.

Tax Lifting Results in Lower Prices

The United States Department of Commerce at Washington has received a cablegram from Commercial Attaché Herring at Berlin stating that the abandonment of 30 per cent coal tax and further price reductions by from 10 to 15 per cent became effective Oct. 15, resulting in the following reduced prices in gold marks per metric ton: Ruhr pitcoal 24.92; Westphalian nut 33.78; Selesian lumps 19; Rhenish lignite briquets 15.15. This was due to violent protests on the part of the industry and the general public against the former prohibitive prices.

Export Clearances, Week Ended

Oct. 20, 1923

FROM BALTIMORE

For Canada:	Tons
Br. SS. Eskbridge	5,989
For Cuba:	
Nor. SS. Krospond	3,357

FROM HAMPTON ROADS

For Cuba:	
Amer. Schr. Commack, for Cienfuegos	1,790
For West Indies:	
Br. Schr. Ada A. McIntyre, for St. Stephens	763
For France:	
Fr. SS. Mecanicien, for Marseilles....	5,958
For Canada:	
Fr. SS. Therese Horn, for Three Rivers	5,819
For Virgin Islands:	
Nor. SS. Halse, for St. Thomas.....	3,164
For Brazil:	
Br. SS. Jeseric, for Rio de Janeiro...	6,465
For Italy:	
Ital. SS. Emanuele Acearne, for Port Ferrajo	11,262
For Hawaiian Islands:	
Amer. SS. Orleans, for Pearl Harbor.	9,133
For Jamaica:	
Swed. SS. Adolph, for Kingston.....	2,931

FROM PHILADELPHIA

For Cuba:	
Am. Schr. Else, for Humacao.....	
For Canada:	
Br. Schr. Cutty Sark, for St. John's	
Br. SS. Clan Macbrayne, for St. John's	
Br. Schr. Harry A. McLennan, for St. John's	

French Coal Output Increasing

With coal production in France increasing, receipts of German, Belgian and British coals are decreasing. Demand for house coals is comparatively quiet at present, but expectations are that this market will soon revive. The Belgian export decree is said to be interfering considerably with receipts of Belgian coals by France and also the execution of private contracts which have been closed. On the other hand business terms with Great Britain are easier and small price concessions are being made for prompt delivery. A shortage of rolling stock is reported in both France and Belgium.

Coke receipts by the S.C.O.F. during September amounted to 135,000 tons, an increase of 30,000 tons over August shipments, while perequation price for October has been fixed at 212 fr., as

compared with 200 fr. in September. Every possible effort is being made by metallurgists to increase the production of coke. Cokeries destroyed during the war are being rebuilt and new cokeries are being constructed in various parts.

During August production of coal and lignite amounted to 3,405,028 metric tons, as compared with 3,214,814 tons in July, while during the same month coke production was 180,860 tons as compared with 178,427 tons in July.

Ruhr Coal Shipped to Italy

Shipments of reparation coal from the Ruhr to Italy during the past five years follow: 1919, 114,000 tons; 1920, 1,330,400 tons; 1921, 2,765,200 tons; 1922, 2,480,000 tons, and 1923, 850,000 tons.

Movement at Hampton Roads

Below Normal

Business at Hampton Roads was dull last week, with the bunker trade showing the only activity. Coastwise shipments were not holding up to the record, while export business moved on a very slender schedule.

Movement at the piers was below normal, and the market was weak. Prices were at a low level, but buyers were not tempted to any great degree. Coal dumpings were considerably below the activity at the same period last year.

Shippers were not optimistic over the foreign trade situation, and did not look forward to any great movement of coal abroad.

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 11	Oct. 18
Cars on hand	1,194	1,132
Tons on hand	67,277	70,531
Tons dumped for week	113,677	99,790
Tonnage waiting	1,900	500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,761	1,905
Tons on hand	102,350	112,450
Tons dumped for week	110,814	75,274
Tonnage waiting	10,100	3,900
C. & O. piers, Newport News:		
Cars on hand	2,120	2,048
Tons on hand	102,500	108,240
Tons dumped for week	78,484	70,342
Tonnage waiting	4,000	15,025

Pier and Bunker Prices, Gross Tons

PIERS	Oct. 13	Oct. 20†
Pool 9, New York.....	\$4.95@5.35	\$4.90@5.25
Pool 10, New York.....	4.50@ 4.90	4.35@ 4.75
Pool 11, New York.....	4.25@ 4.60	4.00@ 4.50
Pool 9, Philadelphia....	5.30@ 5.50	5.30@ 5.50
Pool 10, Philadelphia....	4.50@ 5.05	4.45@ 5.00
Pool 11, Philadelphia....	4.25@ 4.60	4.20@ 4.55
Pool 1, Hamp. Roads....	4.75@ 4.85	4.75@ 4.85
Pools 5-6-7 Hamp. Rds.	4.30@ 4.40	4.25@ 4.35
Pool 2, Hamp. Roads....	4.25@ 4.40	4.50@ 4.60

BUNKERS

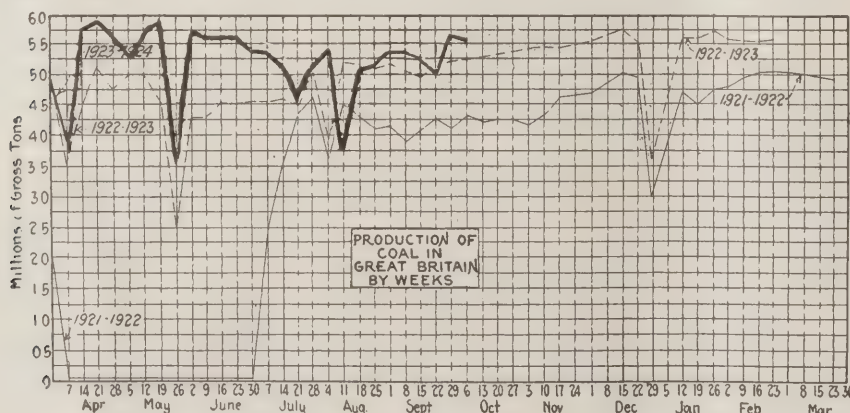
Pool 9, New York.....	5.25@ 5.65	5.20@ 5.55
Pool 10, New York.....	4.80@ 5.20	4.65@ 5.05
Pool 11, New York.....	4.55@ 4.90	4.30@ 4.80
Pool 9, Philadelphia....	5.50@ 5.90	5.50@ 5.90
Pool 10, Philadelphia....	5.00@ 5.35	4.95@ 5.30
Pool 11, Philadelphia....	4.55@ 4.85	4.50@ 4.80
Pool 1, Hamp. Roads....	4.75@ 4.85	4.75@ 4.85
Pool 2, Hamp. Roads....	4.25@ 4.40	4.50@ 4.60

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Oct. 13	Oct. 20†
Admiralty, large.....	27s. 6d. @ 28s. 6d.	27s. @ 28s.
Steam smalls.	18s. @ 19s.	18s.
Newcastle:		
Best steams.	24s. 6d. @ 25s.	25s.
Best gas.	24s. 6d. @ 25s.	24s. @ 24s. 6d.
Best bunkers.	24s. @ 24s. 6d.	23s. @ 24s. 6d.

† Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

ALABAMA

Walter Moore, of the Pratt Fuel Co., Birmingham, has closed a deal whereby his company obtains possession of the Red Oak Mine, of the Disney Coal Co., near Cordova, Walker County. The operation formerly belonged to A. R. Disney and is a slope on the Mt. Carmel seam and is served by the Frisco railroad. The mine is electrified, the coal being cut by machine and motor haulage being employed.

The Hercules Coal Mining Co. has been incorporated with a capital stock of \$2,000, with headquarters at Henry Ellen. W. L. Simmons is president; J. J. Lee vice-president, and F. G. Moore, secretary of the company.

The Hercules Powder Co. has acquired about 600 acres of land near Bessemer, Jefferson County, on which it is understood a large, modern plant will be erected. The company is now operating the old plant of the Aetna Explosive Co., which it acquired through sale by a federal receivership several years ago, but on account of growth in its business a larger and more modern plant is made essential.

ARKANSAS

F. O. Sandstrom, secretary and traffic manager of the Colorado and New Mexico Coal Operators Association was in Chicago the week of Oct. 15 with A. Vogl, attorney for the Colorado operators, compiling and filing the brief for the recent Western rate hearing held in Denver.

ILLINOIS

A report current in railroad and coal circles that the Illinois Central R.R. is going to build a line into the Harrisburg field of southern Illinois has been unofficially denied by the railroad, though the denial is not positive and final. If such a line were built it would give the Illinois Central access into a region practically controlled in the past by the Big Four.

The mine of the Star Coal & Mining Co. at Freeburg, in St. Clair County, was sold Monday, Oct. 15, by order of the court at public sale in Belleville to C. A. Gent for \$6,000. The property had been in the hands of D. S. Gent, as receiver.

The game of "freeze out" between the union miners and the owners of No. 3 mine of the Brewerton Coal Co. at Lincoln goes merrily on. The miners struck Sept. 26 because the checkweighman insisted that a housing that had been built around the scale beam obstructed his view. The mine was shut down and has been in process of dismantling. The strike was pulled without official union authorization although Freeman Thompson, subdistrict president, has voiced his sanction of it since in a number of outbursts of publicity directed at the company and its president, W. A. Brewerton. Since the company started pulling rails and equipment out of the mine, giving every indication of abandoning a property that has given almost continuous employment to 200 men all summer, much pressure by the town of Lincoln and others interested has been brought upon both company and miners to settle. The company is able to fill its contracts from its neighboring mines and no settlement has yet been made.

The Odin Coal Co., of Odin, is rebuilding its tippie, recently destroyed by fire, equipping it with modern type screens and shaker booms. Roberts & Schaefer, of Chicago, have the contract.

The Gartside Coal Co.'s mine No. 4 at Murphysboro, in the Big Muddy seam, has been dismantled and practically everything sold, excepting the tippie and hoisting engines and one boiler. Depressed market conditions are responsible. This company is the oldest operating company in the southern Illinois field and possibly in the state of Illinois. Organized in 1843, it has had continued operating existence for 80 years. In the early days they operated a mine in and around St. Louis just west of the Missouri Botanical Garden. For over 30 years the Gartside Coal Co. brought its coal across the Mississippi in wagons on boats before any railroads crossed the river. The company has been an active retailer in St. Louis since 1843.

Stewart S. Shive, president of the Mammoth Coal Co., of Benton, wrote *Coal Age* Oct. 15 that his company has leased from the United Mine Workers of Illinois the strip mine formerly owned by the Southern Illinois Coal Co. and is now operating it. This is the Herrin property around which the 1922 riot centered.

The L. A. Papke Construction Co. is erecting a warehouse at the new town of Nason, in preparation for erecting 100 or more houses, which will be for sale to miners locating in the new town. A new house will be completed every four days. With the completion of the railroad into Nason, building operations at the new mining town are proceeding rapidly.

T. L. Lewis, Charleston, W. Va., representing the National Coal Association, Washington, D. C., was a speaker before the Rotary Club of Quincy, Oct. 16, on the subject "Causes for the High Cost of Coal." Mr. Lewis has been an active worker in the soft coal fields for thirty years.

The J. H. Patterson Co., operating coal and lumber yards in nine towns, will remove its main offices from Marengo to Rockford Nov. 1. Office rooms have been taken in the Phoenix Building, North Main and Mulberry Streets. The company operates yards in Freeport, Rochelle, Marengo, Huntley, Union, Wauconda, Roscoe, Harlem and Rockford.

The Eureka Coal & Dock Co., of Chicago, has increased its capital from \$100,000 to \$300,000.

The Burke Coal Corporation, of Pinckneyville has been incorporated by J. T. Burke, W. A. Lafont and E. C. Dodge with a capital of \$100,000 to mine and sell coal.

Several coal operators in St. Louis, Mo., with mines in the Fifth and Ninth Districts of Illinois have received letters from D. R. Francis & Bro. of St. Louis, asking if their mines are for sale. This would indicate that another effort will be made such as was made about 3 years ago to gather in several of these mines now while the coal market is in a demoralized condition. It would have a stabilizing effect if it could be put through.

Nat McFadden, engineer at Taylorville for the Peabody Coal Co., will act as instructor in the class for preparation for mine managers in the night school for tradesmen conducted by the Taylorville high school. This class will prepare the men who expect to take the state examination as mine managers.

The five men injured when a cage fell 100 ft. in the Decatur Coal Co.'s mine at Decatur will recover. All were painfully and severely bruised, broken bones being especially numerous. The accident was caused by the snapping of a hoisting cable.

Notices have been posted announcing the closing of the Taylor Springs mine of the Indiana & Illinois Coal Corporation near Hillsboro. The mine will be sealed.

INDIANA

Hearing of the case of the J. Woolley Coal Co., of Evansville, against the Southern Railroad Co. asking for damages of \$105,000, has begun before federal examiners for the Interstate Commerce Commission last week. The coal company alleges the railroad discriminated in distributing coal cars last winter. It also is alleged that railroad supplied cars to the company's competitors and that the loss in business because of this alleged discrimination amounted to more than \$105,000. The railroad company denied the allegation, and maintained that in these months there was a shortage in coal cars, due to the shopmen's strike. Evidence submitted will be taken to the interstate commerce commission at Washington for a decision.

Failure of water supply from a 50-acre lake of the Enos Coal Co., in Pike County, resulted in the company endeavoring to dam a branch of the Patoka River, which would include damming a \$40,000 drainage ditch built by farmers of the adjoining property. The Pike County Commissioners refused permission for the dam when the property owners filed complaint. The company went on cutting timber and getting ready with a big force of men to construct

the dam, when an injunction was filed at Jasper, by Leonard Farmer. It was granted, and the company has been notified of the action, pending a hearing of the case.

Between four and five thousand miners in Indiana are out of work this fall, according to an estimate made Wednesday, Oct. 17 by Carl J. Fletcher, Indianapolis, vice-president of the Knox Coal Mining Co. An overdevelopment of the entire coal industry, combined with large shipments from Eastern non-union fields into Indiana was blamed by Fletcher for the present situation. Most of the miners are finding temporary occupation in other industries, he said.

KENTUCKY

It is reported that the Consolidation Coal Co., in the McRoberts-Jenkins neighborhood, has been working full time in its string of mines and employing night shifts, getting out a heavy tonnage. A good many of the big companies, which have large tonnage in hand, are operating as full as car supply will permit. Business is also heavy in the Harlan and Hazard fields as well as Elkhorn fields, but prices are not satisfactory since steam consumers slowed up on buying screenings.

Charles I. Dawson, Republican nominee for Governor, who is making a stump tour of the state, is plainly denouncing plans for any coal sales or tonnage tax, and pledging his full effort to prevent imposition of any such tax by the next session of the Legislature. Dawson is also panning W. J. Fields, Democratic nominee, for failure to state his position in the coal tax controversy, which promises to be the big issue of the next legislative session.

Three men are dead at Hazard, as a result of a fight in the clubhouse of the Superior Coal Co., No. 4, at Combs just out from Hazard, on Oct. 12, in which Anse Begley, telegraph operator for the Louisville & Nashville R.R., John Baker and his brother, Bob Baker, also died. John Baker lived a few days before succumbing to pistol wounds.

The Ohio River has been at a low stage between Louisville and Pittsburgh for the past few days, and tonnage movements of coal as well as all freights have been light. However, heavy rains over the watershed on Oct. 17 are relieving the situation somewhat.

The Bertha-Consumers Co. has just placed in service three hundred new fifty-five ton, two-door steel hopper railroad cars at its Elsie Mines, Elsiecoal, Ky., on the Louisville & Nashville R.R. The latest improved shaker screen equipment also has been installed at these mines and new houses have been completed to take care of an enlarged working personnel.

The Dixie Gem Consolidated Coal Co., Pineville, Bell County, has increased its capital stock from \$10,000 to \$60,000.

The Kentucky Coke Co., subsidiary of the Louisville Gas & Electric Co., a Byllesby interest, has increased its liability limit from \$500,000 to \$5,000,000. Donald McDonald, Halford Erickson and Matt O'Doherty signed the amendment. The Louisville Gas & Electric Co. interests are installing a new artificial gas plant at Louisville, to start with a capacity of 12,000,000 cu.ft., later to be increased. The company controls its own coal mine at Echols.

The Fordson Coal Co., operating in eastern Kentucky, has asked an injunction to prevent John Colts O'Roake and others of Leslie County, from interfering with surveyors who are running lines on the Ford properties. The surveyors were recently forced to break camp and move on by the hillmen. The suit was filed in federal court at Covington, and a temporary injunction granted. Defendants were ordered to appear in London, Ky., Oct. 18, for a hearing of charges.

It is reported from Jenkins that residents of that town, and the towns of McRoberts, Dunham, Burdine and other operating centers of the Consolidation Coal Co., in the Elkhorn fields, have started a fund for erection of a monument to the memory of John G. Smyth, former company manager, who was killed in a slate fall at Penny, where he held an interest in a small mine he was inspecting at the time. Mr. Smyth was founder of the towns named.

The Clearfield Cannel Coal Co., Clearfield, Rowan County, capital \$100,000, has been chartered by Guy Snyder, G. H. Gearheart, Clearfield; and Drew Evans, of Morehead.

The Dawson Daylight Coal Co., Louisville, will develop 1,400 acres of coal property at Dawson Springs, the contemplated daily output to be 1,500 tons.

The S. & W. Coal Co., Sutton, Pike County, capital \$30,000, has been chartered by J. M. Smith, Uniontown, Pa., and Nora

C. and A. C. Walther, of Sutton. The same interests also chartered the Rockledge Development Co., capital \$20,000.

MASSACHUSETTS

The Island Creek Coal Co. reports for the quarter ended Sept. 30 last net income after taxes amounting to \$623,634, against \$713,154 for the same period last year. After preferred dividends the earnings in the third quarter were equivalent to \$4.61 a share on the 118,798 shares of common stock, against \$5.37 in the same quarter last year. For the nine months ended September 30 last, earnings available for the common stock were equal to \$14.80 a share, against \$20.75 a share in the same period of 1922.

MINNESOTA

The investigation of County Attorney Olson, in Minneapolis, into the coal situation continues to afford the daily papers with considerable copy worthy of headlines. He suspects that the allowance by dealers for loss in breakage of anthracite to be too much, and also sees that there is too much unanimity of prices, although there are some differences. The latest thing to command official attention is the price of coke. The officials of the coking plant were summoned to give evidence. It was claimed against them that they fixed prices because they sent out cards announcing their price, but the answer was that it was purely for advertising purposes. He further complains that coke follows the price of anthracite, although it is made from soft coal. The county attorney believes that the state law against trusts is available.

The Minnesota Securities Commission has revoked the license of the Loudon Coal Mines Co., with an office in Minneapolis, to sell stock in the state. The company was licensed in April, 1920, to sell 2,000 shares of stock at \$50 a share. It is alleged that the company's salesmen have held out an offer to deliver coal at 50c. a ton over the wholesale price, although the company has no yards or facilities for the delivery of coal.

A vigorous campaign is being made against anthracite because of the high price in the Northwest. The Minneapolis Citizens' Alliance, an open-shop association, devotes a portion of its October bulletin to the story of the United Mine Workers, and the recent increase in anthracite, and urges the development of lignite and peat for fuel, in place of anthracite.

MISSOURI

The east side of the Walton coal mine at Higbee was closed down Oct. 1. A total of seventy-nine men were given enforced vacations, which included nineteen company men. There is no immediate prospect of the mine reopening.

Drillers in the big test oil well at Chillicothe passed through four strata of coal one day recently, making a total of 22 ft. passed through in the last 175 ft. of drilling. The various depths are as follows: At 360 ft., the first 6 ft. of bituminous coal; at 378 ft., the second vein of bituminous coal, 3 ft. thick; at 443 ft. a 7 ft. vein of semi-anthracite coal; at 524 ft. a 6 ft. vein of semi-anthracite coal. The geological survey indicates that the coal area in this field extends over 4,000 acres of land and a little over two miles in length.

The Busy Bee coal mine, at Huntsville, which has been idle for a long time, is to be opened after a turbulent time in the courts and elsewhere for the past three years. The plant was sold to Mitchell & Lovell, coal operators of Huntsville, who failed to put the mine in condition to operate because of the opposition of the local miners' union, who demanded that a debt of about \$3,600 for labor be paid. This was not done and the mine remained idle. Recently W. E. Mitchell purchased the interest of his partner, Al Lovell, in the mine and lease of coal. Mitchell subleased the mine to Walter Winkler and Sam Skaggs, experienced miners, and they will operate it on the co-operative plan and run it on the miners' scale. The mine is being cleaned and repaired and is expected to be in operation in 30 days.

The body of Ernest R. Sweeney, of the Gray-Bryan-Sweeney Coal Co., of Kansas City, was found in the Missouri River lodged in underbrush near the bank, not far from Randolph, Oct. 16. Mr. Sweeney disappeared the morning of Aug. 30. His son a few days later found a note in his father's apartment to the effect that he intended to commit suicide. In it he said he was "tired of living." Mr. Sweeney's act is attributed to ill-health and to worry about his wife, who is in a sanitarium in Colorado.

NEW YORK

The Central Railroad of New Jersey after several tests to reduce the time of transporting coal from the anthracite fields to New York City and points east and also to eliminate congestion at different points, has adopted a schedule whereby a train of coal is transported to Jersey City in practically half the time formerly required. Under the old system when a train left the anthracite fields it was taken to Mauch Chunk or Allentown, where it was sidetracked until another train crew could take it to its destination. This system usually consumed at least twenty-four hours before the coal reached Jersey City. Under the new system one of the new Mikado type engines is coupled to a train of cars at Penobscot averaging from seventy-one to seventy-six coal cars, with a tonnage of from 4,600 to 4,760 and transported through to Jersey City with a stop at Allentown of sufficient time to change the entire crew. The engine remains coupled to the train and makes the entire trip. According to a railroad official the trip is made in a little more than twelve hours. Returning trains averaging from 80 to 120 empty cars are brought back on the same plan as outgoing trains.

The Penn Fuel Co., New York City, in submitting a price of \$4.47 per ton was the lowest bidder in offering to furnish and deliver, alongside vessel New York harbor, 670 gross tons Pool 9 bituminous coal, to the United States Shipping Board. The bids were opened on Oct. 15 and the coal was delivered on Oct. 17. Other bidders were: H. B. W. Haff, \$5.10; Lee Coal Co., \$4.63; Imperial Coal Corporation, \$5.04; Rhodes Fuel Corporation, \$4.68; Seiler Coal Co., \$4.64, and Knickerbocker Fuel Co., \$5.25. On a net ton basis, f.o.b. mines, the prices submitted ranged from about \$1.27 to \$1.97.

R. W. Hopkins, chief fuel inspector for the United States Shipping Board, North Atlantic District, has gone to Europe for a few months for the purpose of investigating the fuel situation.

PENNSYLVANIA

The Philadelphia & Reading Coal & Iron Co. and the Lehigh Valley Coal Co. have announced a 10 per cent increase in wages to their monthly men, including mine foremen, assistants, firebosses and clerks. The new wage dates from Oct. 1.

A. S. Wilson of Southmont, Johnstown, has been appointed general manager of the Eastern division of the mines of the Cosgrove-Meehan Coal Corporation in western Pennsylvania, according to an announcement by H. J. Meehan, president of the corporation. He has been connected with the Cosgrove organization for some years and has been actively engaged in their mining work in both the Western and Eastern divisions. Mr. Wilson has assumed charge of his new duties and occupies offices in the Swank Building in Johnstown.

Nine hundred men at the Central colliery of the Pennsylvania Coal Co. at Pittston went on strike Oct. 18 because the boss fireman at the mine refused to join the union. At the Wright Slope No. 6 mine of the same company, also at Pittston, 150 employees struck because a driver boy, who was employed in Detroit during the recent suspension of mining activities was not given his place on his return.

A permanent organization of The Coal Consumers' Association of Philadelphia was effected on Oct. 9. The primary purpose of the association is to bring about a reduction in the cost of anthracite. It has communicated with President Coolidge and Governor Pinchot. A committee has under preparation a schedule of fair prices.

A new corporation, known as the Chase's Mills Coal Mining Co. has been organized to operate the Chase Mills mine, Tioga County. Officers and directors include Dr. C. N. Bradford, Floyd Crist, Alfred Collins, and Robert Krise, all of Canton. The mine is six miles from Canton. Considerable improvement work was started at the mine.

Officials of District 7, United Mine Workers of America, in an official notice sent to all local unions of the district call for Monday, Oct. 29th, being observed as Mitchell Day. The miners are directed to remain away from work that day. The official call in conclusion makes the following statement: "In the observance of Mitchell Day this year we are reminded that the organization has just achieved one of the greatest victories in the history of the anthracite region and this victory was made possible as a result of united organized co-operating effort and we should reserve in the declaration of Mitchell Day this year to do all in our power to maintain our forces to the highest degree of usefulness to the end that in the future we

may continue to write progress into the history of the United Mine Workers of America."

The following plants in the Connellsville coke region have recently closed down: Waltersburg Coke Co., one plant of the Westmoreland-Fayette Coal & Coke Co. and some of the plants of the Consolidated Coke Co., the two latter being in the Pt. Marion-Masontown section. The Pittsburgh & Erie Coal Co., Braznell mine, on the edge of the coke region a couple miles from Brownsville, which had been working steady till last week, is now running on time. The Lilley Coal & Coke Co., following the strike, recently reported, has decided not to make any attempt to start up in the near future, owing to the dull condition of the coal market. This is a union mine near West Brownsville, in Washington County, and on the Monongahela River.

Just when Governor Pinchot will be ready to call a conference of the Governors of anthracite-using states he is not yet ready to say. Prior to leaving the Capitol at Harrisburg for the annual conference of all the Governors at West Baden, Ind., he said he has not yet all the data on the coal situation in Pennsylvania he desires. The Governor suggested the conference to discuss means of keeping down the retail price of coal.

Stockholders of the Reading Co. at a special meeting on Oct. 15 held at Philadelphia, authorized the officers to carry into effect the third modified plan decreed by the United States District Court, to segregate the various properties controlled by the company. Authorization also was voted to increase the indebtedness of the company to the extent of \$64,000,000, the creation of a mortgage and deed of trust to secure the issue of bonds, to merge various subsidiaries, and to dispose of the Reading Iron Co., and the Philadelphia & Reading Coal & Iron Co., in accordance with the segregation plan.

Attorneys for 123 coal companies claim that they have reduced tax assessments of County Schuylkill lands \$100,000,000. The reduction is an agreement between the attorneys for the coal companies and the county attorneys that the ratio of real estate assessment is 45 per cent of the full value and not 60 per cent, as heretofore claimed by the county commissioners. As the coal lands cannot be assessed at a higher ratio of value than other real estate, it is apparent that a big reduction has been made. Although attorneys for the county say the reduction is not more than \$45,000,000, even with that the total assessment is now \$375,000,000, having been increased to that point from \$69,000,000, the last previous assessment. Corporation attorneys say the assessment has been decreased from \$420,000,000 to \$320,000,000. The agreement does not halt the hearing, as the most important issue, whether the coal lands have been assessed at market values, is to be determined. The county commissioners deny that any great victory has been won by the corporations and say they have been willing all along to lower their assessment to arrive at a settlement.

Shipments of anthracite during September, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 2,194,940 gross tons. Operation was resumed on Sept. 19 and during the ten working days to the end of the month there was a daily average shipment of 219,490 gross tons. This daily average could have been materially increased had the collieries resumed full operation on Sept. 19. Some, because of an insufficient force of men, did not resume operation until a later date. The average daily shipment during the preceding month of August was 247,105 tons. Shipments by originating carriers were as follows:

	September 1923	August 1923
Phila. & Reading.....	420,859	1,277,770
Lehigh Valley	372,997	1,154,004
Jersey Central	154,200	496,725
Del. Lack. & Western...	318,182	1,004,507
Delaware & Hudson...	298,775	943,143
Pennsylvania	196,839	555,064
Erie	251,277	759,711
N. Y., Ont. & Western...	61,229	154,586
Lehigh & New Eng....	120,582	327,345
Totals	2,194,940	6,672,855

Solution of the recurring coal disputes lies in the direction of better organization in the industry and the working out of an agreement between the coal operators and the mine workers by which the responsibility for establishing and maintaining peace in the industry is recognized and placed upon permanent committees made up of representatives of operators and miners, according to Dr. Royal Meeker, State Superintendent of Labor and Industry. "Public ownership or operation of the mines offers no hope of a

solution in the near future," he said, "because neither the public nor the mine owners are ready for this step. The business of digging, transporting and marketing coal is a very complicated one, and it would require many years to educate the public, the mine owners and mine workers for such an enterprise and to build up a public agency which could conduct this business efficiently, even if it were possible to divorce it from the curse of political appointments and political pressure. Eventually, it is probable, we will come to public ownership and operation, but what is needed is stabilization of the coal industry during the period of education and training requisite to the successful operating of the coal industry by the public."

WEST VIRGINIA

With the end of the first week of October a total of 1,518,000 tons of coal had been consigned from northern West Virginia points to the lakes and it is now estimated that if the average prevailing during the season is maintained the total will reach 1,900,000 tons before the end of the lake period for navigation. Not less than 30,000 cars of coal have been shipped from mines on the Monongah Division of the Baltimore & Ohio and from mines on the Charleston division of the same road even so far this season. There have been shipped from Scotts Run territory about 4,777 cars. Virtually twice as much tonnage has been shipped to lake piers as during any other recent lake season.

A special committee has been delegated by the Kiwanis Club of Beckley to urge the commission recently appointed by Governor E. F. Morgan of West Virginia to select Beckley as the proper place for the location of the recently created School of Mines of West Virginia. The committee is composed of E. L. Ellison, J. Q. Hutchinson and the Rev. W. R. Lloyd. Although replies to communications addressed to the members of the commission have been of a non-committal nature the promise has been held out that Beckley would be considered in connection with the selection of a site.

Millions of dollars collected by the United States Government on the payment of taxes from royalties on coal leases executed prior to March 1, 1913, may have to be refunded as the result of the suit of the Thacker-Pocahontas Coal Co. of Welch, against Albert B. White, collector of internal revenue for West Virginia. This company asks the refund of \$6,000 paid in income tax on royalties received. The case was argued at Huntington in the U. S. District Court for the southern district of West Virginia before Judge George W. McClintic. It is planned by each side to carry the case to the U. S. Supreme Court in the event of an adverse decision in the court below. The coal lease involved in the suit was executed by the Thacker-Pocahontas company in 1901. The argument advanced by the company is that the lease really constituted "a sale of the coal in place" and that it was made prior to March 1, 1913, when the income tax law became effective and that the royalties received are deferred payment for the coal sold under the lease, and if that be true the royalties received are not taxable. Representatives of the government contend that the lease is in the same form which is in general use and does not constitute a sale. It also is asserted by the plaintiff company that if it be held that the royalties received are not to be considered as deferred payments, then enough has not been allowed for the depletion the mining of coal involves.

Coal-loading records for any six-day period in the history of the Chesapeake & Ohio R.R. were exceeded during the week ending Oct. 13, when 17,605 cars were loaded and moved from the Logan, New River, Kanawha and Kentucky fields. The previous record was 17,489 cars during the week of Sept. 29.

The records of the West Virginia Compensation Commission go to show that there is not as much hazard to the coal industry in West Virginia as there is in connection with other industries; the hazard about which so much is heard seems to be more imagination than fact. In short though 60 per cent of the wage earners of the state are connected with the coal industry yet that industry has only 40 per cent of the accidents in the state. Of course the records of the Compensation Commission, being official, effectually dispose of the fiction that there is more danger attendant upon the occupation of mining than in any other occupation. It also is shown by the records that out of the 40 per cent of injuries reported, those peculiar to the mining of coal constitute a still smaller percentage of the whole. The fact that the hazard involved in the mining of coal has been reduced in West Virginia is due partly to drastic laws on the subject and to the education of

miners in safety methods and first aid work under the supervision of the West Virginia Department of Mines which is constantly striving to reduce the hazards.

Four of the six mines of the Cannelton Coal Co. near Montgomery, have been forced to close down due to the dormant demand. The mines just closed are among the largest mines operating on the Kanawha & Michigan.

The White Oak mine, on Jumping Branch in Summers County, is undergoing development and a small tonnage of coal has been produced at this mine recently.

There is a possibility that development of coal underlying the lands of the New River Coal & Land Co. opposite Hinton will be undertaken in the near future. At least plans are being made with that end in view.

Charles C. Dickinson, president of the Dry Branch Fuel Co., was seriously injured in Charleston, Oct. 18 when he was struck by an automobile. The machine struck him as he was crossing the street. His left arm was broken just below the shoulder. In addition he suffered the fracture of both bones in the left forearm. He is cared for at the Kanawha Valley Hospital.

At a special receiver's sale the operation of the Fort Defiance Coal Co. near Kanawha Falls, in the Fayette County field, was sold to Eben M. Martin, the purchaser obtaining the property for the sum of \$2,602. It was necessary, however, for the purchaser to assume the payment of delinquent royalties, which will reach a total of \$5,000.

Edgar Combs placed on trial in Logan County Oct. 15, charged with having participated in the armed march of 1921 against Logan and more directly with having fired the shot which killed Deputy Sheriff John Gore, of Logan, entered a plea of guilty Oct. 17 after the court had denied a request for a change of venue and after C. J. Van Fleet, who has been counsel for the union miners in all the other cases growing out of the armed march, had retired from the case. Two days were consumed in arguing on a motion made by Van Fleet for a change of venue, his plea being that Combs could not obtain a fair trial. Affidavits were submitted by the prosecution to show that Combs could and would receive a fair trial. It also was pointed out by counsel for the state that in every instance where there had been a change of venue, by propaganda and otherwise the union had sought to influence jurors in advance. When Combs indicated to his attorney that he desired to plead guilty, Van Fleet withdrew. The plea of guilty was made with the understanding that a life sentence instead of the death penalty would be concurred in by the prosecution. As soon as Combs had made his plea the court imposed the life sentence upon him.

WASHINGTON, D. C.

During September the Geological Survey made reports on 23 applications for coal prospecting permits and 23 applications for coal leases, under the Leasing Act of Feb. 25, 1920. Since the passage of the leasing law a total of 1,153 applications for coal permits and 411 applications for coal leases have been reported on by the Survey.

C. Lorimer Colburn, of the U. S. Bureau of Mines has succeeded E. H. Denny as secretary of the Joseph A. Holmes Safety Association. Chapters of the association were recently instituted at West Terre Haute, Ind.; Barton, Ohio; Rayland, Ohio; Staunton, Ill.; and New Philadelphia, Ohio.

The Interstate Fuel Co. and the White Ash Coal Co., both of St. Louis, Mo., are named as respondents in a complaint issued by the Federal Trade Commission. The concerns are engaged in the business of buying and selling coal in wholesale and retail quantities, and are charged with the use of the words "Mt. Olive," "Mt. Olive Grade," and "Guaranteed Mt. Olive Coal" in connection with coal from districts other than the Mt. Olive district, sold by respondents in competition with coal mined at Mt. Olive, Ill. The Commission alleges that respondents' coal sold under such names is not the product of the Mt. Olive mine or of the district understood by a substantial part of the purchasing public as the Mt. Olive district. It is also alleged that the company's acts are unfair to competitors who actually deal in Mt. Olive coal.

Argument has been heard in the U. S. Supreme Court in the case of the Matthew Addy Co., coal dealers of Cincinnati, charged with violating the Lever fuel-control law by selling coal at a margin of 25c. per ton as against a margin of 15c. established by the government during the war.

CANADA

The provisional officers of the United Mine Workers of District 26, have sent a communication to the Dominion Coal Co. asking that a date be set for a conference to discuss a new wage contract, and suggesting Tuesday, Nov. 20, as a date suitable for the first meeting. If this is not agreeable, any other day could be mutually arranged. The present working contract between the miners and operators expires on Jan. 15 and under the agreement it is necessary that if either party to the agreement desires a change, they must give 45 days notice in writing of such desirability. It was said that the miners will demand a restoration of the 1921 rates, and some readjustments in several classes. Phalen local at No. 2 is the first of the U.M.W. locals to take a stand on what they want in a new contract. They have passed a resolution, that is being forwarded to all other locals in the district, asking for a 40 per cent increase over the present rates, which is equivalent to 20 per cent over the 1921 rates.

The eighth annual field day of mine-rescue and first aid competitions of the Vancouver Island Mine Safety Association was held at Ladysmith, B. C., on Sept. 3. There were nine entries for the mine rescue event for the V.I.M.S.A. shield and individual prizes. After a close struggle the shield was won by No. 7 team, Captain Williams, of Cumberland, with 93.2 per cent; second place by No. 3 team, Coal Creek, Captain Caulfield, with 93 per cent, and third place by No. 5 team, Captain Broderick, Nanaimo, with 89.4 per cent. In the first-aid events the British Columbia Mines Department Cup was won by Nanaimo, Captain Barton's team; Captain Beveridge's team, Cumberland, being second. There were eight entries. The W. L. Coulson Cup was won by Captain Beveridge's team, Cumberland, with Captain Delaney's team, of Ladysmith, second. There were eight entries. For the one-man event there were nine entries, and J. Thompson and J. Scott (patient), of Nanaimo, took first place, and H. M. Yeowat and A. Inayh (patient) second. In the two-man event J. B. Stewart's team, of Cassidy (Granby Consolidated L. & P. Co.), was first, and Thorpe's team, of Nanaimo second. The V.I.M.S.A. Junior Challenge Cup was won by Captain Wharton's team, Nanaimo, with Captain Wilson's team of Ladysmith, second. The V.I.M.S.A. Ladies' Challenge Cup was won by Mrs. Henderson's team, of Cumberland. Second place was won by Mrs. Delaney's team, of Ladysmith, and Mrs. Rutherford's team, of Nanaimo, won third.

Ross C. Wheatley, of Hamilton, Ont., has been appointed Canadian representative of the Maher Collieries Co., of Cleveland, Ohio, which will open offices in Hamilton about the beginning of 1924.

Dan Livingstone, James B. McLachlan and others of the deposed United Mine Workers' executives in District No. 26 had their legal status restored on Oct. 9, when Justice D. D. McKenzie, in the Supreme Court, at Sydney, N. S., granted an order discharging and vacating the restraining order which Silby Barrett, provisional president, obtained from Justice Chisholm in Halifax July 23. This restraining order prevented Livingstone, McLachlan and the various district board members, from functioning as U.M.W. executives and also prohibited them using certain moneys, then on deposit in the banks to the credit of the U.M.W. in District 26. N. R. McArthur, solicitor for Barrett and President John L. Lewis, announced that he had filed a discontinuance of the order and would not take the action to trial as proposed.

MEXICO

Alexander V. Dye, of New York City, an experienced mining man, has been appointed commercial attaché of the Department of Commerce at Mexico City, it has been announced by Secretary Hoover. Mr. Dye is a native of Flora, Ill., and a graduate of Williams Jewell College and of the University of Leipzig. He is intimately acquainted with Mexican economic conditions, having served as United States Consul at Nogales from 1909 to 1913. Mr. Dye served as assistant general manager of the Phelps Dodge Mining Co. of Arizona several years. During the war he was war trade representative at Christiania, Norway, and was European representative of the American International Corporation 1919-21. In September, 1921, he was appointed a trade commissioner of the Department of Commerce and assigned to the American Embassy at London. He sailed from London Oct. 17 and after conferring with the Department of Commerce officials in Washington will proceed to his new station at Mexico City.

Obituary

Byron F. Hobart, 76, once president of the Kansas & Texas Co., died Oct. 3 in San Diego, Cal. Mr. Hobart had lived in San Diego since 1914. He long ago sold his coal interests to Richard Keith of Kansas City. He retained large properties in Missouri and was president of the Union Iron Works, of Springfield, Mo. He was the first president of the San Pedro, Los Angeles & Salt Lake Railroad Co., but retired from all business activities when he went to San Diego.

Frederick Rheinfrank, 62 years old, senior vice-president of the Stokes Coal Co., New York City, died Oct. 15 after an illness of several months. He was born in New York City and had spent most of his life in the coal business. He formerly was head of the J. Rheinfrank Company, which was absorbed by the Stokes interests a few years ago. He was a member of the Uptown Club, the New York Athletic Club and several other organizations. He leaves his wife, Mrs. Mary Louise Rheinfrank.

Thomas Ward, 82, retired coal dealer, died Oct. 18 in his home, 596 West 152d Street, New York City. He was born in County Wexford, Ireland, and came to New York in 1866. After being on the police force for a short time he entered the employ of Townsend & Co., coal dealers, and in 1888 he purchased the business and conducted it as the Thomas Ward Coal Co. In 1908 the business was turned over to his sons, Joseph, William, Thomas and Walter, and he had since devoted his time to real estate operations, having acquired holdings in the Washington Heights section. Besides his wife and sons he leaves a daughter, Mrs. William J. Hammer. Funeral services were held at 10 A. M., Oct. 20, in the Church of St. Catherine of Genoa.

Profound regret was caused by the death at Fairmont, W. Va., on Saturday, Oct. 13, of **A. Brooks Fleming, Sr.**, one of the grand old men of the state, long a leader in its industrial, commercial and political life as well as a leader at the bar and at one time the Governor of West Virginia. At the time of his death former Governor Fleming was in his 84th year. Until within the last few years he had continued in the active practice of law and had also devoted much of his attention to the many mining properties in which he and members of his family were interested, having played an important part throughout his long and useful life in the coal development of northern West Virginia. He married Miss Caroline Margaret Watson, daughter of the late James O. Watson, a pioneer in the mining industry in northern West Virginia, with whom Governor Fleming was actively associated in the coal business. His wife is a sister of Colonel Clarence W. Watson, president of the Consolidation Coal Co. She survives him in addition to four children: Mrs. Charles E. Ward, of Charleston, W. Va.; Mrs. Charles B. Mitchell, of Fairmont; George W. Fleming, of New York, president of the Elkhorn Coal Corporation, and A. Brooks Fleming, Jr., who is assistant to the president of the Consolidation Coal Co. For many years Governor Fleming was counsel for that company and other large companies in northern West Virginia, and a director in the Consolidation company. The funeral was held at Fairmont Oct. 15th and was attended not only by many distinguished citizens of West Virginia but by many coal men from New York and other important coal centers.

Thomas Cunningham, county mine inspector of Madison County, Illinois, died recently at his home Edwardsville, Ill. The County Board of Supervisors has appointed a man under the emergency act to fill the place until Dec. 1 when the term of Cunningham would have expired, at which time a regular appointment will be made. The duties of the officer is to inspect reports of deaths, injuries and accidents at the mines.

Recent Patents

Flotation Machine. Thomas A. Janney, Garfield, Utah, 1,457,077. May 29, 1923. Filed Aug. 21, 1919; serial No. 318,958.

Lamp Holder for Miner's Cap. Eli Israel, Wilkes-Barre, Pa.; 1,466,300. Aug. 28, 1923. Filed Feb. 24, 1922; serial No. 538,983.

Method and Apparatus for Separating Coke and Ash. Philip H. Jung, Mount Union, Pa.; 1,466,377. Aug. 28, 1923. Filed Nov. 8, 1919; serial No. 336,689.

Electric Hoists. Detroit Hoist & Machine Co., Detroit, Mich. Catalog 23 E. Pp. 24; 6x8 in.; illustrated. Describes various special applications of hoists, monorails, cranes and winches.

Method of Burning Pulverized Fuel. Henry Kreisinger, Pittsburgh, Pa., assignor to Combustion Engineering Corp., New York; 1,463,283. July 31, 1923. Filed Oct. 22, 1920; serial No. 418,640.

Reciprocating Screen or Conveyor. Richard S. Jacobsen, Chicago, Ill., assignor to Webster Mfg. Co., Chicago, Ill.; 1,465,942. Aug. 28, 1923. Filed May 26, 1921; serial No. 472,772.

Coke-Oven Door. Arthur Roberts, Evans-ton, Ill., assignor to Chicago Trust Co., Chicago, Ill.; 1,466,064. Aug. 28, 1923. Filed Oct. 31, 1919; serial No. 334,704.

Association Activities

Transportation problems were paramount at the regular monthly meeting of the **Smokeless Coal Operators Association of West Virginia** held in New York about the middle of the month. In calling the meeting to order President Robert H. Gross made feeling reference to the recent death of Kuper Hood. A committee consisting of T. F. Farrell, O. M. Deyerle, G. H. Caperton, W. P. Slaughter, George Daniels and T. S. Crockett was appointed to prepare suitable resolutions of respect covering the death of Mr. Hood. There was discussion of the position taken by coal operators north of the Ohio River that the coal fields of West Virginia are "children born before their time" and of the activities of operators in the Pittsburgh district in filing their petition before the Interstate Commerce Commission asking that the freight rates on coal to the lakes and Northwest as to differentials against West Virginia be still further widened, all of which were considered as being of vital importance to the coal industry of the entire state.

Traffic News

The railroads during the month of September placed in service 18,519 new freight cars, together with 380 new locomotives, according to the Car Service Division of the American Railway Association. This brought the total number of new freight cars installed from Jan. 1 this year to Oct. 1 up to 134,636, while the number of new locomotives installed during the same period totaled 2,963. The railroads on Oct. 1 also had on order 64,601 new freight cars, with deliveries being made daily. They also had 1,242 new locomotives on order. Of the new freight cars installed during September, 8,916 were coal cars, which brought the total number of cars for that class of equipment installed during the first nine months this year up to 55,575.

According to information the October report of the D. L. & W. Ry. should show the highest car loadings for the current year. For the first thirteen days of this month loadings of anthracite on Lackawanna's lines amounted to 415,690 tons, as compared with 389,410 tons for the same period last year. Bad order cars as of Oct. 12 amounted to 3.68 per cent of the total on line, while locomotives out of commission represented 16.16 per cent of the total on line.

W. J. Manley has resigned as traffic manager of the Logan Coal Operators' Association after three years' service with headquarters in Washington, to take a position in the traffic department of the Pittsburgh & West Virginia Ry. and West Side Belt R.R. at Pittsburgh.

Complaint has been filed with the Interstate Commerce Commission by Smith & Duckworth and Joseph Dinford & Son, against the C. C. & St. L., and others, alleging violation of the Transportation Act in the rate of \$1.40 a net ton charged on bituminous coal from points in the Clinton and Brazil districts of Indiana to Crawfordsville, Ind., and other Indiana districts via interstate routes. Nine similar complaints were filed by other consignees, alleging unjust discrimination with respect to Indiana rates.

The Car Service Division of the American Railway Association announces that the locomotive equipment of the railroads of the United States is now in the best condition it has been in years. The railroads of this country on Oct. 1 had 9,823 locomotives, or 15.3 per cent of the total number on line, in need of repair. This is the smallest number in need of repair

for any period since the Car Service Division began the compilation of these records in August, 1920. This also is a decrease of 969 locomotives compared with the number in need of repair on Sept. 15, at which time there were 10,792, or 16.8 per cent. The railroads on Oct. 1 had 54,159 serviceable locomotives, an increase of 892 compared with the number serviceable on Sept. 15. They also had on Oct. 1, 2,620 locomotives in good repair but in storage.

Suggestion that freight rates on anthracite to Canada be the same as those to northern New York and New England has been made by President Coolidge to President Rea of the Pennsylvania R.R. It is said that the fact that coal is shipped to Canada at lower freight rates than for domestic consumption in the United States is a source of complaint in New England.

The Interstate Commerce Commission has given notice that the case of the **Northwestern Coal Dock Operators' Association vs. the Chicago & Alton R.R.**, Docket 14476, has been assigned for hearing and before the full commission, Nov. 15, 1923, at 10:30 a.m., in Washington. This case also includes Docket 14533. Traffic Bureau of the Sioux City Chamber of Commerce vs. the Baltimore & Ohio R.R.; Docket 14622. Board of Railroad Commissioners of the State of South Dakota vs. the Chicago & Alton R.R.; Docket 14142. Illinois Coal Traffic Bureau vs. the Chicago & Northwestern Ry., and Docket 14477. C. Reiss Coal Co. vs. Ahnapoe & Western Ry. Among other matters, the case involves dock rates on coal vs. all-rail rates.

Freight traffic during the first eight months this year was the heaviest in the history of the United States, according to reports by the Bureau of Railway Economics, amounting to 304,267,000,000 net ton miles. This was an increase of 3.6 per cent over the corresponding period in 1920, which marked the previous record and 5½ per cent greater than the first eight months in 1918, when freight traffic was greatly stimulated by the war. Compared with the first eight months last year, when freight traffic was reduced somewhat not only by the strike of coal miners but also by that of the railway shopmen, freight business from Jan. 1 to Sept. 1 this year was an increase of 33½ per cent. The average load per car in August was 28½ tons, the same as in July. This is the highest average for any August since the compilation of these records was started in 1917, except in 1918, when the average was 30.1 tons and August, 1920, when it was 29.8 tons. The average daily movement per freight car during August was 28.2 miles, which was an increase of two-fifths of a mile over that for July this year and the highest for any August since the compilation of these records began, exceeding by four-fifths of a mile the average for August, 1920, and by 2½ mile the average for August, 1918.

The receiver of the **Denver & Rio Grande Western R.R.** has asked the Interstate Commerce Commission for permission to acquire the line of the **Alamo Coal Co.** connecting its mine at Alamo, Colo., with the applicant lines at Kebler, in Huerfano County, Colo. The coal road is 4.18 miles in length and in addition has tippie, passing and storage tracks approximating 1.65 miles in length. The consideration is to be \$80,000. It is stated to be uneconomical for the coal company to equip and operate this trackage, which would put it at a disadvantage in competing with other coal mines in the Walsenburg district.

Freight cars in need of repair on Oct. 1 totaled 151,332, or 6.7 per cent of the number on line, according to a report by the Car Service Division of the American Railway Association. This is a decrease of 13,952 under the number in need of repair on Sept. 15, at which time there were 165,284, or 7.3 per cent. Freight cars in need of heavy repair totaled 118,563 or 5.3 per cent of the number on line, which was a decrease of 11,549 compared with the number on Sept. 15. Reports showed 32,769, or 1.4 per cent, in need of light repair, a decrease of 2,403 within approximately 15 days. This is the best condition of railway freight cars that has existed on the American railroads for years.

Coming Meetings

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 24

NEW YORK, THURSDAY, NOVEMBER 1, 1923

Number 18

Dividing the Spoils

ANTHRACITE mine workers are complaining that since they got their 10 per cent wage advance, their landlords have been raising rents, barbers charging more and the cost of living generally has been going up for them. It is not surprising that these beneficiaries of Governor Pinchot should complain that they are being called upon to share their gains and thus to increase the prosperity of their home towns. It would have been surprising indeed if the merchants and landlords had not set about to garner to their coffers as much as possible of Pinchot's \$40,000,000 gift.

We shall await with interest to learn whether Mr. Pinchot, having been notified that other citizens of Pennsylvania have taken to themselves the 10 per cent increase he gave the miners, will then call in the operators and announce that another increase is justified, due, and must be forthwith granted.

Do Strikes Pay?

DESPITE the five months' strike the production of bituminous coal in 1922 exceeded that of 1921 by more than 6,000,000 tons, and the average number of days worked the country over was 142, only 7 days less than the 149 in 1921. More tons in less days meant more men. The net gain in men employed—from 663,700 in 1921 to 687,900 in 1922—was 24,200.

Compared with 1921, Illinois last year lost 11,000,000 tons of coal output, followed by Ohio with a drop of 5,000,000 tons, Pennsylvania with 3,000,000 tons, Wyoming and Indiana with about 1,000,000 each, and Kansas and Missouri with losses between 500,000 and 1,000,000 tons. The total of these is about 22,500,000 tons.

Turning to the gains, which were in the aggregate sufficient to overbalance the strike losses in other fields and add 6,000,000 tons, we find Kentucky leading with 10,000,000 tons over 1921, West Virginia with 8,000,000, Alabama with 6,000,000, Virginia with 3,000,000 and Colorado and New Mexico with nearly 2,000,000 between them. There was little difference in output in the two years in Iowa, Montana, Maryland, and some other states.

Alabama employed 2,000 more men; Kentucky, 10,000; West Virginia, 8,000, and Virginia, 1,000 more than 1921. The men in Alabama worked 49 more days than in 1921, those in Virginia 32 more, but the greater number of men in Kentucky worked 12 less and in West Virginia 6 less on the average than in 1921, when there was no general strike.

It is perhaps surprising that all the furor of the big strike of 1922 had no greater influence in price than is shown by the figures for average realization published by the Geological Survey. The average value per ton of all bituminous coal at the mine in 1922 was \$3.02, a gain of 13c. over 1921. Kentucky received an average

of 33c. per ton more than in 1921; West Virginia 9c. more. Alabama coal averaged 74c. less per ton and Virginia coal 48c. less in the strike year than in 1921.

Thus the big strike brought more mine workers by the thousands into the soft-coal industry, all in the non-union fields, where the expansion was possible. It proved no bonanza period for the non-union producers as a whole, for with prices held down and no more opportunity to work than in as dull a year as 1921 there was little of the golden opportunity that is supposed to confront them when the union mines are on strike. Of course it must be remembered that the railroad men in the South were on strike if the coal miners were not, and this affected the returns for 1922 to a certain extent.

Spuds

THE world is small after all. Here is the farmer whose woes are concerning the politicians—he has trouble with the price of wheat, the boll weevil, and now we learn that with potatoes all is not well. Some seventy million bushels of potatoes rotted in the ground, undug, last year. Yet, according to the *Country Gentleman*, only a normal number of bushels reached the market, at prices particularly ruinous to the individual grower. This publication for the dirt farmer goes on to say that those undug potatoes—and the farmer—broke the market. Spurred on by rumors that there was a general overproduction he hastened his digging and by his very energy in getting them on the market, broke prices so that it did not pay to dig the rest. No matter how low the price, there is a limit to the bushels of potatoes the country will buy and use.

This country is saturated with soft coal. Stocks are abnormally high. The mines have been kept in operation throughout the summer and the price each week has slumped lower. What is breaking the price? Why is it that last week the Shipping Board was offered 1,800 tons of high-grade low-volatile coal at \$1.02 per net ton at the mines—coal that doubtless cost nearly \$3 per ton to produce?

The answer is the same for potatoes and coal—more produced than required. The farmer who this year lost money on potatoes may turn to another crop next year and make a profit. The coal operator who in such a market digs coal and ships it unsold is more foolish than the farmer because the coal will not rot if left in the ground for another season—that is to say more foolish unless he is consciously riding the market down in the hope of proving a better stayer than some other fellow and thus testing out the theory of the survival of the fittest.

We believe it is an idle dream to imagine that the farmers can ever be brought to the point of sowing a crop to fit the market, no more, no less, if for no other reason than because no one can ever gage in advance the requirements accurately. Nor can we ever reach such

perfection in coal-mine capacity and production that we may foresee and entirely forestall "no bills" and distress coal on the one hand and panic prices on the other.

If the farmer will read the signs of the times and act concertedly he may help himself—so may the coal operator when he gets the same treatment under the Sherman Law.

Regulation of the Consumer

COAL salesmen who have trouble disposing of small sizes may look forward to the day when they may take the attitude displayed by the operators of the "Coal River Collieries." This company, it will be recalled, is the Brotherhood of Locomotive Engineers and has mines in West Virginia and western Kentucky. The stock in this enterprise is owned by members of the organization and the company specializes in car-lot sales of coal to its stockholders. This is excellent, for it is effectual education for these men in some features of the coal business.

For instance, in the October issue of the *Locomotive Engineers' Journal*, Grand Chief Engineer Stone advises that much confusion and dissatisfaction is caused by the invariable demand for lump coal, "the very highest price coal there is." He urges that run-of-mine is the best, costs \$1 less per ton, but that "if you must have lump coal, then order egg or nut size, which is still cheaper than the large lump coal." His argument is that "if you follow these suggestions, you will burn less fuel, have more heat, and save a big percentage in the cost of your fuel bill. Try it once and be convinced."

If commercial operators could tell their customers, "If you must have lump, order nut or egg," a part of their troubles would be over. That is regulation of consumption and would follow, as the night the day, any regulation of coal production and distribution.

The Perennial Optimist

SOMEONE has said that the surest way to go broke is to "go short" on the United States, which is but another way of saying that the upward surge of business and industry in this country has always overcome temporary depression and mounted yet higher. In his annual address to the American Iron and Steel Institute last week Judge Gary again gave utterance to his unflinching faith in prosperity. He always manages to see the bright side of things, and who will venture to say that his predictions have not proved his wisdom?

"It may be stated with confidence that the outlook is good," he says this year, and if the outlook is good for iron and steel it must be good for coal in so far as tonnage is concerned. According to Judge Gary, the iron and steel industry will show considerable profit this year, though not as much as the capital invested should produce. This is not what the coal industry has to show for this year, despite the excellent showing on production. The hard-coal branch is the better off, as prices have been sustained at a profitable level, strike losses in September being the only detracting factor.

The soft-coal industry, however, has poured coal onto the market at continually lowering prices and the average return has not been remunerative, though many companies have had a good year. The prediction that business is not going to pot because of Europe's troubles and that the outlook is good will hearten those in the

coal trade who are hanging on by a thread, for a continuation of present conditions will weed out the weak and in the end produce a healthy trade for those fitted and equipped to survive.

Culpable but Not Criminal

IT IS easy to understand why the Coal Commission displayed such choler in its report on the wholesale coal trade. Its investigations brought to light the intimate details of a series of deals in which coal, notably anthracite, was passed from hand to hand at increasing prices and by those who made serious attempts to conceal their activities. There is nothing to be said in extenuation, for instance, of the resort to split commissions as a method of getting round the prices set in the gentlemen's agreement known as the Pennsylvania Fair Prices of 1922. The best that can be said for those who sought to reap large profits by diverting company coal at premium prices and otherwise indulging in "backdoor" selling of coal is that they violated no law.

The crux of the whole matter is that the Commission, finding such plain evidence of extortion, waxes exceeding wroth because it could lay its hand on no panacea for this evil. It unfairly ties its recital of these abuses onto its story of the coal wholesalers and thus indicts that branch of the coal industry. Its own evidence includes producers, wholesalers and retailers equally in nearly every citation of pyramided prices. It is in the exercise of the middlemen *function*, no matter by whom performed, that these shady practices are found.

This report of the Coal Commission is not, however, wholly unfair to the wholesale coal trade, even though it smacks of the universal prejudice against middlemen. It had the facts from the books of the companies with respect to costs, income and profits. Its report is built around these bookkeeping facts. It finds that "even though the wholesaler normally operates at a fair margin and carries on an essential distribution service respecting a considerable part of the nation's tonnage, his speculative activities in times of shortage have been one of a number of causes of public unrest and dissatisfaction respecting the coal business." This is a back-handed way of saying, as is stated with respect to the retailer in the same report, that "In general the competitive nature of the retail trade makes regulation of margins and prices unnecessary except in cases of emergency shortage." This is equally true with regard to the wholesaler and the producer—and the consumer, although the Commission omits that reference.

Now, of course, the obvious thing to do is to attack the problem at its source—to eliminate the shortages—which is to say, cut out the large-scale strikes. But that is too simple in theory and too difficult in practice to intrigue the intellects of those who would reform coal. It is idle and even silly to level criticism at the Coal Commission for gathering and publishing facts or to condemn the collection of data in the report on the wholesale coal trade just because it discloses the indulgence by a few in unmoral tactics, the recital of which strikes a popular chord.

The coal trade may well consider in advance the effect on the incoming Congress of this angle of the Coal Commission's work fortified weekly by assaults from the Federal Trade Commission. Here is something that will appeal to demagogic congressmen and furnish inspiration and material for a flood of oratory, as it has already of press comment.



*Blocking a Car in Anthracite Breast**

Changes in Design of Mine Cars Made Necessary by the Substitution of Mechanical for Animal Haulage[†]

Rigid Trucks Reduce Derailments—Omitting Washer May Wreck Car—Should Brakes Be Provided?—Mis-shapen Cars Run Foul of Timbers—Should Make Car Irons of Wood Cars Excessively Heavy

BY G. M. GILLETTE[‡] AND J. W. REED[§]

SAFETY in mine-car construction and maintenance is such a broad subject and involves so much detail that in an article such as this it is possible only to call attention to those facts which seem to stand out most prominently.

The thickness of the seam of coal and the method of mining restrict the width and height of mine cars, and the size of the shaft limits their length. These dimensions enter materially into the safety of the car, but we cannot alter these conditions and must use the size which permits us to get out our coal most economically, accepting these restrictions as we do natural hazards such as bad roof.

The design of bumpers, couplings, running gear and body, however, are features which may be modified, and the safety of their construction, therefore, is open to discussion. The coal-mine car is, and has been for

the past ten years, undergoing reconstruction in order to meet the new requirements of electrified mines. Undoubtedly many of our haulage accidents are traceable to the use of a car designed primarily for mule haulage which, with little or no change, has been pressed into service with gathering motors.

The new requirements are that the car be capable of being pushed ahead of the locomotive around sharp curves and be able to withstand more abuse and higher speeds than the mule-drawn car. Safety in present-day mine cars is largely a matter of mechanical strength. Their axles and wheels must above all remain rigid. A flimsy car or even one in which the wheels are merely out of line will cause many derailments.

BOLTING AXLES TO CAR BOTTOM INADEQUATE

The means of fastening the axles to the car body therefore is most important. The axles must not be merely bolted to the car bottom. It is necessary that they be reinforced and braced from axle to axle in order that they may be held rigidly in place, and it is better yet to fabricate or weld these braces and the axles into a truck of all-metal construction and then fasten this truck as whole to the car body and drawbar.

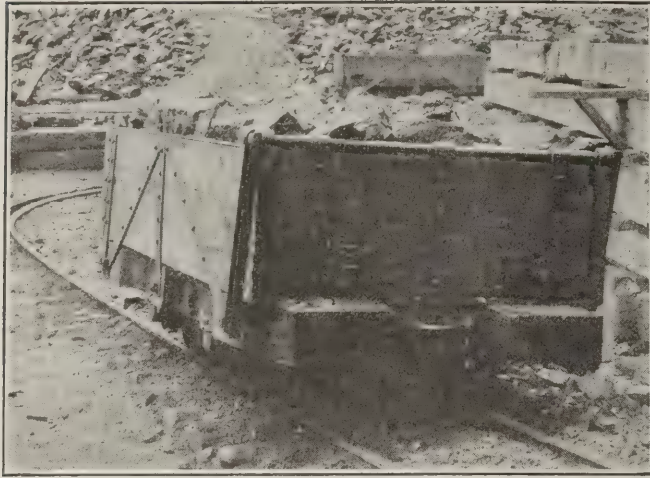
Lubrication is important, and roller bearings, grease or oil arrangements by which a constant supply of

*The headpiece shows method of blocking car by a post resting against a tie in the room track. This may not prove a sure anchorage and the prop may fall. Consequently a block is set on the rail and secured by a clevis, a chain leading from the clevis to the car hitching, to which it is attached by a hook. Should prop and block fail the chain would act. A small prop sprag has been placed under the front wheel.

†Article entitled "Safety in Underground Transportation in Coal Mines—Mine Cars," read before the National Safety Council at its Buffalo meeting, Oct. 4, 1923.

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TWO-BUMPER ENDGATE CAR AT AN ANTHRACITE MINE

In the anthracite region, mules and short locomotive trips are still not uncommon. Conditions in many anthracite mines do not favor the storage-battery locomotive and the long trips that are so general in bituminous-coal mines. Consequently the double bumper and endgate have not found so much opposition from mining engineers in the hard-coal region as in soft-coal districts.

lubrication is furnished the wheel, decrease the wear on the axle and hub and help to prevent the wheels from becoming wobbly. But of even more importance than lubrication is that the wheel be so designed that the hub and axle shall wear evenly. The weight of the car must rest squarely upon the hub bearing. When it fails to do this, the hub will quickly wear conical, causing the wheel to become wobbly. To produce an even wearing of the hub and axle the center of the line where the tread rides the rail must be very nearly under the center of the hub bearing.

In service the wheels always must remain securely fastened to the axle. A washer and cotter key through the end of the axle probably is the oldest and the most common form of fastening. The use of this washer is obligatory as it prevents excessive wear of the cotter key, but unfortunately it frequently is omitted when the old wheels of a car are replaced. Any wheel in which the device by which it is fastened to the axle is not protected against excessive wear is dangerous and one that will be found loose on the axle most of the time. This defect is not confined to the old-style "oil-it-every-trip" wheel, for some roller-bearing and grease-packed wheels have this defect. Many a serious wreck can be traced to such loose wheels, whereas had the wheels been securely fastened the derailments would have been so trifling that the cars could be replaced in a few minutes.

Brakes sometimes are omitted, sprags being used to hold cars on steep gradients. This undoubtedly introduces an extra hazard, and we are disposed to believe that brakes are a necessity in all mines both for safety and efficiency. In a single coal mine brakes of many different designs are commonly found in use. Much might be said for and against almost all of them. The important requirement is that when they are in the off position they must release fully so as not to drag on the wheels and when applied they must put sufficient friction upon the wheels to retard, stop or hold the cars on the grades encountered or as the necessity of the haulage system requires.

Within certain limits the simpler forms of brake riggings are more dependable as they are more easily kept in repair. Of course the brake must be of sturdy construction and to operate satisfactorily it must have

provision for taking up the wear of the band or of the shoes by which the pressure is applied.

With compound-lever action the play in the bearings between the movable parts must be carefully regulated. A little too much play in each bearing means much lost motion when the movement finally reaches the brake shoe, and many otherwise well-designed brakes have failed entirely on account of poorly made bearings. If you are having trouble with your form of brake, study carefully the bearings between movable parts. A more serviceable bearing probably will eliminate most of the trouble. Loose bearings are one of the most common causes of dragging brakes, and of course a brake which always rubs on the wheels usually is worn out and useless when needed.

On light grades the two-wheel brake meets with all the requirements of safety, but on heavy grades the four-wheel brake is almost a necessity.

For safety the brake should be applied either by pulling up or back on a side brake and away from the center of the car with an end brake. All brakes must be operated from the same side, which must be that opposite the trolley wire—that is, on the clearance side of the roadway.

The handle or device for operating the endgate latch should either operate automatically as the car is dumped or else be placed within convenient reach of the man standing alongside the car. To locate it so that the man must step on the front bumper to unlatch the endgate is dangerous.

CAR WITH ENDGATE IS STRUCTURALLY WEAK

Both the swing and lift endgate type of car cause one entire end of the wagon to be left structurally weak and without side support. Only with difficulty is a car of this kind designed with the required rigidity, and it is not easy to construct one that will keep its shape reasonably well after some years of service. The increasing use of rotary dumps, by removing the need for a swinging or lifting endgate, is overcoming this defect and permitting of a much more substantial type of car.

Where the roof is unusually dangerous and where, accordingly, it is necessary to timber close to the track a crooked car is a menace, for the side of the wagon may strike and dislodge such timbers, greatly increasing the dangers of haulage. Anything that makes possible the use of a more rigid car is a step forward in safety. For this reason I look upon the rotary dump or any dumping system which eliminates the endgate as a safety provision.

Car irons, drawbars and the iron ribs of wooden cars must be designed with more than the strength desired for the car when new, it being customary as soon as the wood portions wear out to rebuild the irons into a new car and to continue doing so during the life of the mine, so that the irons in the car usually have the life of a number of mine cars. The rusting and corrosion during the length of service expected of car irons should be taken into consideration in the original design of the car.

The design of mine-car bumpers should be carefully considered if safety is to be attained. The old-style double bumper with a three- to five-link coupling was the natural outcome of years of experimenting in producing a car suitable for mule haulage. It is a good car for that purpose, but with the electrification of the mines and the introduction of gathering locomotives

this type of bumper became unsafe and the cause of numerous accidents. The single and round bumpers designed so that cars may be pushed ahead of gathering locomotives, though they overcome some of the objectionable features of the double bumper, introduce several new hazards which require careful consideration.

Prominent among these hazards with some kinds of round bumpers is the closeness with which the edges of the cars approach each other on curves. When side brakes are provided the brake handle should not protrude past the end of the car. End brakes cannot be applied or loosened from the inside of curves nor can a car with end brakes be coupled safely from that position.

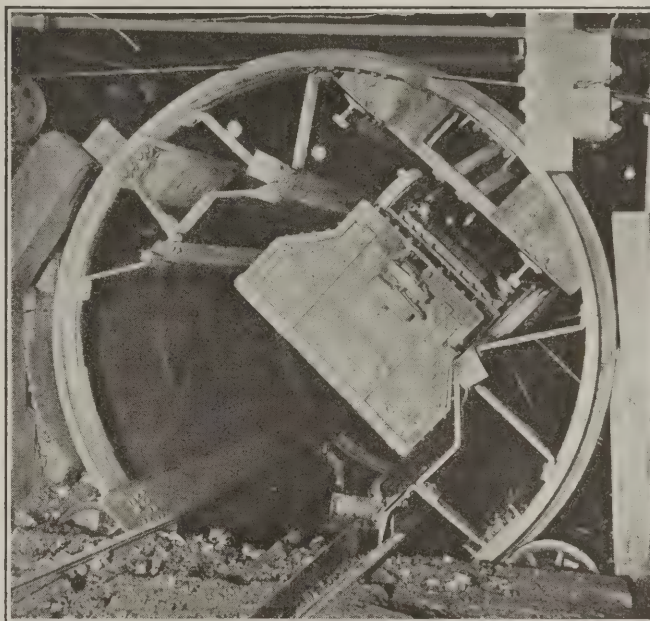
The bumper must be large enough to furnish a good footing for the brakeman riding the rear end of the trip and must hold the cars far enough apart to prevent injury when coupling cars on straight track. The bumpers must be deep enough to prevent them from riding over one another when the cars strike together.

The hole for the removable pin must be made larger through the bumper than through the draw bar so that objects passing through the latter will fall on through and not obstruct the hole. The coupling link should have room back of the fixed pin so that it can slide back clear of the edge of the bumper when cars come together. When two cars are bumper to bumper, 4 or 5 in. of room should be provided between the tops of the clevises holding the link, in order to prevent serious injuries to hands when coupling. The removable pin must be fastened to the car by a chain and should have a wide flange just below the hand hold to prevent the hand of the man making the coupling from being pinched between the pin and the end of the car. The hole for this pin should not be far from the end of the car body.

Much vertical play must be allowed between the link and clevis or when the cars are pushed together the link will bear down upon the end of the next car and raise it off the track at low joints.

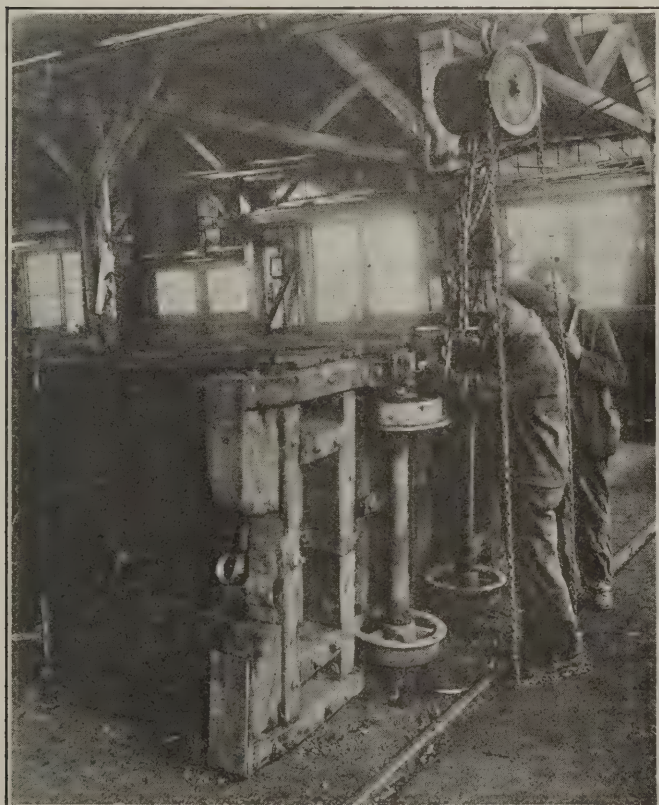
As cars vary in capacity from 1,000 lb. to 5 tons or even more, their strength must be calculated for their individual needs. However, within practical limits, if the various parts of the car are made heavier than apparently is required by the strength-of-materials formula, you will have a car more easy to keep in repair, and that means a safer car, for more accidents occur from faulty upkeep than from faulty design.

The following criticism has been made of the state-



CAR BEING OVERTURNED IN ROTARY DUMP

This car has merely a center bumper. Among other advantages of the rotary dump is the fact that with it a car can be made which will keep its shape and not sag down onto the wheels and get out of line, raking props and other timbers and making brakes, where provided, ineffective.



TIPPING OVER A MINE CAR IN SHOP

More attention has been paid lately to the stiffness of the truck. Unless the truck keeps its shape the car will not be safe nor indeed run easily.

ment in this article, "I am disposed to believe that brakes are a necessity in all mines both for safety and efficiency":

"There is a strong tendency now to do away with brakes entirely. With electric haulage and large cars, a car is not supposed to move unless a locomotive is attached to it. In consequence, unless the grades are excessive, the locomotive can apply all the brake power necessary. Most accidents occur by depending on brakes. Frequently these are out of order and a runaway occurs. Better to have no brakes and not depend on them than have brakes that are not dependable."

In replying to this criticism we feel that this is a fact, but we would not recommend dispensing with the brakes at all times. It is most difficult to arrange mechanical haulage so as always to move the car with the locomotive. Though such a manner of operation is possible yet we do not believe it will ever "work out" in the usual system of coal mining.

What is said by this critic about bad brakes also is true, but is this not a question of upkeep, for which the management is responsible? It does not seem that we should abandon the use of a necessary part of the car equipment because its upkeep is likely to be neglected. Should we not aim at eliminating such defects as prevent the brakes from being maintained in proper working order?

Suggestions as to the Construction and Location of Mine Gathering Pumps*

PUMPS for development work should be located in a place temporarily provided as near as possible to the place where the water accumulates but so far away from the haulage roads and working places as not to interfere with mining operations.

For development work, piston and plunger pumps generally are used. For ease in handling, they should be mounted on trucks or skids. They should have a capacity of from twenty to one hundred gallons per minute at 125 ft. total dynamic head.

Where quantities of water in excess of one hundred gallons per minute are to be handled, rotary and centrifugal pumps are used to some extent, and if the volume of water is fairly constant and does not contain too much acid these pumps prove very satisfactory. (This recommendation is noted as being contrary to the consensus of opinion of the convention at Pittsburgh.)

The discharge pipe should be of sufficient capacity that the total dynamic head will not require the pump to exceed its rated capacity. Where small quantities of water are to be handled it is not feasible to use pipe that will resist the corrosive action of acid water. Where larger quantities of water are pumped and the water contains much corrosive acid, it is advisable to use wood or other acid-resisting pipe.

KEEP ACID WATER FROM EXTERIOR OF PIPE

Care should be taken to keep the pipe blocked up from the bottom of the heading or pump chamber so that no acid water or moisture can come in contact with the outside of the pipe. The loss of head due to friction should be taken from the tables in the Hydraulic Society's Report of 1922, pages 16, 17, 18 and 19.

Pump installations for development work are of a temporary character, and they should be installed with that fact in view. The pumps should be so located that they are easily accessible for oiling and repairing and so that the attendant can move about the pumps freely without coming in contact with any of their moving parts.

Large sump capacity cannot usually be provided in practice, but sufficient space for water storage should be obtained so as to keep the pump in as nearly constant operation as possible. The motors for development pumps should be specially built for this class of service, as the standard motor does not give satisfactory results under ordinary pumping conditions. Where direct current is used compound motors should be installed. They usually should receive their power direct from the haulage circuit. Where alternating current is available the ordinary squirrel-cage induction motor proves very satisfactory.

Controllers should be moisture-proof and enclosed, whether they are manually or automatically operated. All coils and resistance should be so constructed as to resist the moisture contained in the mine atmosphere.

All motor windings, including the armature and field coils, should be thoroughly treated with a compound that will resist the action of the acid in the mine water.

Special attention should be given to see that the field coils are entirely saturated with moisture-proof insulated material.

For gathering work, pumps should be selected which will start without priming and will pump air and water alternately in case the suction pipe is not at all times submerged. Pumps should be so constructed that they can be lubricated without excessive waste of oil. In all cases they should be fully equipped with grease or oil cups, whichever is best suited for the bearings. They should be so constructed that the acid water leaking from the packing glands cannot get into any of the bearing surfaces.

Valves should be so constructed that small chunks of coal and any other solid matter such as are constantly being washed into the sumps will go through them without clogging. Valves should be readily accessible for cleaning in case they become clogged.

PLUNGERS SHOULD NOT CORRODE, SCORE AND WEAR

The plungers of plunger pumps should be constructed of material that will resist the corrosive action of the acid in the water and will not be scored or worn excessively by the packing. The working barrel or liner of piston pumps should be constructed of material that will resist the corrosive action of the acid water and the wear of the packing in the piston.

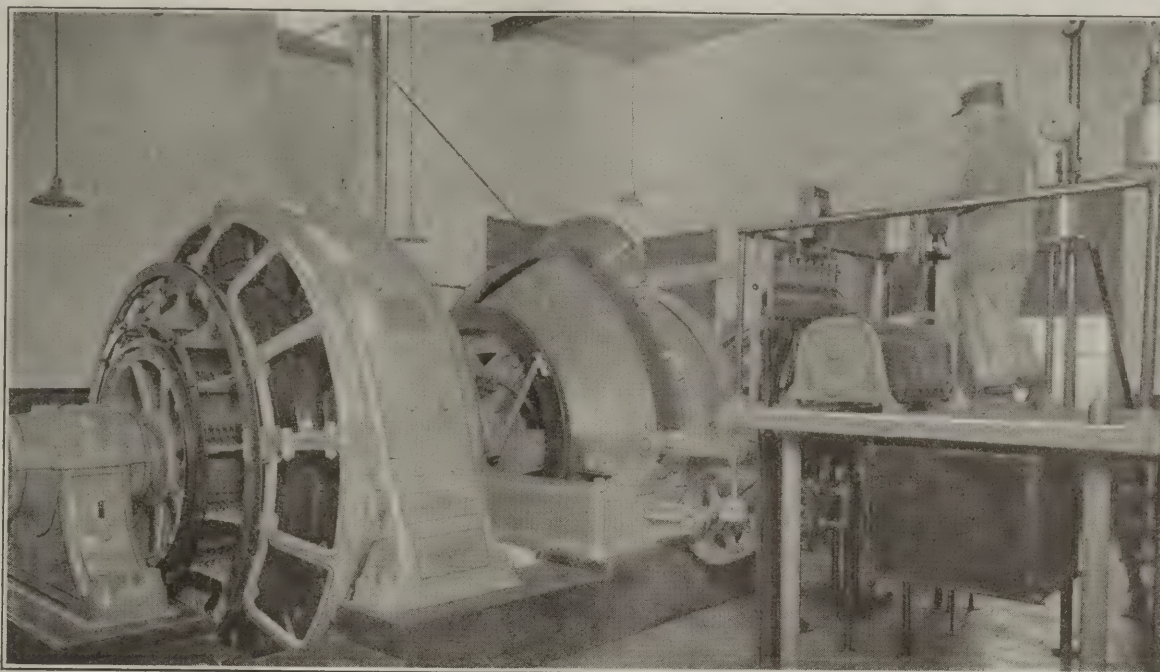
All the pumps for this class of work now on the market could be much improved. The upkeep on the types of pumps used today is entirely too high, and to that end some radical changes should be made.

In the past year pumps of the self-priming centrifugal type have been constructed and placed in service. These pumps have not been running long enough for their true merits to be determined, but there are indications that under certain conditions they will give better service than either piston or plunger pumps.

It has been recommended that complete detailed specifications be prepared for both piston and plunger pumps. I am much opposed to this as it would be a physical impossibility to write a specification that would not conflict in any way with some of the builders of development pumps. Later on, when we can get a little better co-operation between the manufacturers of this type of pump, would be a better time to give detailed specifications.

RESULTS OF TESTS of a power plant at Rivermines, Mo., using pulverized coal as a fuel, are given in Technical Paper 316, just issued by the U. S. Bureau of Mines. Two boiler tests, six drier tests and eight mill tests were made by the fuel section of the Bureau of Mines, in co-operation with certain engineering firms. The boiler tests were made on two Stirling boilers, each having 7,688 sq.ft. of heating surface, the coal used being weighed as delivered to the preparation plant and before being pulverized. As the coal was passing through this plant, tests also were made of the drying and pulverizing units for the main object of determining the capacity of these units and the power they consumed. During each of the drier and mill tests 100 to 300 tons of coal was dried or pulverized. Bituminous coal from southern Illinois, of good quality for that district, was used. It was shipped as screenings, and the part delivered to the powdered-coal plant contained little slack. The results of the boiler tests are very good when compared with stoker performance under similar conditions.

*Abstract of report of Subcommittee No. 1 on "Pumps for Development Work" of Committee on Mine Drainage of Standardization Division of American Mining Congress; L. S. Householder, electrical engineer, Rochester & Pittsburgh Coal & Iron Co., Indiana, Pa., chairman.



Peabody Coal Co.'s 1,050-HP. Hoist at Mine No. 9, Calloway, Ill.

Mine-Hoist Control Equipment for Large Installations

Advantages of the Ilgner-Ward-Leonard System—
High Efficiency Hoisting—Automatic Control Features
—Auxiliary Hoisting Motors for Men and Repairs

BY H. W. CHADBOURNE

Power and Mining Engineering Department, General Electric Co.

UNDER certain conditions the Ilgner-Ward-Leonard system of control for large mine hoists has inherent advantages over the induction motor or direct-current motor when operated directly from a constant potential. The principal advantages of this system are that a constant amount of power is taken from the line, and it is possible to get automatic control or a system of control which will respond to many different conditions of load, speed and length of hoist. For short, fast hoisting cycles, this type of equipment also has greater efficiency than can be obtained with other systems of control commonly used on small hoists.

That engineers of both coal and metal mines are realizing more and more the advantages of the Ilgner-Ward-Leonard system is attested by the fact that in eight months the General Electric Co. has received orders for twelve such equipments in sizes varying from 475 hp. to 2,200 hp. capacity. The total horsepower of the hoist motors equals 16,650, all on a 40-deg. C. rise continuous rated basis. Ten equipments were for coal mines and two for metal mines.

Of these twelve equipments, three have drum control and nine have the magnetic type. With magnetic control the strength and direction of the generator field are controlled by a small master switch which carries the contactor control current only, while contactors handle

the field current. This control has been arranged to obtain different results, depending upon requirements. There are a number of advantages of magnetic control over drum type control, either hand or motor operated. First, the master switch is small and the manual effort required from the operator is slight. This is an important item on fast cycles. Second, magnetic control can be arranged very simply to give current limit acceleration if desired—that is, the operator may throw the



FIG. 1—GENERAL VIEW OF SEMI-AUTOMATIC HOIST EQUIPMENT

This hoist is one of the Valier Coal Co., Valier, Ill. On the left is the flywheel motor generator set.

master switch to the full running position and the hoist motor will properly accelerate with the current never exceeding a predetermined value. The current output of the generator is thus kept below an amperage well within its commutating limits.

Ordinarily this control is not connected to give current limit retardation. Should conditions warrant, however, this feature can readily be included. The contactors are so connected that they drop out in sequence, thus giving some time delay. This allows the motor to act as a generator and assist in bringing the load to rest.

UNUSUAL CONTROL FEATURES FOR SPECIAL RESULTS

Unusual features introduced in the control to obtain certain results have been embodied in recent installations, two hoists for the Inspiration Copper Co. being good examples of these innovations. The supply hoist equipment has a motor rated for 600 hp. at 400 r.p.m., with a flywheel set having a 450-kw. generator, a 500-hp. induction motor and a 16,500-lb. flywheel. This equipment has a master switch giving 15

points for automatic acceleration, all of which may be hand controlled. The master switch is located in the hoist house as usual, but the signals for hoisting are given by a man who at times rides the cage and at times signals from the different levels. As a safety precaution an arrangement is made so that it is impossible to signal from any level unless the cage is at that level. This is accomplished by a device similar to a geared limit switch but with eleven contacts, one for each level. The equipment also is provided with an extra control switch for limiting the speed of man hoisting, by preventing the closing of the last field control contactors.

The main ore hoist for the Inspiration Copper Co. consists of a 2,150-hp. hoist motor of 51 r.p.m., a flywheel set consisting of a 1,600-kw. generator, a 1,900-hp. induction motor and a 78,000-lb. flywheel. The main hoist apparatus is located in the same room as the man hoist.

This controller has a motor-operated drum for controlling the generator field, a five-point selective switch mounted near the drum controller in the hoist house and

a system of master switches, one in the hoist house and one at each of the three levels from which ore is to be hoisted. These master switches are in reality small one-point controllers which are under the control of the operator. The direction of hoisting is controlled by two geared limit switches in the hoist house which operate alternately.

The operator sets the selective switch for the correct level and re-clutches the drum, after which the man at the level operates the hoist from that level. It also is possible to operate the main hoist manually from the hoist house.

In order to get variable rates of retardation a cam turn-off device is used which is automatic, the cam turning the drum controller toward the off position at the correct rate to obtain the retardation required. In this case it is necessary to retard at three different rates, besides having a short interval at constant speed. Therefore it becomes advisable to use a cam turn-off device. If an attempt were made to duplicate this condition of retardation with current limit relays it would mean very complicated equipment.

The two equipments also are supplied with a switching arrangement so that the man-hoist motor can be operated from the main generator in case of emergency.

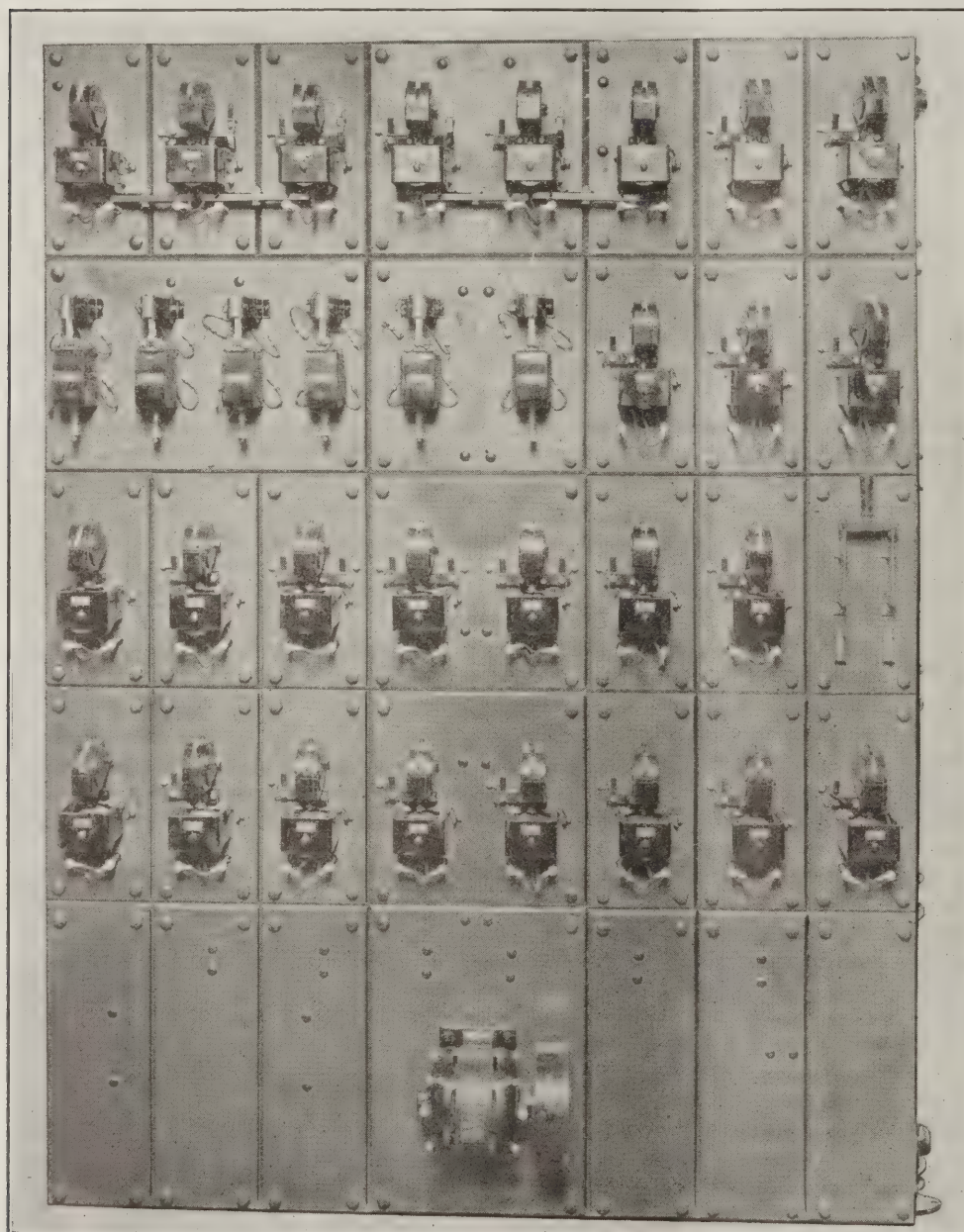


FIG. 2—CONTROL PANEL

Uniformity of arrangement of equipment greatly simplifies the design and maintenance of the hoist control equipment.

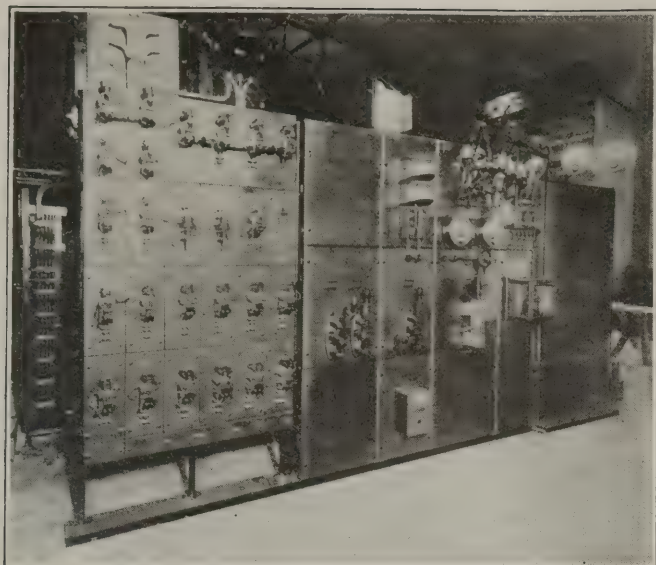


FIG. 3—MAGNETIC CONTROL AND SWITCHBOARD PANELS

The switchboard panels are equipped with the usual protective devices. The magnetic control panel shows the control contactors. Illustration shows 1,400-hp. hoist at plant of Homestake Mining Co., Lead, N. D.

One unusual feature of the five equipments ordered by the Old Ben Coal Corporation is that each hoist is equipped with an auxiliary induction motor geared to the opposite end of the drum shaft from the main motor. This auxiliary motor is for use at night and idle periods and operates the drum at a much reduced speed. The hoist builder has interlocked his part of the equipment so that it is not possible to operate the main motor with the induction motor gears in mesh. The control circuits are so interlocked that the auxiliary induction motor cannot be operated when the induction motor of the flywheel set is on the line, or vice versa. Therefore, both equipments—the main hoist motor and the auxiliary hoist motor—cannot be operated at the same time. All of these main motors are also equipped with transfer switches in the control to limit the speed when hoisting men and also to light signal lamps so that the men will know that the control is in the man-hoisting position.

It might be of interest to note some of the work done by such large equipments. The 2,200-hp. motors for the Old Ben Coal Corporation each hoist 8,400 lb. of coal per trip, a distance of about 500 ft. (the distance varies from 484 ft. at one mine to 519 ft. at another), making a trip in 18-seconds, or 200 trips per hour. This gives 840 tons per hour for each hoist, or about 6,000 tons per day of seven hours. The Inspiration Copper Co.'s 2,150-hp. motor hoists 24,000 lb., or 12 tons, of ore per trip. The lift from the bottom level is 1,485 ft. This takes 69.3 seconds per trip, or 625 tons per hour, which is 4,400 tons for a seven-hour day.

Physically the 2,150-hp motor at 53 r.p.m. is the largest hoist motor in the United States. The three

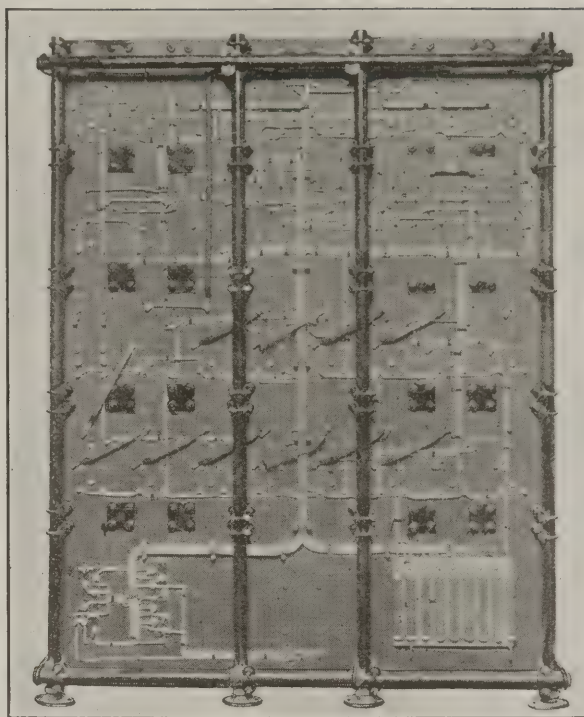


FIG. 4—REAR VIEW OF CONTROL PANEL

The wiring arrangement shows how each part is related to the other. This is the rear of the panel shown in Fig. 2.

2,200-hp. motors for the Old Ben Coal company, being at 110 r.p.m. are smaller mechanically. When ordered, these 2,200-hp. motors were the largest horsepower rated hoist motors in the United States either in metal or coal mines.

DETERMINATION OF FINENESS OF PULVERIZED COAL.—In conjunction with the committee on coal and coke of the American Society for Testing Materials, methods for making size tests of powdered coal, both by hand and machine sieving, have been formulated by W. A. Selvig, assistant analytical chemist, attached to the Pittsburgh experiment station of the U. S. Bureau of Mines, Department of the Interior, and sent to various co-operating laboratories for trial and criticism. This work will be continued with a view to formulating a satisfactory standard for making fineness tests of powdered coal.

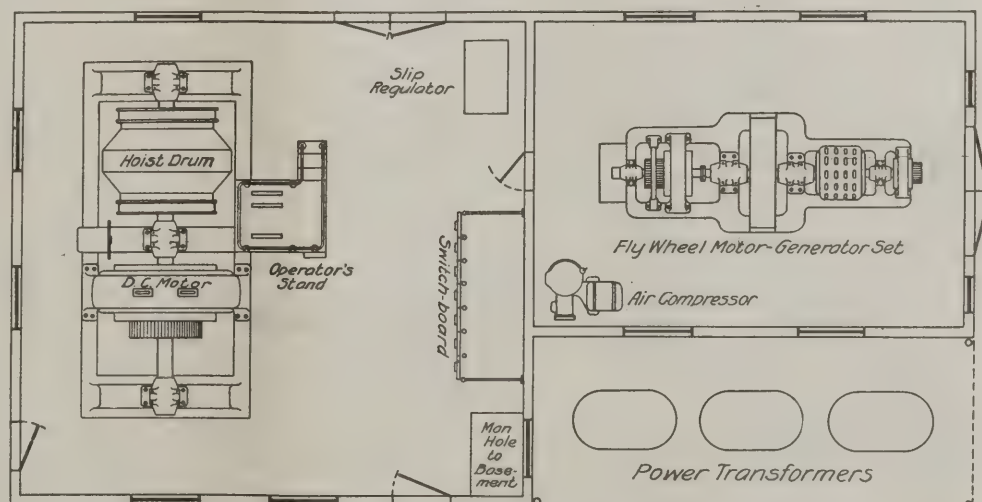


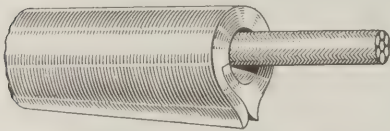
FIG. 5—LAYOUT FOR A COAL-MINE HOIST STATION

Here is a large capacity hoist using the Ilgner-Ward-Leonard system of control. The flywheel set is in a separate room, while the power transformers are located outside.

New Equipment

Safety in High-Voltage Line Work

RUBBER blankets have been used for many years to protect linemen from high-voltage current when making repairs. They are awkward to carry and to place. A simple protector for linemen is shown in the illustration. It is in the shape of a hose and has a sort of self-locking arrangement which gives it a firm hold on the wire. Yet it is readily applied and shifted into place



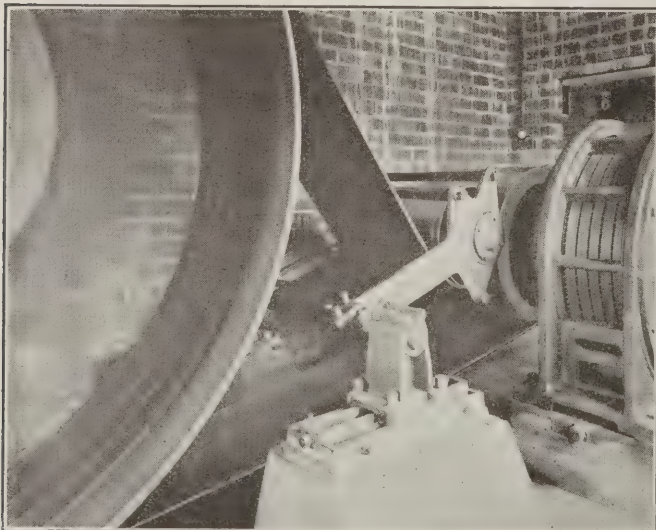
HOSE TO PROTECT LINEMAN
Used in place of a rubber blanket this self-locking hose keeps lineman from being electrocuted.

along the conductor by pressure at one end. It also is quite easily removed. The lineman does not have to lean over far to apply, shift or remove the hose. It is made by W. H. Salisbury & Co., Inc. Of course it always is preferable to deaden the wires by the use of a switch, locked against reclosing, before attempting to do any work on them, but where this cannot be done the hose protection is available and highly effective.

Device for Use on Belt Drives Having Short Pulley Centers

BELT drives always are popular among the mechanical men at the coal mines because of their flexibility and the ease with which the speed of a machine may be varied by changing one or both pulleys without a change in pulley centers.

The photograph shows the Lenix drive, made by F. L. Smidth & Co., of New York, applied to a 200-hp. fan. As will be noted in the picture, the pulley centers are extremely short yet the drive is made highly efficient by reason of the Lenix, which permits of the elimination of 75 per cent of the initial tension found in ordinary belt drives.



A LENIX APPLIED TO A FAN DRIVE

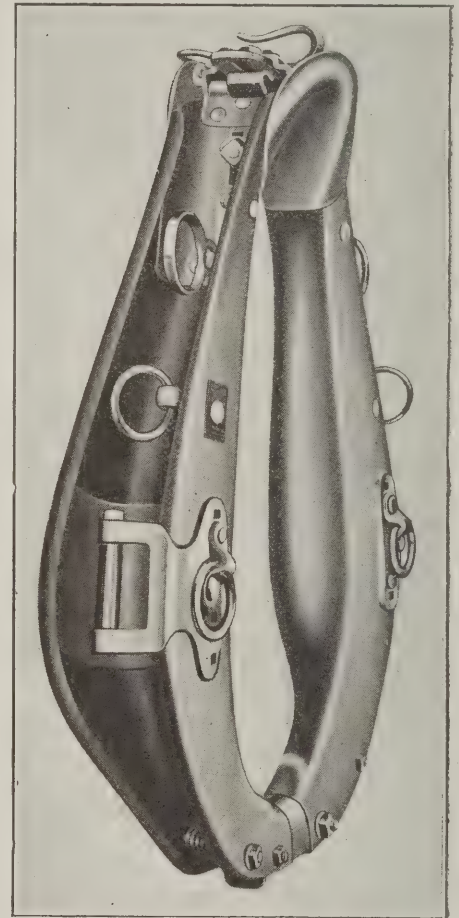
Where the pulley centers are short, the Lenix greatly increases the drive efficiency and at the same time decrease the belt tension.

The best conditions for Lenix drives are with high belt speed and short pulley centers. It also permits high pulley ratios with the use of high-speed motors, resulting in higher efficiencies.

This device is being recommended for mine fans and similar drives, especially where it is either necessary or desirable to have short belt centers.

Saving Mules from Galled Shoulders

ZINC oxide is a well-known antiseptic. On the other hand, leather is a germ breeder. It is surprising therefore that mule collars are still constructed with the rubbing surfaces of leather and not of zinc. Where their collars are made of zinc the shoulders and necks of horses or mules can be kept free from sores. An oxide of zinc forms on the collar and helps the sores to heal, if there are any in process of development. A collar of this kind, manufactured by the Thomson Co., of Fitchburg, Mass., is illustrated herewith. It is easily adjustable and so sweat bands, always unsanitary, which steam the necks, cause sores and are breeding places for germs, are unnecessary. These collars are much lighter than a leather collar for they weigh about 16 lb., whereas the usual collar with hames will weigh as much as 25 lb. Special springs absorb the shock when starting a load or when striking an obstruction. The collars are easy to keep clean as they can be sufficiently cleansed by wiping them with a kerosene cloth. This should be done invariably after using.



COLLAR THAT WILL KEEP THE MULE ON THE JOB

Most of the absenteeism of mules from the mines, apart from that due to lack of coal orders, results from sore shoulders and necks. A zinc collar is said to reduce such absenteeism.

The collars are easy to keep clean as they can be sufficiently cleansed by wiping them with a kerosene cloth. This should be done invariably after using.

This type of horse collar has been in use for more than thirty-five years. During this time it has been gradually improved. Recent changes in design provide for an easy and wide range of adjustments.

A RECENT ADDITION to the list of permissible electric cap lamps approved by the U. S. Bureau of Mines for use in gaseous and dusty coal mines is the Concordia lamp (type RM 6 o.d.), manufactured by the Concordia Electric Co., Pittsburgh, Pa.

How Mines Can Be Moistened Without Use of a Big Force Fan or Obstruction of Haulage Roads

By Using Disk Force Fan in a Subsidiary Intake Conditioned Air Is Delivered to Main Airway, the Ventilation of Which Is by Suction, the Air Being Motionless in Mine Portal

BY THOMAS CHESTER
American Blower Co., Detroit, Mich.

EVERY winter and spring explosions which unmistakably are due to dust occur in coal mines in greater or lesser degree, sometimes causing terrible disaster in which hundreds of men are killed and severe financial loss to the owner.

Normally a tremendous drying out occurs in mines in cold weather and according to a paper read recently to the employees of the Colorado Fuel & Iron Co. by James Dalrymple, chief inspector of coal mines for Colorado, it appears that in that state during the month of March there was an evaporation of 12,991 gallons, or approximately 54 tons, of water per 24 hours for each 100,000 cu.ft. of air circulated per minute. In January and February the evaporation is even greater, but no figures have been published for these months.

Local explosions of gas occur from time to time, but if the general percentage of methane in the mine air is well below the danger point and the coal dust is thoroughly wet, such an explosion will have a limited effect.

Any dry combustible material if in finely divided form can be exploded if suitably distributed in air. Experiments have been made as to the inflammability of about 150 different varieties of dusts produced in industrial work. In this way information has been obtained in regard to the flame temperatures and the pressures generated in pounds per square inch. That the coal is explosive because reduced to dust is shown by the fact that dust explosions occur in factories where fine dusts of combustible material are made as well as in coal mines, and much serious and expensive damage has been done in this way, some examples of wrecked buildings being flour mills, starch factories, chocolate plants, sugar refineries, aluminum factories, etc.

WHY FINENESS CAUSES INFLAMMABILITY

A block of coal will not burn until the surface is raised to the ignition temperature, and the mass retards this rise in temperature by absorbing heat from the surface. Finely powdered dry coal will burn almost in the same manner as a gas and for this reason this material is now used in furnaces as a fuel.

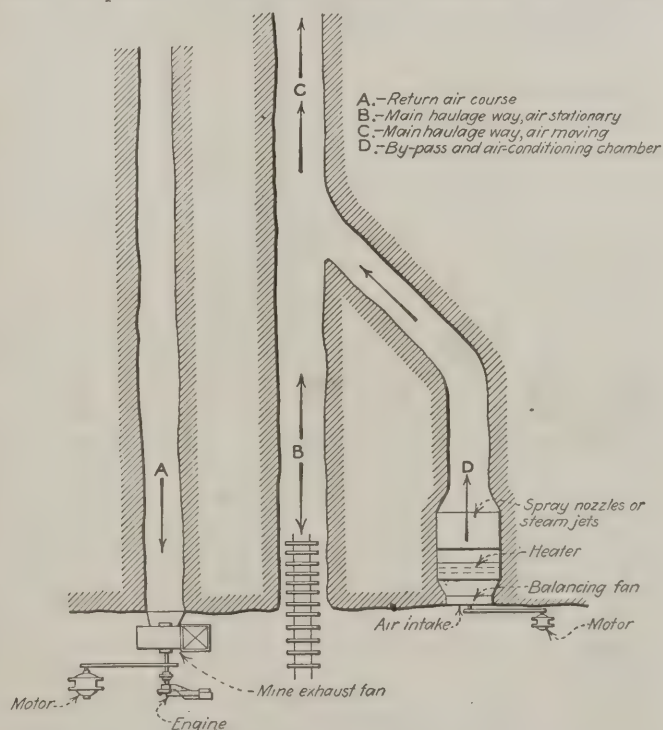
It will readily be seen, therefore, that the sprinkling of water in coal mines is of value because the dust particles thereby are made wet, and this moisture has to be converted into steam before gas can be distilled from the dust particles.

If this absorption of heat is great enough combustion will cease. The same result is achieved by spreading powdered limestone or other finely divided inert material throughout the mine. The substance used in this way absorbs heat and does not subsequently liberate any. Coal dust, on the contrary, absorbs heat at the outset, but upon being raised to the combustion temperature gives off heat in accordance with its calorific value.

It has been established that the more finely divided any combustible is the more rapidly it will burn, whether placed in a pile or distributed in a suitable manner in a current of air. Thus, for the purpose of slowing down the speed of ignition the explosive material used for large naval guns is agglomerated into comparatively large pieces. In this way the explosion is made less rapid. The principle involved is that the more finely divided any material is the much greater is the ratio between the exposed surface and the mass, and conversely the larger the particles the greater the ratio of mass to surface.

Consequently another advantage in wetting coal dust is that it causes the particles to cohere to a certain extent, with the result that the ratio between surface and mass is reduced. Also the increase in weight of the individual particles caused by this agglomeration and by the saturation with water reduces the ease with which dust can be blown into the air from the floor of an entry.

Serious mine explosions seldom occur in summer. This is because a comparatively large quantity of water vapor is present in the outside atmosphere. In passing through a mine this air is cooled below dewpoint, with the result that water is precipitated in the form of dew. After a period of hot and humid weather it is often



CONDITIONS AIR AND PASSES IT TO MAIN ENTRY

By means of a fan air is driven into the main entry beyond the portal at such speed as to satisfy the exhaust fan. Consequently the air between the portal and the point of entry of the conditioned air is stationary.

found that mines are wet to the face of the longest entry on account of this condensation.

The quantity of water vapor in a cubic foot of saturated space of air at various temperatures with normal barometric pressure is as indicated in Table I.

TABLE I—GRAINS OF WATER VAPOR IN CUBIC FOOT OF SATURATED AIR

Deg.	Grains	Deg.	Grains	Deg.	Grains
10	0.776	34	2.279	58	5.370
12	0.856	36	2.457	60	5.745
14	0.941	38	2.646	62	6.142
16	1.032	40	2.849	64	6.563
18	1.128	42	3.064	66	7.009
20	1.235	44	3.294	68	7.480
22	1.355	46	3.539	70	7.980
24	1.483	48	3.800	72	8.508
26	1.623	50	4.076	74	9.066
28	1.773	52	4.372	76	9.655
30	1.946	54	4.685	78	10.277
32	2.113	56	5.016	80	10.934

Air having a dry-bulb temperature of 95 deg. and a wet-bulb temperature of 77 deg. carries about 8 grains of moisture per cubic foot and has a relative humidity of about 47 per cent, which means that it is 47 per cent saturated.

If this air is cooled down to 70 deg. it will still carry about 8 grains of moisture per cubic foot, but then will be in an almost saturated condition or nearly at dew-point. If this air is cooled down to 60 deg. it will still be saturated, but will then carry 5.745 grains of moisture per cubic foot, as will be noted from the above table, and the quantity of water condensed out of the air will be 2.235 grains per cubic foot, and it is the deposition of this moisture which makes a mine wet in summer.

This action can be produced artificially in winter by heating the air to the required temperature and loading it with moisture before it goes into a mine. Usually it is not necessary, however, to actually deposit moisture in a mine during winter, as in most cases this action is produced naturally during summer and autumn; all that is necessary in winter is to prevent evaporation. This is done by raising the air temperature to permit of the absorption of water, and the moisture content is brought up as near as required to saturation at the mean temperature of the mine—that is to say, of the coal seam and roof.

Dust explosions can be produced by runaway cars, collisions, rock falls, blown-out shots and by local gas explosions. Any one of these can stir up enough dust to start a general explosion, which is intensified as it passes through the mine. After a dust explosion is well under way the velocity of the detonating wave reaches about 2,000 ft. per second with great heat and pressure.

If exhaust steam is blown into the air entering a mine, much water is precipitated and fog is produced owing to the fact that the cold air cannot take up the moisture in the form of invisible water vapor, but this is possible when the air is preheated.

Moisture can be added to mine air by providing water sprays at intervals which permit suitable increments in the quantity of water vapor carried as the air temperature is gradually raised by contact with the airway surface. The logical plan, however, is to concentrate the air-moistening equipment on the surface, where it can be given attention, and where any necessary variations in temperature and relative humidity easily can be produced.

When a mine is ventilated by a fan operating as a blower it is easily possible to place the air-conditioning apparatus between the fan and the intake drift or down-cast shaft. When a mine is ventilated on the exhaust principle the condition is not quite so simple, as it is not desirable to use double doors or air locks to enable the

intake air to be suitably conditioned, because this would interfere with taking out coal as rapidly as possible.

Martin J. Lide, consulting engineer of Birmingham, Ala., has developed and patented a system whereby this difficulty can be overcome satisfactorily. The Lide system consists of the use of a disk fan for blowing all the air which goes into a mine, through a bypass which enters the main haulage slope or shaft some distance within the portal or collar, as the case may be. A suitable area of heating surface is furnished for raising the air to the required temperature and either water-spray nozzles or steam jets are used to add moisture.

By using the bypass and disk fan the mouth of the slope or shaft is kept in a neutral condition as regards air movement and there is no interference with the haulage of coal. The inflowing air passes through the disk fan and air-conditioning apparatus and through the bypass to the mine. This will be clear from an inspection of the sketch herewith, which gives a plan of an installation of this character applied to a drift mine.

With the Lide system the air can be supersaturated when required, so that during shutdowns moisture can be deposited in the form of dew by the air used for ventilation. This is much better than sprinkling, because men who have to work in dark places cannot be sure that their work is well done. Moreover they are not always actuated by a desire to perform their work thoroughly.

This system can be best applied to mines which are equipped with power plants and have a large quantity of exhaust steam available, but operations which use purchased power can use low-pressure steam from a plant installed for this purpose. This need not be expensive, as second-hand boilers can be used for the low-pressure needed and waste coal can be burned by installing a forced-draft fan.

If evaporation is prevented in cold weather, as indicated, and if the rooms are sprinkled wherever coal-cutting machines are at work, it will be found possible greatly to reduce or wholly to eliminate dust explosions.

French Coal Imports and Exports in July

French imports and exports of coal and coke in July of this year and for the first seven months of the year were as follows, in metric tons:

Coal	Imports		Exports	
	July	Jan.-July	July	Jan.-July
Great Britain.....	1,624,400	10,649,400	.....	.....
Belgium.....	160,900	1,333,900	91,100	716,100
Saar.....	372,500	1,222,500	17,600	178,600
Germany.....	73,600	749,600	1,900	41,900
United States.....	154,600	452,600	.....	.....
Holland.....	70,100	378,100	.....	.....
Switzerland.....	.....	.....	42,300	209,300
Italy.....	.....	.....	6,400	65,400
Other Countries.....	.....	.....	.....	.....
Totals.....	2,472,400	14,825,400	176,700	1,374,700
Coke				
Germany.....	152,700	927,700	.....	1,600
Great Britain.....	15,200	333,400	.....	.....
Belgium.....	47,100	267,100	2,300	5,300
Holland.....	37,500	213,500	.....	.....
United States.....	44,100	164,900	.....	.....
Saar.....	5,300	65,900	.....	3,900
Czecho Slovakia.....	.....	28,300	.....	.....
Switzerland.....	.....	.....	15,600	59,600
Italy.....	.....	.....	19,600	143,600
Other Countries.....	.....	.....	.....	.....
Totals.....	301,900	2,001,900	40,700	230,700
Patent Fuel				
Belgium.....	37,500	234,500	.....	6,200
Germany.....	12,900	111,900	.....	5,100
Great Britain.....	19,800	101,800	.....	.....
Holland.....	.....	10,600	.....	.....
Switzerland.....	.....	.....	9,300	93,300
Algeria.....	.....	.....	.....	9,100
Italy.....	.....	.....	700	7,700
Totals.....	72,200	460,200	12,800	147,800

Group Insurance as an Aid to Reducing Mine Accidents

Safety Engineering Department of Large Insurance Company Makes Recommendations—Analysis Covering Fifteen Months Indicates Possible Reduction of 75 per Cent—Employee Safety Organization Highly Effective

BY THOMAS A. WALSH
Safety Engineer

SERVICE is more than delivering satisfactorily that which has been sold. It is more than commercial cleverness. Service is the secret of success. President Coolidge has said: "The business of the country depends upon private initiative. It depends upon good-will and a desire to serve more than ruinous competition and a desire for gain."

In a recent article in *Coal Age** the possibilities of a better understanding between employer and employee through group insurance was pointed out. Attention was drawn to the number of coal companies that had adopted group insurance as a means of establishing better relations between themselves and their workers. It is recognized that a sincere and an active interest in the physical safety of the men on the part of the employer is another approach toward cementing the tie between them.

Realizing this fact, one of the large insurance companies has established a service bureau which, among other services, has a safety engineering department. As one of the safety engineers of this bureau, I recently visited a group of mines that had purchased group insurance and were anxious to have me make a survey and supply them with recommendations for reducing accidents among their workmen. After spending several weeks making careful investigations of this company's operations, covering eight camps and fifteen mines, a report on the conditions found, which included recommendations for accident prevention, was prepared. This article is based on that report.

Analysis Reveals Heavy Loss in Output and Expense.

—Preliminary to the survey, an analysis was made of 575 accidents involving a loss of time of one day or more, in all the mines for a period of fifteen months. This analysis showed that because of accidents and on the basis of weighting as established by the International Board of Accident Commissions, there were 110,000 days lost in this fifteen months' period, with a coal production loss of 495,000 tons and an accident cost of approximately \$50,000, totaling an operating loss of approximately \$1,040,000.

As indicated by Fig. 1, 40 per cent of these accidents involved miners and 35 per cent transportation men as follows: brakemen, 20 per cent; trackmen, 10 per cent, and motormen, 5 per cent. Miners and transportation men sustained 75 per cent of all accidents for the period. These accidents were responsible for 86 per cent of the total tonnage loss due to accidents, as shown in Fig. 2. The remaining 25 per cent of the total accidents reviewed affected machine men, timbermen and others in varying percentages from 5 to 1. Fig. 3 indicates that 36 per cent of all accidents are attributed directly to slate and coal falls; 15 per cent occurred

in transporting material and equipment and 11 per cent in handling material in the course of producing coal. The remaining cause classifications in Fig. 3 are of varying importance, with a maximum of 17 per cent for all other causes to 1 per cent for nail punctures and explosions.

A study of this cause chart indicates that a possible reduction of 75 per cent of all causes can be looked for, with an immediate reduction of 50 per cent in the classification of slate and coal falls alone. There also are presented diagrams of accident severity and frequency rates, computed on a monthly basis and comparing the ratio of accidents and days lost due to these accidents per 100 men for eight camps. The annual average monthly accident rate is 1.2 per 100 employees for all mines, and the severity rate is thirty days per 100 men employed. The fatality rate is 3.5 per 1,000 employees.

Causes of Accidents.—The company is doing everything practicable to eliminate accidents from a physical point of view. Physical conditions of the properties, both on the surface and underground, are good. These conditions are maintained through the efforts of a competent mine inspector. His work is largely that of inspecting the various mines from the point of physical safety. He has the fullest co-operation of all officials, from the general manager down to assistant mine foremen. But physical conditions involve probably only 10 per cent of those factors which when corrected tend toward accident elimination.

A study of the diagrams indicates that accidents

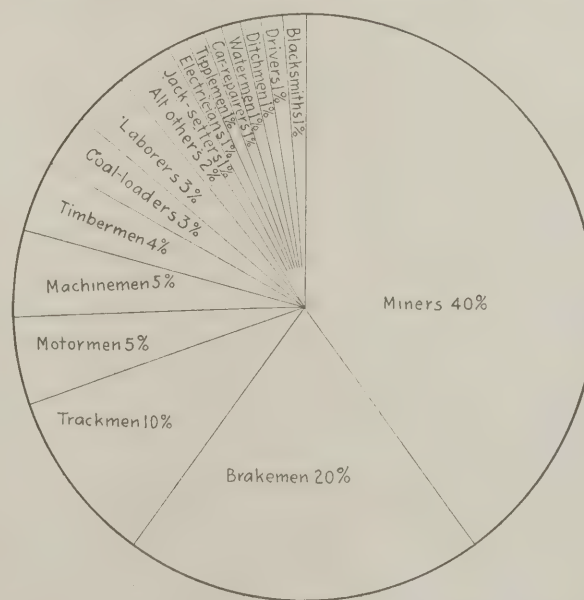


FIG. 1—DISTRIBUTION OF ACCIDENTS BY OCCUPATIONS

This diagram shows that more miners meet with accidents than men in any other work around the coal mines. It appears, however, that the accident rate is higher among brakemen since there are many miners to each brakeman employed.

*"Group Insurance: What It Is and Its Advantages to Employer and Employee," by R. W. Sparks; Aug. 16, 1923.

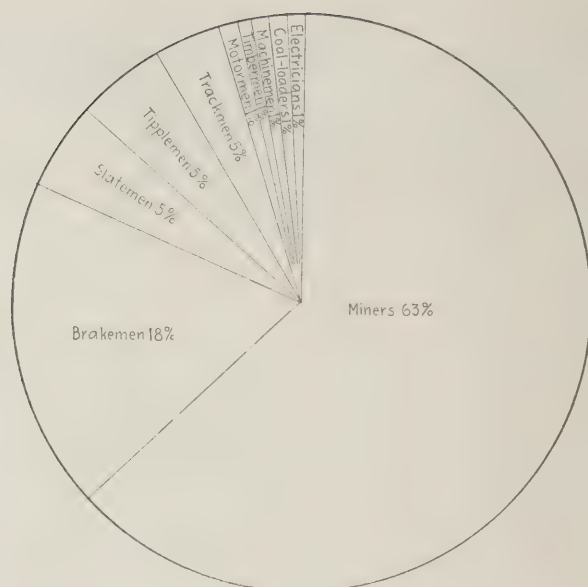


FIG. 2--ACCIDENTS AS A CAUSE OF LOST PRODUCTION

According to the analysis of accidents at these fifteen mines, accidents to miners cause the largest loss in production, with brakemen second. That accidents to brakemen figure so largely is evidence of the importance of transportation in getting coal to the tippie.

involving the negligence of the personnel compose a greater proportion of the total than those attributed to defective structural conditions of the property, either on the surface or underground. To effectively reduce this present high accident rate, which is largely due to individual carelessness, it was suggested that a safety organization be developed, including formation of safety committees, holding of meetings, carrying on of efficient educational work in accident prevention through the use of bulletin boards, pay envelopes, etc., and the investigation of all accidents involving loss of time.

The plan proposed should easily be launched and maintained, due to the exceedingly good feeling existing between employees and this employer and because of the favorable attitude of the general manager and the mine officials generally. Under such favorable circumstances, measurable results from the efficient operation of the plan should be quickly realized.

Where accident-prevention work is made part of the operating practice of the industry and is administered through efficient methods, effective results as indicated are obtained. As an indication of what can be done the following notes from records available to the writer are suggested. The A Coal Co. recently, during a period of approximately one year, has reduced the number of lost time accidents 51 per cent and in the same period reduced the number of days lost due to such accidents 85 per cent. The hours worked increased 2 per cent. The tonnage mined per day increased 11.2 per cent. There was a 68 per cent reduction in accident cost per ton of coal mines accompanied by a 72 per cent decrease in accident cost per \$100 of payroll.

The B Coal Corporation passed through 1919 without a single fatal accident and with a reduction of more than 70 per cent in non-fatal accidents for the same period. Compared with a previous year's record of 2,212 non-fatal accidents, the record for 1919 was 1,717 non-fatal accidents.

The C Coal Co. reports that it has reduced its fatality frequency rate from 1 for every 84,972 eight-hour shifts worked during the period from 1913 to 1916 to

an average of 1 for every 400,727 eight-hour shifts worked during the years from 1917 to 1920. From Jan. 15, 1918, to Aug. 2, 1920, this company operated 763,000 eight-hour shifts without a single fatality.

The D Coke Co. reports that it reduced its rate during 1920 to 1.71 deaths per million tons produced. The E Coal Co., of West Virginia, reduced its accidents 18 per cent in 1920 from 1919. It has reduced fatalities 33 per cent, while at the same time increasing output.

The F Steel Corporation since 1906 has reduced serious and fatal accidents 56.13 per cent and further reports that since 1912 accidents causing a loss of time greater than the working day have been reduced 71.41 per cent.

In all of the foregoing instances the personal factor of the operation has been considered as the governing one in the reduction of accidents. Accidents can be reduced only through the combined efforts of all concerned. For this particular company the following program of accident-prevention work in its various camps was designed and recommended:

Plan for Safety Organization.—Central safety, mine safety and, where feasible, sectional committees should be organized.

The Central Safety Committee should be made up of the general manager as chairman, safety engineer, general superintendent, chief engineer, maintenance engineer, claim man, and superintendents of the various mines.

The Mine Safety Committee should consist of the mine superintendent as chairman, the safety engineer as secretary, the mine foreman, assistant mine foreman, mine electrician and workmen. The assistant mine foreman and the workmen to be rotated.

The following schedule of items is suggested for the consideration of the committees at their meetings:

Central Safety Committee

- (1) Review abstract of minutes of mine-safety committees.
- (2) Review all mine accidents occurring during previous month.
- (3) Receive recommendations for the prevention of such accidents.
- (4) Receive review of recommendations submitted by the mine committees to this body with the idea of making them standard practices, wherever possible.
- (5) Consider accidents on a basis of loss in production and insurance cost.
- (6) Assist in the development of general operating rules.
- (7) Every two months appoint a special committee to make a survey of at least one mine with the idea of promoting better safety conditions in the particular mine visited. A detailed report of this inspection should be submitted, with recommendations, to the Central Safety Committee.
- (8) Keep in touch, as far as practicable, with all new safety devices or methods developed for the prevention of accidents in their particular industry.

Mine Safety Committees

- (1) Report and review all accidents occurring in the particular mine.
- (2) Consider suggestions and recommendations submitted by members and others regarding accident-prevention methods, sanitation and welfare.
- (3) Submit for approval to the Central Safety Committee such recommendations as should become part of the company's standard practice.
- (4) Initiate and arrange for the carrying on of educational work in accident prevention among employees of the mine concerned.

The Court of Inquiry should be a special committee,

appointed as accidents occur, by the chairman of the Mine Safety Committee to investigate the serious accidents and fatalities. The organization of the Court of Inquiry would comprise the mine superintendent as chairman, the camp doctor, the safety engineer, the foreman in charge of the employee who was injured or killed, and witnesses to the accident. The duties of this Court of Inquiry would be to determine the cause and the responsibility for the accident. A questionnaire compiled along the following lines may serve as a guide to this committee:

- (1) Date of the accident.
- (2) Doctor's statement as to physical condition of injured when visited by him.
- (3) Foreman's and assistant foreman's report of the accident.
- (4) Witnesses' reports of the accident, supplemented by photographs, drawings or other data relating to the physical conditions of the plant or machine where the accident occurred.
- (5) Consideration by chairman, mine superintendent and safety engineer of data presented by those interviewed and findings by the members of the committee as to
 - (a) Cause of the accident.
 - (b) Responsibility for the accident.
 - (c) Recommendations to prevent a recurrence.
- (6) These findings should be submitted in a report to the president and other executive members of the company through the chairman of the Central Safety Committee.

Duties of Mine Safety Engineer.—To head up this plan and to be responsible for the detailed operation of it, it is suggested that a mine safety engineer be charged with the duties as listed below:

- (1) Have general supervision of all safety work.
- (2) Make regular safety inspections of all mines accompanied by a mine official.
- (3) Where necessary, expedite all safety recommendations.
- (4) Analyze all accident reports and investigate all accidents for the purpose of taking steps to prevent their recurrence.
- (5) Inspect all mine-rescue apparatus for the purpose of seeing that it is in readiness for any emergency.
- (6) See that all first-aid stations are properly maintained.
- (7) Check all drawings and co-operate with the operating and construction departments that safety standards in physical conditions of the mines are maintained.
- (8) See that proper safety specifications are provided for new equipment.
- (9) Follow up machinery contracted for from outside shops to see that standard guards are provided where required.
- (10) Supervise and conduct all safety educational work.
- (11) The development of safety bulletins should be under his supervision as well as the provision of standard danger signs to be used where necessary throughout the mines.
- (12) Attend all safety committee meetings and act in an advisory capacity and, as secretary to each committee, prepare all reports.
- (13) Under the direction of the mine superintendent institute all hearings of courts of inquiry and prepare reports of same.
- (14) Supervise all training of first-aid and mine-rescue teams.

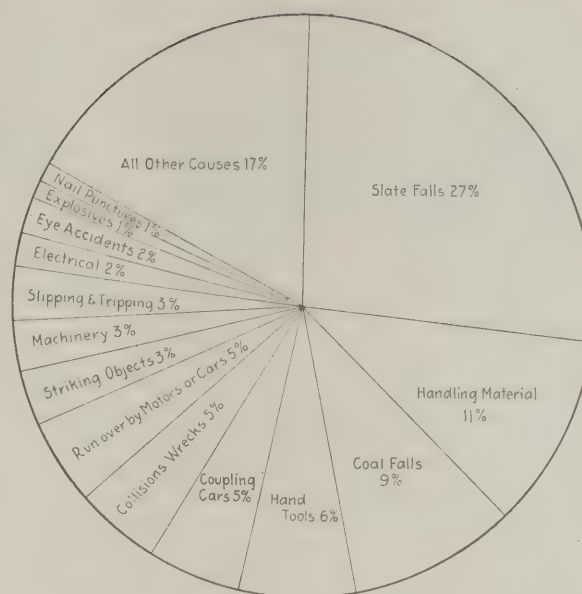


FIG. 3—CLASSIFICATION OF ACCIDENTS BY CAUSES
The more important causes of accidents will be recognized as those peculiar to the mines.

- (15) Supervise the general sanitary conditions of all mine camps.
- (16) Supervise the organization and maintenance of all fire-protection methods and equipment applied to the mines and camps.
- (17) Submit to the management a monthly report of the activities of his department involving
 - (a) Number of lost-time accidents—time lost.
 - (b) Number of non-lost-time accidents.
 - (c) Total number of accidents.
 - (d) Causes of lost-time accidents.
 - (e) Costs involved through lost-time accidents, non-lost-time accidents, and departments or mine sections involved.
- (18) Be responsible where the occasion requires for handling all details relative to workmen's compensation.

Safety Education.—In conjunction with committee organization, one of the most important requirements for efficient accident prevention work is education through the following or similar methods: (a) Bulletin boards, (b) payroll inserts, (c) home-made bulletins describing mine accidents with suggestions of prevention, (d) publication monthly of the comparative accident standing of the company mines in general and sections of the individual mines with the names of the foremen in charge of such sections. These ratings should be posted on the bulletin boards as well.

It has been observed that although many coal companies have gone to considerable expense in providing bulletin boards they do not always appear to realize what they should on their investment because the boards are not properly maintained. Bulletins are always a source of interest to employees and form one of the most important links in the chain of safety education.

It is suggested that a safety bulletin board service be developed in the following detail:

- (1) Accident-prevention bulletins should be placed on a well-constructed board devoted entirely to this use.
- (2) These boards should be located at points where employees congregate in leisure hours. Such places may be check boards, near entries to mines, outside of time offices, at first-aid stations or other gathering places.

(3) Bulletins should be changed frequently; preferably each week and on a scheduled day.

(4) The type of bulletin posted should be varied by using (a) those of the National Safety Council; (b) cuts from publications relative to hazards of the coal-mining industry or sections of it; (c) home-made posters exhibiting defective material or tools that may cause or have caused accidents. Such bulletin should be placed as near as possible to the section of the mine in which the accident occurred or in which the hazard illustrated is most closely related to the work of the employees. This method will make the most direct appeal.

(5) One bulletin at a time should be used. Four or five posters on the board at one time scatter attention and lessen the educational effect of the point dealt with.

(6) At regular intervals there should be placed on the board graphic presentations of department or sectional standing, also the standing of the various mines in relation to one another. This can be done by showing the number of lost-time accidents in a department or section and the days lost through such accidents. By applying this method to the several mines, accidents and days lost may be totaled for the mines as a whole, so that the accidents and days lost for each mine may then be compared.

(7) It has been found effective to mail to the homes of employees bulletins having an appeal to employees' dependents. This is done in order to obtain the co-operation of families in the work of reducing accidents.

(8) Instead of destroying old and discarded bulletins, they should be given to the local school teachers, police or fire departments.

Probably one of the most effective means of education in accident-prevention work is to bring to the attention of employees at frequent intervals information regarding the subject through the use of payroll inserts. If possible these inserts should be developed from actual company accident experience.

In this case it was suggested that the fifteen mines of the company be put on a monthly competitive basis, through the listing of the number of lost-time accidents occurring, naming the foreman in charge of the particular section in which the accident occurred, and by showing the estimated days lost due to accidents under the various foremen listed.

In connection with placing sections of individual mines on a competitive basis it has also been found practical to have camps compared as units, thus creating a friendly rivalry between the various mines of the company. Successful results frequently are obtained along the line of comparative safety standings through the use of targets, thermometers and other methods of portraying graphically to the employees the number of lost-time accidents occurring in each mine with the total

days lost due to these accidents and the consequent effect on coal production.

New Employees.—Casualty statistics indicate that a large percentage of accidents happen to new employees. The company has taken definite steps to control these hazards by issuing rule books to new employees. Rule books should be developed having more specific facts bearing on the causes of accidents. Such information can be easily obtained through an analysis of the present accident statistics and thereafter rules developed which will concretely apply to specific classes of hazards. The development of such a rule book might be made a part of a program of the safety committees. When undertaken by such committees the preparation of rules invariably has the effect of acquainting the employees with the serious hazards of their work and methods of offsetting them. When the rules are developed by the employees themselves they are likely to be adhered to more closely.

It should be a part of the duties of safety committeemen in the various mines to instruct new men in the elements of the safety rules. Such a practice increases the interest of the old employees and puts the new man on a footing of greater confidence with the men with whom he is about to associate daily on the job.

In order that the personnel of the safety committee may attain standing in the mine or community it has been found practical to designate the members of the safety committee through the use of safety buttons or badges. The safety buttons or badges usually are given to a man at the time of his election to the mine safety committee, and he retains it as a token of appreciation by the company for his interest in accident-prevention work.

Many companies have found it helpful to hold at least once a year a large mass meeting of all employees and their families, with the primary purpose of promoting accident prevention. Sometimes these meetings are conducted in the summer in the form of outings; at other times they are held in the winter in theaters or large halls. This method probably is one of the best means of enlisting the aid of employees' families in safety practice. When rallies are held in the hall, one or two reels of motion pictures on causes of accidents have been found effective.

To launch the proposed program of safety organization in this company's camps it was suggested that a general meeting be held in each of the camps, at which time the employees may be addressed on the importance of the work to be undertaken, what lost-time accidents have meant to them through diminished wages, and how their personal efforts are the largest factors in controlling the accident situation. Such talks could be supplemented with motion pictures on mine accidents.

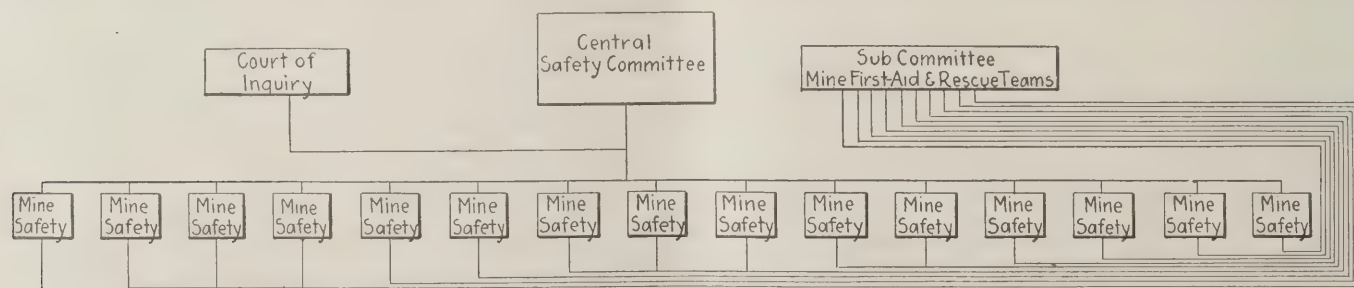
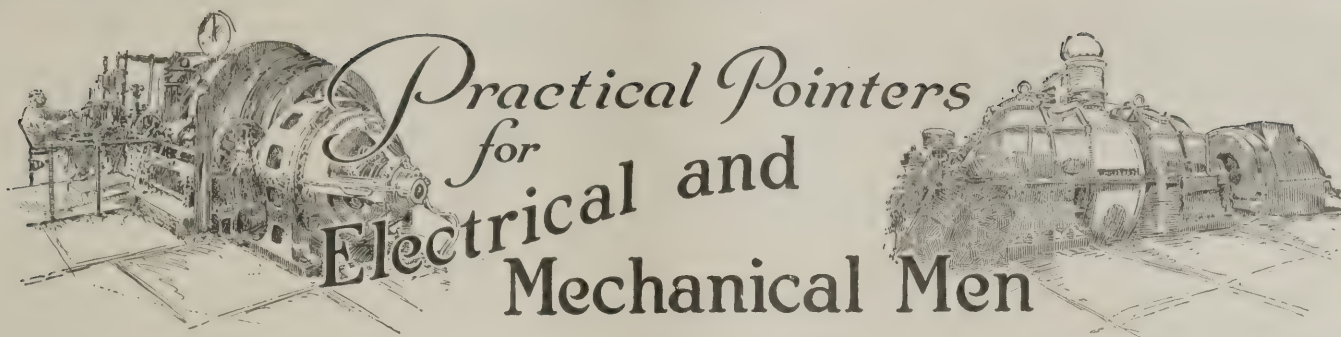


FIG. 4—RECOMMENDED ORGANIZATION FOR PROMOTING SAFETY

The most important feature of this plan is the subcommittee, through which the co-operation of the men can be gained.



Drilling of Brass Made Easy By Properly Shaping the Drill

INDUSTRIAL brass is divided into two classes, cast brass and wrought brass. Cast brass varies in its zinc content from 30 to 40 per cent. The popular proportion is 35 per cent zinc and 65 per cent copper. If a small percentage of tin is in the mixture the drilling will be considerably easier. Often brass will be found to be exceedingly soft and ductile dragging severely under the cutting action of the tool. When drilling this kind of brass the work can be made somewhat easier by seeing to it that the drill is ground properly and that a lubricant is used which will really assist the drill in cutting and not cause digging into the work.

The one most important thing is the resharpening of the cutting edge of the drill which has been ground to the usual commercial shape. The cutting edge on the lip of the drill should be ground in a way that will eliminate the angle of keenness. It is this wedge-shaped lip of the drill that causes it to dig into the brass especially on sheet brass and brass low in tin content. The accompanying sketches give a better idea of the drill lip before and after grinding. The grinding of the drill lip to this shape can be facilitated by grinding on the side of the wheel and not on its face. Drills ground for

drilling brass must be reground to their normal cutting edge when again used for steel and cast-iron drilling.

Brass usually is drilled dry, but lard oil is used on very high speed work. On a job where the drill is digging into the work, however, a few drops of kerosene or cutting compound may be used as a lubricant. A good, cheap cutting compound that will be found useful around a shop is made as follows: 1 lb. sal-soda (carbonate of soda), 1 qt. lard oil, 1 qt. soft soap and enough water to make 10 gallons. Boil this mixture one half hour. This solution may be stored, in the same manner as oil and used for cutting-tool lubricant at a considerable saving in cost.

G. H. RADEBAUGH.

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Use of Borehole Cables for Efficient Power Distribution

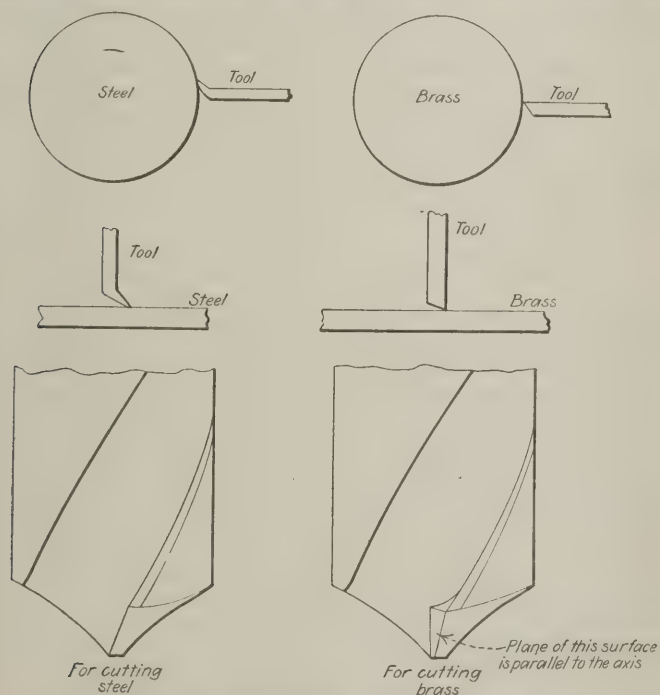
ONE of the important advantages resulting from the use of central-station purchased power at coal-mine operations is the use of alternating current and the relative ease with which it is possible to deliver electrical energy at that voltage which is most effective for each piece of equipment. Substations can be located at points most convenient to the center of the load so as to deliver power with the minimum voltage drop and best regulation.

The general tendency is to have the power company deliver energy at a point on the property where its distribution may be made to the equipment through short distributing lines and cables. The best modern practice for the delivery of electrical energy to substations located inside the mines is by means of insulated cables placed in boreholes. This system of distribution may be employed to advantage whether the mine be of the shaft, slope or drift type, except in special instances where the topography of the surface makes such an arrangement impracticable.

For economical reasons the mine substation usually should be located underground and supplied by high voltage current. This is true whether the substation be a converting station for changing alternating current to direct current or whether the substation be a transformer substation feeding alternating current to hoist, pump, compressor or similar drives.

With the more extended use and development of the full automatic converting substation, this practice may be changed or modified. In any event, boreholes for carrying cables of either high- or low-voltage ratings to the inside mine-distributing center will continue to be a necessity if the economies of operation demanded by modern operating conditions are to be realized.

There are still many operations at which the generating or transforming equipment is located in a sta-



CUTTING EDGES FOR STEEL AND BRASS

In turning, planing or drilling steel the cutting edge is shaped to cut into the metal, while for brass the cutting edge is made perpendicular to the brass surface so as to have a scraping action. It is important on drills to have the plane of the cutting edge parallel to the axis of the drill.

tion at or near the mine opening. It is advisable and may later become necessary, however, to locate an inside substation and deliver the electric power at the working face with a minimum voltage drop. In such cases an underground substation or inside electric power distributing center will be advisable and the surface connection will be by means of insulated cables installed in boreholes properly cased and sealed.

When such equipment is installed it is most important that provision be made for the proper placing and protection of the casing in the borehole, the cable suspension and the cable insulation.

Present practice is to drill the borehole from 2 to 3 in. larger than the outside diameter of the casing or conduit to be used, and fill the space between the casing and borehole sides with cement in order to protect the casing properly and also prevent water seepage. Where ordinary pipe casing is used it should be thoroughly cleaned on the inside and given a protective coat of some compound that will prevent corrosion. Plain black iron conduit can be bought in sizes up to 5 in. and, inasmuch as such pipe is made smooth on the inside and has a protective coating, its use is desirable in all cases where an inside diameter not exceeding 5 in. meets the requirements.

It is imperative that the top of the borehole be thoroughly sealed and protected so as not to admit air or water. The casing has a natural tendency to condense moisture when air circulates in it. With the top sealed, however, there is practically no air movement and the heat generated in the cables readily dissipates any slight moisture that may be present.

When the transformation from alternating current to direct current is made on the surface, larger and heavier cables are necessary than in cases where this transformation takes place underground. This is true because of the much greater currents, at the low-voltage direct-current, which must be transmitted through the borehole cables to the mine workings.

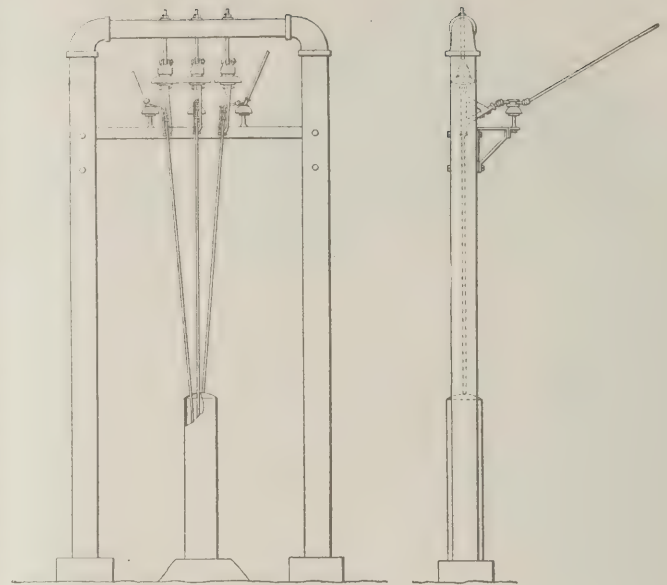
Though insulating problems increase as the voltage is raised, present knowledge of insulating materials makes possible a thoroughly reliable and practicable cable for use at any voltage that is likely to be employed. These cables are not only electrically safe but also are mechanically strong enough to withstand the stresses and strains they must bear.

The usual direct-current voltage employed is 250/275. Occasionally 600 volts direct current is used. The alternating-current voltage most frequently used is 2,200. There are few cases where a voltage in excess of 6,600 will be required.

For 2,200-volt service or higher, lead-covered iron-armored triple-conductor cable with steel supporting wires is highly satisfactory. In fact, in certain cases the use of this type of cable is imperative. In many cases, however, single conductor cables with weather-proof insulation but without lead covering or armor, are preferable.

It is essential that all steel armor or supporting wires be thoroughly protected from the action of moisture and mine air, in order that corrosion may be prevented. Such a cable often is difficult to handle because of its weight, and it also has the added disadvantage of being extremely difficult to repair in case of failure. With iron-armored cable a special supporting device is used, so located as to place the weight of the cables directly on the borehole casing.

When single conductor cables without lead covering



BOREHOLE CABLE SUPPORT

These supports can be made very efficient and yet reasonable in cost by the use of standard line equipment and material commonly used about a coal mine. The borehole casing should be effectively sealed to prevent corrosion by moisture condensation inside the pipe.

or armor are used, the entire weight of the cables is carried by the copper conductor and supported on a frame built directly over the bore hole. Local conditions will usually determine the character of this support, but in any event, it will be relatively inexpensive. By reference to tables showing the weights that copper conductors of various size will support, the maximum permissible length of cable for a given size can be determined without difficulty.

The ease with which borehole cables can be removed for inspection and repair, of course, is dependent on whether armored or unarmored cables are employed. In the former case, removal is necessarily very difficult because of the weight and relative inflexibility of the cable, whereas the unarmored single conductor cables can readily be brought up for inspection and repair by the men employed at the mine. With ordinary care in the installation and maintenance of borehole cables, defects are not very likely to develop.

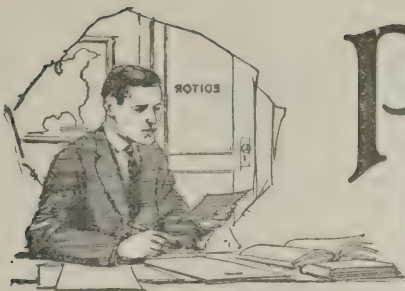
BOREHOLES WARD OFF ABRASION, MOISTURE AND AIR

In cases where it is desired to carry a mine telephone circuit down the borehole alongside the power cables, it is essential that the telephone circuit be enclosed in a thoroughly grounded metallic covering. Often it may be deemed advisable to carry the power cables down a borehole made expressly for the purpose, even though the hoisting or ventilating shafts may be conveniently available. The borehole affords the cables protection from abrasion, moisture and air, as well as from other disturbances encountered in open shafts, which in almost every instance more than justifies the additional expenditure required for cable boreholes.

The advantage of mine substations connected to the outside by cables installed in boreholes will be increasingly evident. The substation can be readily located at accessible and convenient, yet out of the way, points, and can be moved as required and make possible most efficient application of electric power to the mine workings.

Pittsburgh, Pa.

CHARLES M. MEANS,
Consulting Engineer.



Problems of Operating Men

Edited by
James T. Beard



Use of Steel Track Ties in Heavy Motor Haulage

Efficiency in Heavy Traffic Doubted—Instance of Wooden Ties Replaced by Steel Ones—Useful in Rooms, Pillarwork and Back Entries

THE reply given to the inquiry regarding the use of steel track ties, in mines where heavy motor haulage is employed, expresses the opinion that there are limitations to the use of steel ties in mine tracks and asks for the experience of others in this regard. My own conclusion accords with that expressed by the editor, namely, that steel track ties are not as efficient where 10- and 12-ton locomotives are in use.

Experience with the Fairmont, Cambria and Carnegie steel mine ties leads me to say that, while the ties are useful and efficient wherever it is practicable to use them, I do not consider that main haulage roads in mines is their province. When taking charge of the Raleigh Wyoming Coal Company's mines, at Edwight, W. Va., as superintendent, I found all the mine roads laid with steel ties.

DIFFICULTY EXPERIENCED WITH STEEL TIES

There was so much difficulty in keeping the tracks in alignment on the main road, that I found it necessary to replace the steel ties with wooden ones, in order to secure a more stable track. The wooden ties enabled the track to be properly aligned, ballasted and surfaced, which I had found practically impossible to accomplish with the steel ties.

Let me say, however, I consider it good practice to use steel ties, in combination with the wooden ones, on main haulage roads, spacing the steel ties about 10 ft. apart. The use of the steel ties, at intervals of 10 ft., prevented the spreading of the track, in case a section of wooden ties failed because of dry rot.

It will often happen that wooden ties will get in this condition and give way before they are discovered, even in the best managed mines. Where dry rot has set in, the weakened condition of the tie does not appear on a casual inspection of the track; but a derailed car will quickly find the weak part and the result is a wreck of the entire trip, before it can be brought to a standstill. A few steel ties spaced between the wooden ones will generally prevent this accident and avoid delay in haulage on the main roads.

It is my belief that the province of steel mine ties is largely in rooms, pillarwork and back entries or air-courses that are cut off every 200 or 300 ft., making it necessary to pick up the track in sections and move it forward. Steel ties can be used with great success for extension or jumper rails, until the face of a working place is advanced far enough to permit the laying of a

full length of rail and permanent track. Also, steel ties may be used to great advantage on all temporary tracks, in haulage roads.

Charleston, W. Va.

J. W. POWELL.

ANOTHER LETTER

Steel ties give satisfaction under 15- and 20-ton locomotives—In use for 10 years in another mine putting out over 5,000 tons of coal per day, with 8-ton locomotives.

REGARDING the use of steel track ties, in heavy motor haulage in mines, permit me to say that we have been using these ties in the mines of the Old Ben Coal Corporation for many years and they have given good satisfaction. In our Mine No. 16 we are using ties under 15- and 20-ton locomotives.

Our oldest installation of this kind is at Mine No. 9, West Frankfort, Ill. We started this mine, in 1913, with a complete bottom layout of steel ties on our main haulageways. When the installation was first completed, we were using 6-ton locomotives; but, during the past six years, we have employed 8-ton locomotives entirely, in that mine.

The fact that during this period, Mine No. 9 has produced from 5,000 to 5,500 tons, each day that the place has worked, gives a fairly good idea of the traffic conditions. I am advised by Superintendent Dunn, in charge, that it has never been necessary to replace a steel tie, in the bottom layout just mentioned.

While there are, no doubt, many mines where the local conditions are such as to render the use of steel ties unsuitable, that is not the case in our field, where we have found their use very much worth while. The question of whether steel ties will stand up under heavy locomotives is best answered by saying, Select a tie that is heavy enough to take care of the duty required.

P. W. BEDA, Vice-President,
Old Ben Coal Corporation.

Chicago, Ill.

Keeping Water Out of Slope

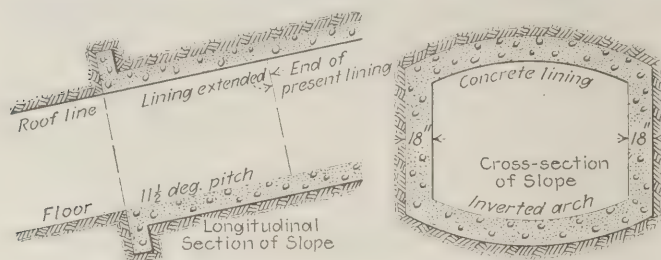
Shallow mines liable to be flooded in wet seasons—Concrete lining must include inverted arch at the floor.

THE difficulty encountered by Joseph Magdalena, regarding the flooding of his slope mine during a rainy season, as described in his letter, *Coal Age*, Aug. 23, p. 291, is no doubt typical of most shallow mines. He explains that, after going to the trouble and expense of lining the top and ribs with solid walls of concrete 18 in. in thickness, the water still came in through the floor of the slope.

His proposal to place a door at the inby end of this concrete lining, at the foot of the slope, has the objection that it would not be possible to work the mine during a flood. The loss on this account, together with the addi-

tional cost of pumping the water from the 300-ft. slope, he would find a large item—too large indeed to be considered from an economical standpoint, in the operation of a mine.

Allow me to suggest lining the floor of the present tunnel with a concrete lining, in the form of an inverted arch, as shown in the accompanying figure. If this work



LONGITUDINAL AND CROSS-SECTION OF SLOPE

is done in sections and care taken to give the concrete floor a good bedding and to secure a watertight joint with the lining of the ribs, I believe the plan will wholly eliminate the trouble, by preventing the seepage of water with which he is now contending.

To insure a complete job, let me say the concrete lining, including the roof, sides and floor, should be extended a distance down the slope to where the coal is found to be solid and free from breaks. At that point, the lining should be extended in wings to give it a better connection with the strata, as I have indicated in the longitudinal section shown in the figure. The depth of these wings will naturally depend on the nature of the strata. Finally, should the lining at any time show signs of leakage, a cement-gun should be used to make it watertight.

CYMRÖ.

Superior, Colo.

ANOTHER LETTER

Work of lining the slope incomplete—Flooding of the mine only what might naturally be expected—Lining should have been in the form of a barrel.

AFTER carefully reading the letter of Joseph Magdalena, *Coal Age*, Aug. 23, p. 291, asking for suggestions regarding the best means of preventing the flooding of his slope mine, which has occurred always at the time of the spring rains, my conclusion is that the work done in lining the slope was incomplete.

The inquirer says that the slope was started in a bed of quicksand 30 ft. deep and driven on an inclination of 11½ deg. Because the mine was twice drowned out, by water running down the slope, that opening has been lined with 18-in. concrete walls and roof, extending down both sides of the road a distance of 300 ft. to the coal, at a cost of \$9,000.

The statement that, in spite of all this, water continued to seep down behind the walls and came up through the floor, shows that the result was only what one would naturally expect. To my mind, the work was only three-fourths complete, as the floor of the slope was still left exposed and unprotected.

My plan would be to line this slope with an extra good brick wall, in the form of a barrel, and further protecting this with an inner lining of concrete. At the entrance or portal I would build a wall about 4 ft. high to prevent any water running into the slope at the mouth. This double wall of brick and concrete should be extended to the coal, which should be sheared to present a

good solid face. Beyond this point, the concrete lining should be extended say 20 ft. along the coal ribs.

Such a plan I feel sure would have put an end to any further trouble from water entering the mine through the slope. As the work progressed, the track should be laid on a good bedding of waste material held in place by crossboards. This ought to provide the needed protection and prevent any damage being done to the slope lining should cars be derailed.

With regard to the steel door, which the inquirer proposed to build at the foot of the slope, I fail to see the need of such a trap. In my opinion, it would be both useless and dangerous. Allowing the mine has another opening that would permit of the place being worked at the time of a flood, neither could the door be made watertight or capable of withstanding the great pressure, estimated as 112 tons when the slope is full of water.

Before closing, let me say that if the mine openings extend under a creek bottom, there should be heavier walls of brick and concrete, at that point, to guard against a possible break in the strata and the flooding of the mine by a sudden inrush of water from the creek.

OSCAR H. JONES,

Wilder, Tenn.

District Mine Inspector.

Finding the Remedy

Ineffectual efforts to prevent the occurrence of explosions in mines—Regarding the situation broadly—Ventilation the greatest need.

MANY have been the causes assigned by different writers, in *Coal Age*, as being responsible for the continued occurrence of mine explosions. The lack of discipline in the mine, bad practices of miners, inefficient management on the part of mine officials and even the prevalence of strikes have been referred to as producing conditions that bring about mine explosions.

While all of these items have their place and contribute to disaster to a greater or less extent, I cannot regard them as being chief causes of explosions. If military discipline prevailed in a mine, that would not prevent an explosion of gas or dust if the ventilation was insufficient and the air current not properly conducted through the workings, so as to keep the places clear of gas and safe for work.

Numerous efforts have been made by the government to ascertain just the conditions under which explosions take place and to find a remedy for their occurrence. It seems to me, however, that many of these efforts have been wasted. To my mind, instead of training men so largely in rescue work, why not start at the other end and take means to urge the need of better ventilation.

NEED OF A BROADER VIEW OF SITUATION

It would seem almost as if we had concluded that the occurrence of explosions in mines is part and parcel of the coal industry. Now, I am a great believer in first-aid training and rescue work; but let that have its place and let us give greater heed to ventilating our mines in a way that will make them immune to such occurrences.

Perhaps I am wrong, but it seems to me that we do not regard the situation as broadly as we should. I am reminded, just here, of a story told me when I was a boy. A mule crossing a bridge spied a knothole in one of the planks near the side of the bridge. The mule imagined that he could fall through that knothole and, to avoid the danger, ran sideways till he fell off the other side of the bridge and was drowned.

We sometimes become so absorbed in our study of certain methods, that we fail to heed more important things that should receive our attention. Like the mule, our eyes are riveted on the knothole. For my part, I do not believe that mine explosions are a necessary part of the work of mining coal. I believe that, with good ventilation and more uniformity in our mining laws in the different states, explosions in mines can be eliminated.

Parnassus, Pa.

C. W. ATKINS.

Inquiries Of General Interest

Essential Requirements of the Hydraulic Ram

Province of the Hydraulic Ram—Energy
of Flow in the Drive Pipe Proportioned to
the Ratio of Pumping Head to Supply Head

WE HAVE made several attempts to install a hydraulic ram for the purpose of forcing water from a supply basin located about 50 yd. distant and lifting it into a tank elevated 40 ft. above the ground. A pump was formerly used to pump the water from this reservoir into the tank, which forms the main supply at the plant. To avoid the necessity of operating this pump we desired to replace it with an automatic ram, which is not wholly satisfactory.

The surface of the water is from 6 to 8 ft. above the ground where the ram was placed, and the lift to the surface of the water in the tank is 40 ft. We used a 2-in. pipe to conduct the water from the supply basin to the ram and the same size of pipe is used to carry the water from the ram up into the tank. I should state, here, that the supply pipe is carried over the dam of the reservoir, instead of being laid in a ditch, and, on this account, the pipe line acts as a siphon at that point. I want to ask if that hinders the action of the ram. Also, kindly explain what are the essential requirements for successful operation.

—, Ky.

MINE SUPERINTENDENT.

In regard to the siphoning action, at the head of the supply pipe where it is carried over the dam, the only effect is to increase the pipe resistance by reason of its increased length. The effective head in the drive pipe is the same as if the line of pipe was straight. The head is measured, vertically, from the surface of the water in the reservoir to the level of the overflow valve, as indicated in the accompanying figure. As a result of increasing the length of the pipe by carrying it over the dam, the velocity of the flow in the drive pipe is decreased slightly. It is assumed that all the joints are airtight and the mouth of the pipe is fully submerged.

The province of a hydraulic ram is to furnish a means of lifting water automatically through a height greater than the supply head. This is accomplished by utilizing the energy of the water flowing in the drive pipe under gravity, by transmitting that energy to the water in the column pipe. In the figure is shown a diagrammatic elevation of the arrangement of a

hydraulic ram with reference to the supply basin, to which it is connected by the drive pipe. The pipe should have an inclination of, say not less than 1 in 6. Too small an inclination will reduce the efficiency of the operation, while too great an inclination causes too great a strain on the pipe and the valves.

The action of a hydraulic ram is wholly automatic when the two valves have been properly adjusted to suit the conditions. It will be observed that the overflow valve *A* acts upward, in closing; while the discharge or clack valve *B*, at the foot of the air chamber, acts downward, in closing. At the start, the overflow valve is open and the discharge valve shut, these positions being due to the gravity of each valve. The water flowing from the supply basin through the drive pipe escapes through the overflow valve, until the increasing velocity closes that valve suddenly. The impetus of the entire mass of water in the drive pipe, at that moment, acts to force the discharge valve upward, against the pressure and head of water in the air chamber and some of the water enters the air chamber. The action is only momentary, however, and the compression of the air in the chamber overcomes the impetus of the water and again closes the valve *B*. In the recoil that follows, the overflow valve *A* drops and water again escapes at that point, until its velocity is sufficient to force the valve upward, closing it as before and repeating the rush of more water through the discharge valve into the air chamber.

The connection of the column pipe with the air chamber is indicated by the dotted circle near the

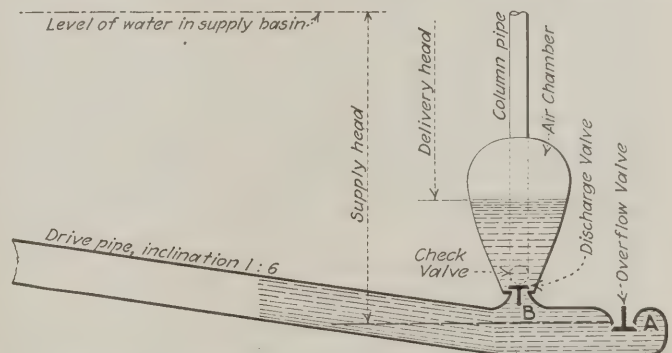


DIAGRAM ILLUSTRATING THE HYDRAULIC RAM

bottom of the chamber. At this point, there is another valve not shown in the figure. This is a check valve, acting to prevent any back flow of water from the column pipe into the chamber. It will be understood that the compression of the air in the air chamber acts to force the water from that chamber into the column pipe at each throb or stroke of the system, the closing of the discharge valve *B* being immediately followed with the opening of the check valve at the foot of the column pipe.

The successful operation of a hydraulic ram depends largely on the correct adjustment of the overflow valve. The weight of the valve is partially supported by a spring or counterpoise that enables the valve to act freely between the atmospheric pressure and its gravity and the impetus of the rushing water escaping at that point. The length of the drive pipe plays an important part, by reason of its greater or less resistance to the energizing flow from the supply basin to the ram.

The ratio of the delivery head to the supply head must be proportioned to the length of pipe, this ratio

decreasing as the length of drive pipe increases. In practice, the ratio of the delivery head to the supply head may vary from, say 5 to 10, depending on the length of drive pipe. A common rule for determining the diameter of drive pipe required, for any given quantity of water desired, is to multiply the required quantity of water to be delivered (gal. per min.), by the ratio of the delivery head to supply head and extract the square root of $\frac{1}{2}$ of the product.

For example, in the present case this ratio being $40/8 = 5$, for a delivery of, say 100 gal. per min.,

the required diameter of drive pipe would be $d = \sqrt{\frac{1}{2}(5 \times 100)} = 6\frac{1}{2}$ in. It is well to make the diameter of the delivery pipe from 0.4 to 0.5 times that of the drive pipe, giving in this case, say from $2\frac{1}{2}$ to 3 in. We would suggest using, in the present case, a 6-in. drive pipe and a 3-in. delivery pipe, for a flow of 100 gal. per min. into the tank.

The hydraulic ram is so wasteful of water that it cannot be recommended for pumping, except where the supply of water is inexhaustible. The water pumped rarely exceeds 10 per cent of the flow from the basin.

Examination Questions Answered

Mine Foremen's Examination, Olympia, Wash., Aug. 1, 1921

(Selected 1st-Class Questions)

QUESTION—A seam pitching 27 deg. 30 min., has a slope driven for a depth of 2,655 ft. on the seam. The elevation of the top of the coal, at the slope mouth, is 1,910 and the surface elevation directly over the bottom of the slope, is 1,872 ft.; what is the cover over the bottom of the slope?

ANSWER—The vertical fall of the slope, from its mouth to the bottom, is $2,655 \times \sin 27^\circ 30' = 2,655 \times 0.46175 =$ say 1,226 ft., which makes the elevation at the foot of the slope $1,910 - 1,226 = 684$ ft. Then, subtracting the elevation on the top of the coal at the slope bottom, from the surface elevation above that point, gives for the depth of cover at the foot of the slope $1,872 - 684 = 1,188$ ft.

QUESTION—What are the essentials in pillar drawing to insure safety and economy?

ANSWER—In planning the work with reference to the safe and economical drawing back of the pillars, due regard must be had for the relative width of pillar and opening, which must be determined by a careful study of the conditions relating to roof, floor and seam, including the depth of cover, thickness and inclination of the seam and the possible presence of gas and water or slips and faults in the strata. The pillars must be of such a size as to avoid the occurrence of a squeeze, which would crush the pillars and make their extraction difficult and dangerous. Only experienced men must be employed in the work of drawing pillars. If gas is present in the roof or floor care must be taken to avoid danger from its accumulation on the falls and only safety lamps or electric cap lamps must be used. Before the work of drawing pillars, in a section of the mine, is completed, the possible effect on adjoining sections and on the surface must be carefully studied. It is important to keep the breakline across the ends of the pillars in a practically straight line.

QUESTION—How many tons of coal is there in a room 325 ft. long and 22 ft. wide, on a seam of coal 4 ft. 8 in. in thickness?

ANSWER—Not knowing the specific gravity of the coal, which may vary from 1.2 to 1.5 or more, it is only possible to assume an average weight of 1.3 \times

$62.5 = 81.25$ lb. per cu.ft., for this coal in the solid. The cubic contents of the room is $22 \times 325 \times 4\frac{2}{3} = 33,366\frac{2}{3}$ cu.ft. Finally, the weight of coal filling this space, on this assumption, would be $(81\frac{1}{4} \times 33,366\frac{2}{3}) \div 2,000 = 1,355$ tons. Or, assuming a weight of 80 lb. per cu.ft. for the coal, making $2,000 \div 80 = 25$ cu.ft. per ton of coal, the weight of coal, in the solid, in this room, would be $33,366\frac{2}{3} \div 25 = 1,334\frac{2}{3}$ tons.

QUESTION—What would you suggest to prevent, as much as possible, accidents from the following causes: (a) Falls of rock and coal; (b) mine cars and haulage; (c) injuries from shots and gas?

ANSWER—(a) To reduce to a minimum accidents from falls of rock and coal, there is needed careful instruction of the miners and close supervision of their work, during working hours; careful inspection of each working place; and maintaining discipline in the mine, by suitable punishment for any violation of mine rules and regulations or disobedience of orders. An ample supply of posts and cap-pieces of the proper size must be kept on hand and ready for use in every place.

(b) To reduce the number of accidents from the movement of cars in rooms and on haulage roads, no cars must be left standing where they will obstruct haulage on the main roads, or where they will be in danger of getting loose and running out onto the main track. Careful instructions must be given to the men in respect to cars left at the faces of rooms, or on side tracks, to make sure that they will not be moved from their position. Separate travelingways must be provided so that men will not be compelled to travel the main roads on their way to and from work. Where this is necessary, shelter holes must be provided and kept free of all obstructions, at regular short intervals on roads where rooms are not turned. All haulage roads should be provided with an ample clearance on at least one side of the track and continuous on that side. A carefully arranged schedule should be maintained providing for the movement of loaded and empty trips and a good signal system should be installed between the shaft bottom and inside partings. In slope haulage and on all inclines where cars must be hoisted or lowered, care must be taken to avoid accidents from the breaking of ropes or cars getting loose and running down the incline.

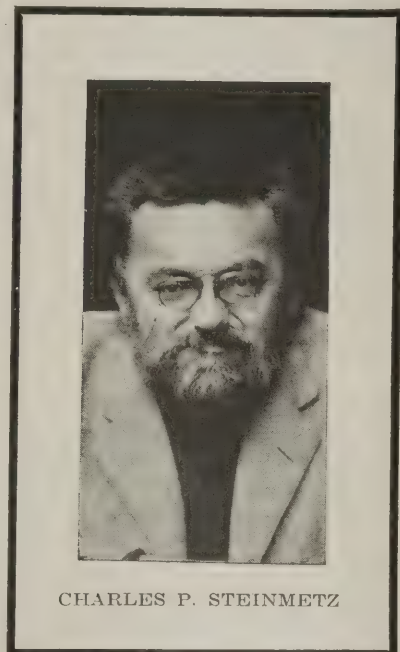
(c) To reduce the number of accidents in shotfiring and from the presence of gas, a careful inspection of the mine and working places must be maintained. The work must be done by competent shotfirers and fire-bosses and the former should be authorized to examine and pass on all holes drilled by the miners. The safest practice is to authorize the shotfirers to charge and fire all shots that in their judgment are safe, after the men have left the mine, examining every place for gas before firing a shot therein.

Steinmetz, Electric Wizard, Dies Suddenly

Dr. Charles Proteus Steinmetz, electrical scientist, died at his home at Schenectady, N. Y., Oct. 26. His death was due to heart failure brought on by a physical breakdown following a recent trip to the Pacific coast which overtaxed his vitality. For the last two weeks he had been under the care of a physician and nurse, but was regarded by them as doing well and as making progress toward complete recovery.

Charles Proteus Steinmetz was born in the old city of Breslau, in Silesia, on April 9, 1865. He obtained his education in the common and high schools of Breslau and in the famous university in his home town. He fitted himself for astronomy in the university at Breslau, but in the autumn of 1888 entered the great polytechnic school at Zurich, and studied mechanical engineering, turbines, steam engines, bridge construction and other such subjects. The next year he and an American fellow student with whom he had roomed came to America in the steerage of a French liner.

Soon after landing he obtained employment at Yonkers, N. Y., as a draftsman, at \$12 a week, in the office of Rudolph Eickemeyer, electrician, meantime pursuing his studies, at night, and writing scientific papers for the press.



CHARLES P. STEINMETZ

A few years later, in 1892, the establishment for which he was working was acquired with various others by the General Electric Co., and he was sent to Lynn, Mass., by that concern to have charge of one of its plants there. Thence, on Jan. 1, 1893, he was transferred to headquarters at Schenectady, as the chief consulting engineer of the General Electric Co., a place which he filled for the remainder of his life and in which his chief work was done and his most important inventions were made. In 1902 he became also professor of electro-physics in Union University, and continued in that office until his death. In 1912 he was appointed president of Schenectady Board of Education, and in 1915 was elected to the Common Council on the Socialist ticket. Last year he was the candidate on the Socialist ticket for State Engineer and Surveyor.

He was for a time president of the American Institute of Electrical Engineers, and was a member of numerous scientific and educational organizations. Harvard gave him an honorary A.M. degree in 1902, and Union University a Ph.D. in 1903.

He never married. In stature he was almost a dwarf, but he had a massive head and brilliant eyes, commanding the attention of everyone who saw him. His special interests in electrical science were magnetism, the symbolic method of alternating-current calculations, and transient phenomena; but there was scarcely a detail of any branch of electrical science, of astronomy or of mathematics with which he was not conversant in masterly fashion. His writings were voluminous.

The body of Dr. Steinmetz lay in state at his home Sunday. Burial took place Monday afternoon, after private funeral services, at Vale Cemetery in a plot which the inventor acquired several years ago. The Rev. Ernest T. Caldecott, pastor of All Souls' Unitarian Church, officiated at the services, assisted by the Rev. Dr. A. W. Clark.

Miners' Union Again Victorious In Coronado Case

Interstate Trade Conspiracy Not Proved, \$700,000 Verdict Voided—Individual Acts Do Not Make Organization Guilty—Case to Be Appealed

Under instructions from Judge John C. Pollock, a verdict for the defense was returned Oct. 27 in the U. S. District Court at Fort Smith, Ark., in the suit of the Coronado Coal Co. and associated corporations of the Bache-Denman Coal Syndicate against the United Mine Workers of America, in which damages of \$2,222,000 were sought as a result of alleged property loss and resultant interference with non-union mining in the Hartford Valley coal field of Arkansas in 1914. Henry S. Drinker, of Philadelphia, was counsel for the plaintiffs, and Henry Warrum, of Indianapolis, presented the union's case. The trial lasted two weeks.

This is the second victory for the miners' union, the U. S. Supreme Court having ruled last year that in the first trial, which resulted in a verdict of approximately \$700,000 for the plaintiffs, the coal companies had failed to establish a basis for the suit under the Sherman law, and ordered a new trial.

Judge Pollock held that the evidence had failed to establish a direct purpose to interfere with interstate commerce, but rather a conspiracy to prevent the operation of the mines as non-union workings. The ruling also pointed out that under the constitution of the United Mine Workers no individual can bind the entire organization; that until the executive board acts no one is bound except individuals who may be involved in any activity, and upon that ground he held that the International union was not shown to be bound by the acts of those responsible for property damage during the strike.

"Before the plaintiffs can ask for a verdict against the defendants or any of them," Judge Pollock said in directing the verdict, "they must establish a conspiracy to do what was done; they must establish that everyone against whom they ask judgment and a verdict knowingly participated in what occurred; they must establish not only that property was lost through the conspiracy but that the conspiracy was formed for the direct purpose of restraining or monopolizing interstate commerce.

"Almost every act affects interstate commerce. It was never the intention of Congress that anything except something directly interfering with interstate commerce should be taken out of the state jurisdiction. We must always have a line of demarcation. The Supreme Court, on much the same evidence, had placed this case on one side."

Judge Pollock held that the mining of coal is not interstate commerce and the fact that it may be shipped later in interstate commerce does not alter the situation.

On the question as to whether the evidence connected the general organization—the International union—with the Hartford Valley troubles, Judge Pollock said:

"They have the right to unionize the entire country. Not only have they unionized the coal miners of many states, but the evidence in this case shows they have members in foreign countries. Before they ask any one to become a member, he has a right to say: 'What obligation am I taking? On what terms? What powers have they to bind me to what they do, or to bind any money I have contributed?'"

"They have put these powers into the constitution and the Supreme Court has construed that constitution to mean that whenever the executive board representing all of them, put there for that purpose—that whatever they do binds every one of them. Until they do act, no one is bound but the individual. The international union is not bound."

Somewhat of a sensation was created when the plaintiffs produced as a witness Oct. 22 James McNamara, "captain" of the attacking forces which in 1914 drove the non-union miners from the field and caused the complete shut-down of the Bache-Denman Coal Co. properties in the Hartford Valley district.

McNamara was on the stand two hours, telling in detail of the alleged conspiracy to forcibly eject from the Hartford

Valley workmen and guards of the Bache-Denman company and to burn and dynamite the property. He told of speeches made prior to the trouble by himself and others. All of the speakers urged that the miners use no violence, but to go peaceably and persuade men at the mine to come out and join the union.

"What was the purpose of the speeches?" he was asked.

"To keep public opinion on our side," was the answer. "And, in case there should be any violence, to show that we went down there to get the men to join the union. I know that this is a practice everywhere when the mine workers have trouble with operators."

McNamara told of conversations with John P. White, International president of the United Mine Workers in 1914. P. R. Stewart, then district president, said, according to McNamara, "that he and White had arranged a plan to prevent Bache from producing coal." The witness, who served a two-year sentence following the Hartford Valley troubles on a plea of guilty to conspiracy to violate a federal injunction, said that he had been working as a non-union miner most of the time since he had been released from prison.

Pete Hanraty, former president of District 21, was another interesting witness for the plaintiffs. The former union official testified that it had been his practice as district president to notify International officers when an operator attempted to operate on the open-shop plan, because, he said, "it involves every district and the International because an open-shop or a non-union mine can produce coal cheaper than a union mine. If allowed to go on it is only a question of time until the union would go out of existence."

Roland Ford Barns, captain of mine guards; English Daugherty, 66-year old victim of an attack on the Prairie Creek mine, July 17, 1914; M. W. Weston, who operated a slope mine near the scene of the trouble in 1914, and U. S. Judge Frank A. Youmans were other witnesses for the plaintiffs.

Henry Warrum, defendant counsel, offered several objections to testimony presented by the plaintiffs, claiming that the higher courts had previously held that the identical testimony did not establish the grounds which the plaintiff claimed, but Judge Pollock overruled the objections.

Notice was given that the case would be appealed.

Union Combats Co-operative Mining Movement in Southwest

Operation of several mines in the Kansas field during the summer by miners on a co-operative basis has aroused union officials to an effort to stop what they term a drift toward the open shop in District 14. Meetings are being held at various towns in the district each Sunday and the miners are being exhorted to take no part in any operations that have not the union's sanction.

The first of these meetings was in Liberal, Oct. 21. There a resolution was adopted to the effect that the members regretted "any and all propositions along the line of co-operative or any other method than the joint agreement now in effect between operators and miners." The local pledged itself to work among other locals of its section to "secure their assistance in stopping the miners in this end of the field who are operating outside our organization."

BIDS OPENED by the U. S. Shipping Board on Oct. 25 for furnishing and delivering f.a.s. vessels New York harbor on Oct. 27 1,800 gross tons of either Pool 9 or Pool 71 bituminous coal brought prices from ten dealers, ranging from \$4.18 to \$5.25 per gross ton, or on a basis of about \$1.02 to \$1.97 per net ton f.o.b. mine. The contract was awarded to the Rhodes Fuel Co., the lowest bidder. Bids opened by the Board on Oct. 15 for the same quality of coal resulted in offerings ranging from \$4.47 to \$5.25 per gross ton.

PLANS FOR THE ANNUAL CONVENTION of the United Mine Workers of America will be considered at a meeting of the International executive board to be held Nov. 13 at 10 a.m. in Indianapolis, at the call of John L. Lewis, international president. Other matters, including the recent strike in the anthracite fields in Pennsylvania, will be considered by the board, which probably will be in session for a week or more. Plans for increasing the membership also will be discussed. The international convention will be held in January. At this meeting a tentative wage scale will be submitted to the membership in lieu of the present one, which expires April 1 next.

Coal Produced in the United States in 1922*

(In Net Tons)												
State	Loaded at Mines for Shipment	Sold to Local Trade and Used by Employees	Used at Mines for Steam and Heat	Made Into Coke at Mines	Total Quantity	Total Value	Average Value per Ton	Number of Employees				Average Number of Days Worked
								Underground Miners' Loaders, etc.	All Others	Surface	Total	
Alabama.....	17,376,060	360,811	290,187	297,682	18,324,740	\$42,856,000	\$2.34	16,615	6,528	5,026	28,169	215
Alaska.....	76,111	1,221	1,943		79,275	431,000	5.43	149	113	168	430	147
Arkansas.....	1,066,751	15,112	28,183		1,110,046	4,592,000	4.14	2,386	973	676	4,035	81
California, Idaho, and Oregon.....	17,011	3,662	6,220		26,893	104,000	3.87	20	25	15	60	250
Colorado.....	9,144,680	542,783	232,255	99,879	10,019,597	31,701,000	3.16	7,911	3,158	2,437	13,506	191
Georgia.....	41,809	535	2,114	16,178	60,636	246,000	4.06	68	23	59	150	242
Illinois.....	53,695,042	3,227,015	1,545,679		58,467,736	168,925,000	2.89	61,592	24,704	10,040	96,336	120
Indiana.....	18,142,677	537,310	452,902		19,132,889	54,524,000	2.85	20,605	8,288	4,315	33,208	110
Iowa.....	3,653,352	579,907	101,902		4,335,161	16,119,000	3.72	8,369	3,477	1,011	12,857	131
Kansas.....	2,797,291	96,831	61,048		2,955,170	10,816,000	3.66	5,093	1,319	947	7,359	125
Kentucky.....	40,554,793	991,145	534,578	53,659	42,134,175	127,037,000	3.02	34,189	16,207	10,528	60,924	140
Maryland.....	1,165,738	44,676	12,293		1,222,707	4,122,000	3.37	2,563	663	529	3,755	101
Michigan.....	855,917	13,814	59,659		929,390	4,693,000	5.05	1,335	639	192	2,166	162
Missouri.....	2,620,074	228,327	76,349		2,924,750	11,153,000	3.81	5,370	1,848	1,532	8,750	113
Montana.....	2,395,091	92,413	84,717		2,572,221	8,208,500	3.19	2,194	904	537	3,635	140
New Mexico.....	2,871,424	35,931	57,479	182,339	3,147,173	10,977,000	3.49	2,253	969	779	4,001	216
North Carolina.....	68,524	1,500	8,546		78,570	388,000	4.94	50	45	32	127	167
North Dakota.....	1,078,139	211,193	38,232		1,327,564	3,513,000	2.65	846	290	512	1,648	175
Ohio.....	24,434,491	1,953,222	566,078		26,953,791	87,056,000	3.23	34,134	11,772	8,288	54,194	100
Oklahoma.....	2,627,406	28,381	146,724		2,802,511	11,527,000	4.11	4,390	2,234	1,204	7,828	114
Pennsylvania (bituminous).....	94,939,698	5,130,548	2,214,591	10,863,471	113,148,308	351,777,000	3.11	114,541	44,910	29,387	188,838	154
South Dakota.....	450	7,302			7,752	22,000	2.84	32			32	138
Tennessee.....	4,546,552	111,977	113,854	104,391	4,876,774	14,096,000	2.89	6,996	2,537	1,916	11,449	163
Texas.....	1,076,595	12,557	16,855		1,106,007	2,563,000	2.32	1,994	541	306	2,841	185
Utah.....	4,530,382	61,930	99,282	300,414	4,992,008	15,687,500	3.14	2,302	1,327	1,092	4,721	204
Virginia.....	9,650,588	156,354	100,020	584,212	10,491,174	27,083,000	2.58	6,290	4,567	2,542	13,399	198
Washington.....	2,392,305	63,135	84,700	41,025	2,581,165	10,279,000	3.98	2,434	1,170	877	4,481	194
West Virginia.....	76,150,385	2,918,643	709,139	710,025	80,488,192	236,162,000	2.93	57,785	33,029	19,200	110,014	143
Wyoming.....	5,708,071	77,914	185,739		5,971,724	18,162,000	3.04	5,266	2,377	1,402	9,045	128
Total, bituminous including wagon mines.....	383,677,407	17,506,149	7,831,268	13,253,275	422,268,099	1,274,820,000	3.02	407,772	174,637	105,549	687,958	142
Pennsylvania anthracite.....	46,002,699	2,778,200	6,302,123		54,683,022	273,700,000	5.01	72,527	41,752	42,570	156,849	151
Grand total.....	429,680,106	19,884,349	14,133,391	13,253,275	476,951,121	1,548,520,000	3.25	480,299	216,389	148,119	844,807	144

* Statistics compiled by L. Mann, U. S. Geological Survey, Oct. 27, 1923. (1) Includes shotfirers also.

Wide-Margin Sales of Anthracite Waning, Says Trade Commission

Handling Charges by Wholesalers Shrinks from \$1 in Some Instances to 25c.—Resumption of Mining Disperses Panic Demand

"Anthracite wholesalers," says the second report of the Federal Trade Commission on anthracite, released Oct. 29, 1923, "are required to report to the Commission, as to domestic sizes only, their sales of premium or unusually high-priced coal. While excessive wholesalers' margins and scalping by wholesalers strongly tend to the undue enhancement of anthracite prices, an even more significant and equally objectionable cause of high prices is found in the exorbitant prices charged by some of the producers.

"Among these producers there is a very wide variation in the prices of coal at the mine, as shown by the reports made by the wholesalers to the Commission. The following tabulation shows for premium coal the proportion of carloads at different prices paid by wholesalers, for purchases from operators f.o.b. mine, for the week ending Oct. 6, 1923:

Price Range per Ton, f.o.b. Mine	Per cent
\$9.50-\$9.99	6.7
10.00-10.99	45.5
11.00-11.99	13.8
12.00-12.99	33.4
13.00 and over .....	.6
Total	100.0

"With respect to such premium coal, the reports obtained from wholesalers show that they paid in excess of \$11 per ton for nearly 48 per cent of the prepared sizes of anthracite purchased directly from a producer, and over \$12 per ton for more than one-third of such purchases.

"While the Commission has not yet made inquiry from the mine operators regarding their selling prices and cannot state, therefore, the proportion of high-priced or premium coal sold by all operators, it is a matter of common report that some of the larger companies are charging from about \$8.75 to \$9.25 per ton f.o.b. mine for domestic sizes, while other companies, as shown above, are sometimes charging over \$13.

"Such wide differences in prices in the present period of normal operation of the mines are neither reasonable nor necessary, and often become the cause, but still more often the excuse, for the excessive prices now being extensively charged to the consumer."

With respect to gross profits or margins of wholesalers, the report says that for each of the weeks ending Sept. 29 and Oct. 8 the number of cars of anthracite of domestic sizes reported as having been sold at \$10 or more per ton for nut and larger sizes, and \$8 a ton for pea coal, was more than double the number reported for the week ending Sept. 22. The Commission declares this increase was due primarily to the larger volume of coal handled after the resumption of mining following the strike.

"As stated in the previous report," says the Commission, "there was a marked tendency for wholesalers to add 25c., 50c., 75c. or \$1 per ton to the price paid for coal handled, more often than to add intermediate amounts. There was, however, a tendency for the percentage of sales on which 50c. or more per ton was added to decrease. At the present time 25c. appears generally to be regarded as a reasonable amount per ton to be added by wholesalers regularly handling company coal.

"For the week ending Sept. 22 wholesalers added 50c. or more per ton to the price on 66 per cent of all car sizes reported. During the following week the percentage on which 50c. or more per ton was added decreased to 47 per cent, and during the week ending Oct. 6 it dropped to 38 per cent.

"With the falling off in sales at high margins, there were decided increases in the number of sales made at a spread of 25c. per ton. Sales at a 25c. spread represented 31 per cent of the total for the week ending Sept. 22, and nearly 43 per cent for the week ending Oct. 6. The general

tendency shown is for the high speculative margins taken on domestic sizes during the week ended Sept. 22 to decrease as the anthracite mines resume production, as the panic demand of consumers and retailers for coal at any price subsides somewhat and as effective publicity is given to the facts.

"Sales of steam sizes, which wholesalers are requested to report irrespective of price, were made at margins markedly lower than those on high-priced domestic sizes. The bulk of sales of steam sizes in all three weeks were made at margins not exceeding 25c. a ton, with a small percentage of sales in each week made at purchase cost, or less than cost, to the wholesaler.

"The largest per ton loss reported during the three weeks was 55c. a ton on one car of steam coal. Such sales are frequently pointed out by wholesalers as a justification for high margins on domestic sizes. As affecting all sales of steam coal and high-priced sales of domestic sizes covered by reports to the Commission, however, they represent but six-tenths of 1 per cent of the sales reported for the week ended Sept. 22; only 1.5 per cent for the week ended Sept. 29, and 3.9 per cent for the week ended Oct. 6. Losses on such a small percentage of total sales cannot justly be used as an excuse for the high margins taken on domestic sizes."

Coke Output in 1922 Lowest of Any Year Except One Since 1911

Total output of coke in 1922, according to final statistical returns by the Geological Survey, was 37,124,012 net tons, comprising 28,550,545 tons of byproduct and 8,573,467 tons of beehive. Preliminary estimates made in February were substantiated by the final returns from producers. Except in 1921, when business was extremely depressed, each year since 1911 has witnessed a larger total output of coke than 1922. The production of beehive coke was the smallest since 1888, except that in 1921. The output of byproduct coke, however, was the largest recorded since the beginning of the industry, except only that in 1920. As compared with 1920, the last normal year, 1922 showed decreases of 29 per cent in the total production of coke, 8 per cent in byproduct coke and 58 per cent in beehive coke.

Byproduct coke continued to exceed beehive coke in quantity, as it has since 1918. Only 23 per cent of the total came from beehive ovens in 1922, against 22 per cent in 1921 and 40 per cent in 1920.

SALIENT FIGURES OF THE COKE INDUSTRY IN 1922

	Beehive	Byproduct	Totals
Ovens in existence Dec. 31, 1922.....	63,957	11,212	75,169
Daily capacity (net tons of coke).....	107,418	119,898	227,316
Coal charged into ovens (net tons)....	13,285,868	41,052,670	54,338,538
Value of coal charged into ovens.....	\$35,082,804	\$194,015,725	\$229,098,529
Coke produced (net tons).....	8,573,467	28,550,545	37,124,012
Value of coke produced.....	\$50,036,556	\$188,276,767	\$238,313,323
Average yield of coke from coal (per cent).....	64.5	69.5	68.3
Coke used by producer (net tons).....	1,071,886	21,106,823	22,178,709
Furnace coke sold (net tons).....	6,105,003	2,934,924	9,039,927
Value of furnace coke sold.....	\$33,724,440	\$20,636,494	\$54,360,934
Foundry coke sold (net tons).....	1,164,716	1,601,733	2,766,449
Value of foundry coke sold.....	\$8,334,400	\$15,921,431	\$24,255,831
Domestic and other coke sold (net tons).....	179,670	3,865,751	4,045,421
Value of domestic and other coke sold	\$1,086,014	\$34,407,054	\$35,493,068
Screenings and breeze:			
Produced (net tons).....	83,917	2,395,286	2,479,203
Sold: Quantity (net tons).....	41,533	526,157	567,690
Value.....	\$132,448	\$1,583,399	\$1,715,847

The trend of production during the year, as shown by the monthly output, was in the main upward. The year opened with the rate of production higher than in 1921, but nevertheless abnormally low. Production of beehive coke increased from January to March and then slumped during the coal strike. Beginning in October, a rapid rise brought the rate at the end of the year to nearly two and one-half times that at the beginning. Production of byproduct coke declined slightly in February and then gained gradually through June, despite the coal strike. It slumped again in July and reached a low point in September, but increased to unprecedented quantities in November and December.

The following final figures of the production of coke by months are based on complete returns from coke manufacturers. They are somewhat greater than the preliminary

estimates issued currently during the year, which were based on railroad records of shipments.

MONTHLY PRODUCTION OF BEEHIVE AND BYPRODUCT COKE, 1922
(In Net Tons)

Month	Beehive	Byproduct	Totals
January	529,000	1,886,000	2,415,000
February	586,000	1,800,000	2,386,000
March	781,000	2,137,000	2,918,000
April	564,000	2,206,000	2,770,000
May	465,000	2,544,000	3,009,000
June	491,000	2,594,000	3,085,000
July	476,000	2,501,000	2,977,000
August	567,000	1,822,000	2,389,000
September	649,000	2,249,000	2,898,000
October	935,000	2,812,000	3,747,000
November	1,214,000	2,931,000	4,145,000
December	1,316,000	3,069,000	4,385,000
Totals	8,573,000	28,551,000	37,124,000

The value of all the important byproducts from coke-oven operations recovered and sold during 1922 was \$83,387,763. This amount, however, does not represent the total value of all byproducts, as a large part of them, particularly the gas, was used in the plants where manufactured. The following table summarizes the total production and sales of these byproducts. The quantities given are smaller than appeared probable from the quantity of coke reported to the Survey currently during 1922, and the estimates prepared early this year were therefore higher than these final figures.

BYPRODUCTS OBTAINED FROM COKE-OVEN OPERATIONS IN 1922

Product	Unit	Production	Quantity	Sales	
				Total	Average
Tar	Gallons	327,779,734	162,204,417	\$6,419,743	\$0.0396
Ammonia:					
Sulphate	Lb.	695,543,349	714,752,882	17,818,236	0.0249
Ammonia liquor (NH ₃ content)	Lb.	50,036,646	48,523,937	4,559,535	0.0940
Other forms (NH ₃ content)	Lb.	693,782	192,549	12,041	0.0625
				22,389,812	
Sulphate equivalent of all forms	Lb.	898,465,061	909,618,826		
Gas:					
Used under boilers, etc.	M.cu.ft.		19,123,814	1,251,325	0.0654
Used in steel or a affiliated plants	M.cu.ft.	442,671,114	144,976,030	15,942,446	0.1100
Distributed through city mains	M.cu.ft.		56,930,253	20,326,648	0.3570
Sold for industrial use	M.cu.ft.		10,352,921	1,104,096	0.1066
			231,383,018	38,624,515	0.1669
Light oil and derivatives:					
Crude light oil	Gallons	610,437,555	5,138,095	630,768	0.1228
Benzol, crude	Gallons	2,666,177	2,665,889	698,437	0.2620
Benzol refined	Gallons	10,419,504	9,590,459	2,736,944	0.2854
Motor benzol	Gallons	57,025,699	54,930,203	10,491,309	0.1910
Toluol, crude	Gallons	38,159	3,938	652	0.1656
Toluol refined	Gallons	1,955,119	1,906,122	556,363	0.2919
Solvent naphtha	Gallons	2,983,858	2,861,482	538,512	0.1882
Other light oil products	Gallons	580,058	212,712	14,949	0.0703
		75,668,574	77,308,900	15,667,934	0.2027
Naphthalene:					
Crude	Lb.	6,107,742	3,298,851	52,103	0.0158
Refined	Lb.	1,810,972	1,589,084	79,149	0.0498
		7,918,714	4,887,935	131,252	0.0269
Other Products				154,507	
Value of all byproducts sold				\$83,387,763	

^a Includes gas wasted and gas used for heating retorts.

^b Of this amount 98,432,100 gallons was refined on the premises to make the derived products listed.

Statistics compiled by H. L. Bennit, Geological Survey, Washington, D. C., Aug. 31, 1923.

THE NATIONAL RETAIL COAL DEALERS' ASSOCIATION has named S. B. Crowell, president of the association; M. E. Keig, of the Consumers Coal Co., Chicago, and Roderick Stephens, of New York, to represent the association on an advisory committee of fifteen to co-operate with the Department of Commerce in coal matters. The National Coal Association, the American Wholesale Coal Association, the Anthracite Operators' Policy Committee and the American Railway Association also are to appoint three members each to the committee.

Mine Workers in Southeastern Kentucky Take Wage Cuts to Avert Shutdowns

CHICAGO, Ill., Oct. 29.—Cutting wages back 20 per cent, or to the 1917 scale, is spreading through parts of non-union southeastern Kentucky, especially in Bell County. A number of the lesser operations are reported already on the low scale, operators saying that miners have approved of the cut as preferable to mine shutdowns. The cut is not general nor uniform and is discouraged by such operator groups as the Hazard Coal Operators' Exchange, which met Saturday at Lexington, Ky. Observers declare that in spite of official opposition the reduction is going to reach up into northeastern Kentucky before long by the action of "weak sisters" among mine owners. Low prices and no market are responsible. The miners' union is making a special effort to organize the region.

Springfield to St. Joseph Rate Cut

Lower rates on coal from the Springfield district of Illinois to St. Joseph, Mo., have been prescribed by the Interstate Commerce Commission. The rates from mines on the Alton and the Wabash in the Springfield district are held to be prejudicial to the extent that they exceed by more than 40c. per net ton the rate contemporaneously maintained by these roads to Kansas City. Great interest in this case was evinced by the Southwestern Interstate Coal Operators' Association, the Fifth and Ninth Districts Coal Bureau, by the Kansas City Power & Light Co. and by the Central Illinois Coal Traffic Bureau. There is keen competition between Kansas City and St. Joseph for the location of industries and business enterprises. The freight rate on coal has an important bearing on this situation. Operators in the southern Illinois fields opposed reductions from the Springfield district, without securing a corresponding reduction in the rate from other Illinois fields. Operators in the Kansas, Missouri, Oklahoma and Arkansas districts opposed any reduction unless it should apply also to the Southwestern coal field. These operators contend that they already have lost much business in Kansas City to the Springfield district because of the former reduction and they contended that their coal would be displaced at St. Joseph by this reduction.

THE COAL, COKE & IRON ORE COMMITTEE, CENTRAL FREIGHT ASSOCIATION TERRITORY, announces a hearing Nov. 8, at 10 a.m., at room 606, Chamber of Commerce Building, Pittsburgh, Pa., to consider the proposed cancellation of proportional rates on bituminous coal in carload lots from mines in Ohio and the Inner and Outer Crescents of Pennsylvania, Virginia, West Virginia, etc., to upper Mississippi River crossings, for beyond. The committee also will hold a hearing at the same time and place on the proposed cancellation of rates on coke (except petroleum, creosote and tar or pitch coke), coke breeze, coke dust and coke screenings, in carload lots, from ovens on the Chesapeake & Ohio Ry. in the New River, Kanawha, Kentucky and Big Sandy districts, to stations in Ontario and Nova Scotia—i. e., Amherst, N. S.; Owen Sound, Sudbury, Copper Cliff, Victoria Mine, Sault St. Marie and Worthington, Ont.

AT A RECENT MEETING on standardization of anthracite sizes of subcommittee IV of Committee D5 on Coal and Coke, American Society for Testing Materials, held at the office of Hubb Bell, chairman, it was decided tentatively to adopt the following sized screens for anthracite, and to submit the same to producers for their action: Broken, through 4½ in., over 3½ in.; egg, through 3½, over 2½; stove, through 2½, over 1½; chestnut, through 1½, over ¾; pea, through ¾, over ½; buckwheat, through ½, over ¼; rice, through ¼, over ⅛; barley, through ⅛, over ⅜ or ⅞; culm, through ⅜ or ⅞ in.

I. C. C. Likely to Modify Ruling on Private Cars; Railroads Make Poor Case

Lacking New Evidence, Carriers Reiterate Old Arguments—Personal Opinions but No Facts or Figures Presented—Commission Points Out That Case Involves Transportation, Not Merchandising, Problems

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

Judging from questions asked and from the attitude of the members during the rehearing of the assigned-car case, there is some likelihood that the Commission will modify its recent opinion so as to grant a concession to the owners of private cars. It also is regarded as probable that the Commission will defer the effective date of its order from Dec. 1 to Jan. 1. It is the consensus of opinion that no change will be made in that portion of the opinion affecting the preferential use of cars for the procurement of railroad fuel.

The railroads have made a particularly poor case. Even the Chesapeake & Ohio, which clamored loudest for a rehearing of the case, failed to bring in a scintilla of new matter. Railroad witnesses generally simply reiterated arguments which had been presented at the former hearing. Boiled down, the substance of their arguments is that assigned cars are necessary to insure the railroads with a continuous supply of the type of coal best adapted for locomotive purposes. Their statements, however, were presented as personal opinions, and no convincing facts and few figures were presented in the effort to substantiate the statements. Many of the railroad witnesses were purchasing agents or those concerned with the use of fuel. Members of the Commission pointed out repeatedly that the case presents transportation and not merchandising problems.

When the railroads announced, after having presented only perfunctory testimony, that they had completed their case, those in attendance were astounded. No explanation is forthcoming as to why they asked that the case be reopened when they had no new evidence to present. Even Commissioner Aitchison admonished the railroads that a new opportunity had been afforded them to present evidence and urged them to present it if they had it.

RAILROADS OVERCONFIDENT AT FIRST HEARING

It is believed the granting of the rehearing was influenced in no small degree by a feeling on the part of members of the Commission that the railroads had been overconfident during the first hearing. It was assumed that the railroads took it for granted that the Commission would not abolish assigned cars and as a consequence did not make a determined effort to present arguments in favor of the continuance of their use. The showing during the rehearing, however, indicates that the railroads are not in a position to substantiate the claims they have been making in this particular.

That the desire on the part of the railroads to continue assigned cars was actuated more by the better prices they could obtain by furnishing full car supply to the mines with which they had contracts, was emphasized in an amusing way during the hearing. One of the witnesses was making certain points contained in a letter written by an official of the Frisco lines. Opposing counsel happened to ask to see the letter. The witness showed disinclination to comply with the request. Finally he tendered the first page of it. He was asked for the remainder of the letter, which he declined to hand over. Commissioner Aitchison was called upon to rule on the matter. He held that it had been the practice of the Commission to allow opposing counsel to consult a full document when extracts only were being presented. When, under that ruling, the whole letter was passed over, it was found that the railroad official had emphasized the need for assigned cars because of the effective

way in which they could be used to obtain lower prices for coal.

The arguments made by the railroads as to the strides they are making in operating efficiency failed to square with those which were presented at this hearing to indicate the inability of the roads to obtain ample fuel without a preferential car supply. Another interesting point brought out was the large acreage of undeveloped coal mines owned by railroads. The New York Central alone, it was testified, owns 100,000 acres of potential coal lands.

Another point which can be deduced from the testimony is the comparatively small amount of coal which moves in private cars during the period when there is any stringency in car supply. The total probably does not reach 10,000,000 tons on an annual basis, an insignificant amount when compared with the total yearly movement.

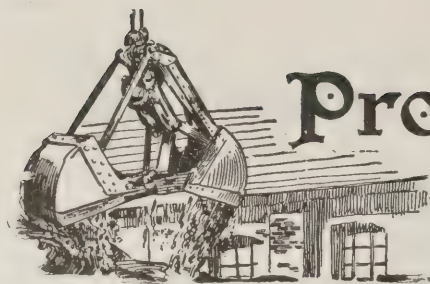
DISCLAIM DESIRE FOR PREFERENTIAL TREATMENT

Those arguing for private cars disclaim any intention of desiring preferential movement or placement. They ask, however, that they be allowed to use these cars during a period of car shortage, provided the railroads have adequate motive power, terminal facilities and other means of handling them without prejudice to shippers who use system cars. It is this amendment which the Commission is thought likely to embody in an amended opinion. The argument against such a concession is that it would be difficult to determine just when the supply of motive power is adequate and just when terminal or junction facilities are sufficiently open to handle the excess of cars. The policing of such a regulation would be difficult especially when the natural tendency on the part of the carrier would be to take on all tonnage offered. It is argued further that even an impartial judge would have a highly technical and delicate question to decide just when the use of private cars would not constitute a discrimination against the shipper in system cars.

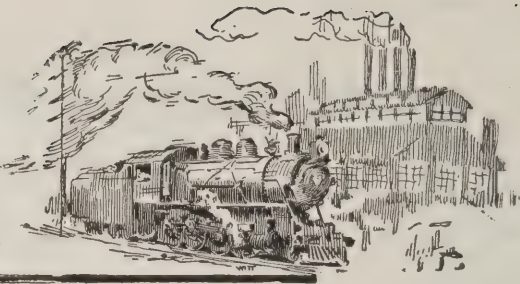
PRIVATE CARS HAVE INDIRECT BENEFIT

The point was emphasized by witnesses on behalf of the owners of private cars that the advantages of their use is an indirect one. Their actual operation results in a loss. For that reason it is contended by those opposing private cars that the advantages are sufficient to justify the continuance of their use even were the decision of the Commission to stand in its present form. There will be no trend, it is contended, to sell these private cars, so that they will not be forced on to a market in which there is only one bidder.

The fact that Commissioner Aitchison assured an intending buyer of private coal cars that he had at that time no reason to believe the policy toward them would be changed carries with it no moral obligation on the part of the Commission, it is contended. One man frequently asks another as to the advisability of purchasing a certain stock. The intending purchaser may act on the opinion and buy. Subsequently the price of the stock may fall, causing a loss to the purchaser. Such incidents are daily occurrences, but there is no thought that the man who proffered his best judgment should share any portion of the loss. It is held that all Commissioner Aitchison did, in an effort to be helpful and friendly, was to give his inquirer the benefit of his judgment.



Production and the Market



Weekly Review

Production of soft coal continues in excess of consumption and the market is indifferent. The demand for storage coal is falling off and buyers with contracts are slowing up receipts. Some large operators have reduced contract prices in an effort to keep their coal on the move and mines going.

The increase in production of soft coal recorded for the second week in October was only temporary, the report of the Geological Survey showing that the output in the week ended Oct. 20 was 10,675,000 net tons, a decline of 278,000 net tons from the week ended Oct. 13 and 24,000 tons less than in the week ended Oct. 6. A further decline is indicated for last week. Complete returns show that the production of soft coal in September was 42,216,000 net tons, a decrease of 2,648,000 tons when compared with August.

Prices for soft coal continue to move downward, *Coal Age* Index registering 184 on Oct. 29, a drop of two points from the previous week. The average price was \$2.23. Increases in southern Illinois, Springfield, western Kentucky, Clearfield, Cambria and Somerset coals were offset by declines in Standard, southeastern Kentucky, Pittsburgh, Kanawha and Pocahontas coals.

PRODUCTION LIMITED BY DEMAND

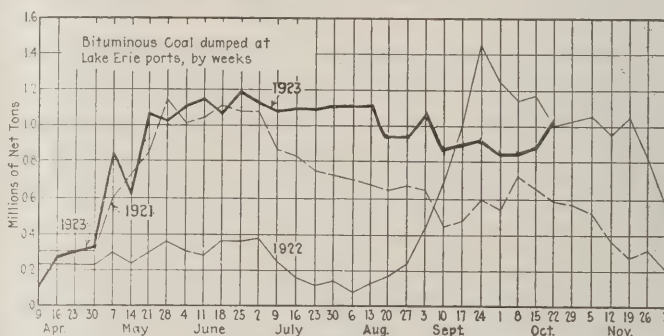
Lack of demand is the dominant factor in limiting production. In the Middle West the trade was aroused by a change in temperatures which created a slightly better demand for domestic coal. Steam coals continue hard to move. In St. Louis the market is quiet with the cheaper domestic coals in better demand than the better grades. No indication of improvement is seen in New England, where reserve coals are piling up and Pennsylvania coals move slowly.

In Ohio there was a slight upturn in domestic coals but there is no activity in the steam situation, users of these coals having from four to six weeks' supply on hand. Not so much coal moved in the Pittsburgh dis-

trict at the extreme low prices, giving the indication that the market now is in a slightly better condition.

Heavy buying of Welsh anthracite is reported, orders aggregating about 140,000 tons, nearly all of which is for Boston delivery, having been placed last week with Welsh mine operators and exporters.

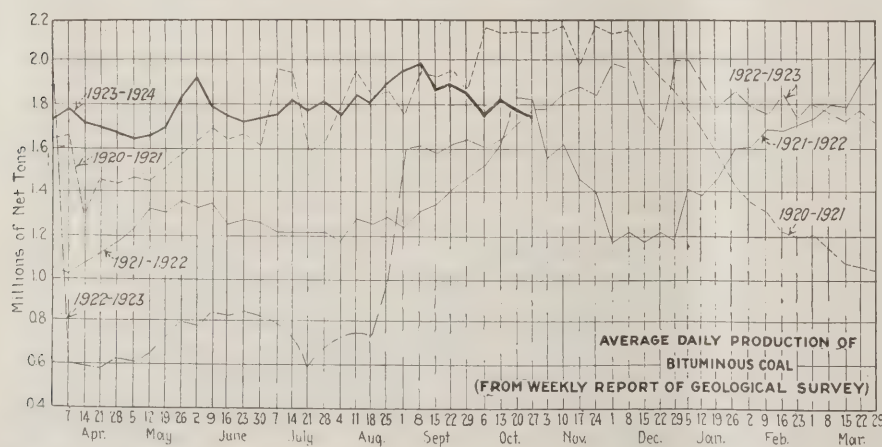
Lake dumpings of soft coal increased during the week ended Oct. 22 to more than 1,000,000 net tons for both cargo and fuel coal.



	Week Ended Oct. 22	Season to Oct. 22
Cargo	955,551	24,571,917
Fuel	54,571	1,340,969
Totals	1,010,122	25,912,886

Production of anthracite is nearly up to capacity, 2,045,000 net tons having been mined during the week ended Oct. 20, an increase of 36,000 tons when compared with the previous week. Due to observance of Mitchell Day, Oct. 29, by the mine workers output will show a decrease this week. Brisk demand for the domestic sizes continues, with stove and chestnut leading. Egg, pea and buckwheat are accumulating on the Duluth docks, stove and chestnut sizes moving rapidly.

There is little activity in the export market. Some orders were placed but the tonnage was small. At Hampton Roads, dumpings during the week ended



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Oct. 6	9,736,000	10,699,000
Oct. 13 (a)	10,110,000	10,953,000
Oct. 20 (b)	10,378,000	10,675,000
Daily average	1,730,000	1,779,000
Calendar year	301,239,000	445,801,000
Daily av. cal. year	1,211,000	1,796,000

ANTHRACITE

Oct. 6	1,994,000	2,015,000
Oct. 13	2,112,000	2,009,000
Oct. 20	2,039,000	2,045,000

COKE

Oct. 13 (b)	185,000	284,000
Oct. 20 (a)	210,000	276,000
Calendar year	5,354,000	15,374,000

(a) Subject to revision. (b) Revised from last report.

Oct. 25 were 259,158 net tons, as compared with 274,854 tons dumped the previous week, the decrease in shipments to New England and other coastwise points accounting largely for the decline.

Middle West on Slow Upturn

Although Illinois and Indiana mines are working less than half time—many mines a good deal less than that—and, although production has not taken a marked turn for the better, yet domestic demand all around is stabilizing, prices fluctuate less and less from circular levels and there is a slightly better tone to Midwest coal trading. A little cooler weather had an effect on the market. Good southern Illinois lump brings close up to the circular of \$4.35 everywhere but in great centers like Chicago, where quotations must be shaved down to \$3.90 or thereabouts. Central Illinois is moving about all its 6-in. lump output at the circular price of \$3.25, profiting over southern Illinois in many markets by reason of both a favorable freight rate and the wide difference in price.

Indiana is having a little more trouble maintaining its

circulars, but there, too, big lump is showing slight signs of activity. In all fields the middle sizes—egg and nut—are sluggish. Screenings, however, have not been backing up much on the mines even though in most regions less-than-a-dollar prices have practically disappeared. Big buyers of steam coal are inclined to hold out waiting for a drop in screenings when lump demand becomes lively with cold weather.

St. Louis Is Sluggish

Conditions in St. Louis continue quiet. There is little domestic demand and it is for cheaper grades of coal, there being little call for Franklin County and practically none for anthracite, smokeless or coke. Dealers are all loaded up and little is doing in wholesale business. Country trade is somewhat similar, although it is good in spots. Carload steam is unusually slow, but wagonload keeps up fairly good. Country steam is not a factor in St. Louis. A little is moving to the Omaha, Minneapolis and Chicago markets.

Reports from the Carterville field show that there is a further curtailment of production on account of no market and mines continue to suspend operations. All mines have

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Oct. 30 1922	Oct. 15 1923	Oct. 22 1923	Oct. 29 1923†
Smokeless lump.....	Columbus.....	\$6.60	\$6.35	\$6.35	\$5.75@ \$6.00
Smokeless mine run.....	Columbus.....	6.25	3.05	3.05	2.00@ 2.65
Smokeless screenings.....	Columbus.....	5.85	2.25	1.35	1.25@ 1.50
Smokeless lump.....	Chicago.....	6.35	6.10	6.10	6.00@ 6.25
Smokeless mine run.....	Chicago.....	5.75	2.85	2.85	2.75@ 3.00
Smokeless lump.....	Cincinnati.....	7.00	5.85	5.85	5.75@ 6.00
Smokeless mine run.....	Cincinnati.....	6.10	2.50	2.50	2.00@ 3.00
Smokeless screenings.....	Cincinnati.....	6.10	1.60	1.75	1.00@ 2.00
*Smokeless mine run.....	Boston.....	7.10	4.65	4.55	4.35@ 4.50
Clearfield mine run.....	Boston.....	3.50	2.00	1.95	1.50@ 2.50
Cambria mine run.....	Boston.....	4.10	2.60	2.50	2.25@ 3.00
Somersett mine run.....	Boston.....	3.75	2.35	2.25	1.75@ 2.75
Pool 1 (Navy Standard).....	New York.....	4.85	3.10	3.05	2.85@ 3.25
Pool 1 (Navy Standard).....	Philadelphia.....	.....	3.15	3.15	3.00@ 3.25
Pool 1 (Navy Standard).....	Baltimore.....	.....	.....	.....	.....
Pool 9 (Super. Low Vol.).....	New York.....	4.25	2.35	2.35	2.10@ 2.50
Pool 9 (Super. Low Vol.).....	Philadelphia.....	4.30	2.45	2.45	2.25@ 2.60
Pool 9 (Super. Low Vol.).....	Baltimore.....	4.00	2.25	2.15	2.15
Pool 10 (H.Gr. Low Vol.).....	New York.....	3.50	2.05	2.05	1.85@ 2.25
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	3.50	2.05	2.00	1.80@ 2.05
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	3.35	2.15	2.10	2.10
Pool 11 (Low Vol.).....	New York.....	3.05	1.85	1.85	1.60@ 1.90
Pool 11 (Low Vol.).....	Philadelphia.....	3.15	1.75	1.70	1.55@ 1.70
Pool 11 (Low Vol.).....	Baltimore.....	3.25	1.80	1.90	1.80@ 2.00

Midwest	Market Quoted	Oct. 30 1922	Oct. 15 1923	Oct. 22 1923	Oct. 29 1923†
Franklin, Ill. lump.....	Chicago.....	\$5.35	\$4.05	\$4.10	\$3.90@ \$4.35
Franklin, Ill. mine run.....	Chicago.....	4.10	2.60	2.60	2.25@ 3.00
Franklin, Ill. screenings.....	Chicago.....	2.60	1.35	1.45	1.40@ 1.50
Central, Ill. lump.....	Chicago.....	5.00	3.10	3.10	3.00@ 3.25
Central, Ill. mine run.....	Chicago.....	3.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings.....	Chicago.....	1.85	.80	.90	.90@ 1.20
Ind. 4th Vein lump.....	Chicago.....	5.10	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run.....	Chicago.....	3.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings.....	Chicago.....	2.35	1.20	1.20	1.15@ 1.30
Ind. 5th Vein lump.....	Chicago.....	4.75	2.50	2.50	2.25@ 2.75
Ind. 5th Vein mine run.....	Chicago.....	3.65	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago.....	2.10	.80	.80	.75@ .90
Mt. Olive lump.....	St. Louis.....	.....	3.10	3.10	3.00@ 3.25
Mt. Olive mine run.....	St. Louis.....	.....	2.25	2.25	2.20@ 2.30
Mt. Olive screenings.....	St. Louis.....	.....	1.25	1.25	1.20@ 1.30
Standard lump.....	St. Louis.....	4.25	3.00	3.10	2.90@ 3.25
Standard mine run.....	St. Louis.....	2.60	2.05	2.05	1.80@ 2.30
Standard screenings.....	St. Louis.....	2.00	.55	.50	.40@ .60
West Ky. lump.....	Louisville.....	5.00	2.55	2.40	2.35@ 2.50
West Ky. mine run.....	Louisville.....	2.80	1.75	1.65	1.50@ 1.85
West Ky. screenings.....	Louisville.....	2.00	.55	.50	.45@ .60
West Ky. lump.....	Chicago.....	4.10	2.60	2.60	2.50@ 2.75
West Ky. mine run.....	Chicago.....	3.10	1.75	1.75	1.50@ 2.00

South and Southwest

High-Volatile, Eastern	Market Quoted	Oct. 30 1922	Oct. 15 1923	Oct. 22 1923	Oct. 29 1923†
Pool 54-64 (Gas and St.).....	New York.....	3.30	1.65	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.).....	Philadelphia.....	3.50	1.65	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.).....	Baltimore.....	3.35	1.75	1.75	1.75
Pittsburgh sc'd gas.....	Pittsburgh.....	5.00	2.55	2.55	2.50@ 2.60
Pittsburgh gas mine run.....	Pittsburgh.....	.....	2.20	2.25	2.20@ 2.30
Pittsburgh mine run (St.).....	Pittsburgh.....	3.25	1.85	1.85	1.85@ 2.00
Pittsburgh slack (Gas).....	Pittsburgh.....	3.60	1.20	1.20	1.00@ 1.15
Kanawha lump.....	Columbus.....	6.25	3.15	3.15	2.85@ 3.50
Kanawha mine run.....	Columbus.....	4.75	1.85	1.85	1.75@ 2.00
Kanawha screenings.....	Columbus.....	4.10	.95	.90	.80@ 1.00
W. Va. lump.....	Cincinnati.....	6.00	3.35	3.50	3.00@ 3.75
W. Va. Gas mine run.....	Cincinnati.....	4.35	1.65	1.60	1.25@ 1.75
W. Va. Steam mine run.....	Cincinnati.....	4.10	1.65	1.60	1.25@ 1.75
W. Va. screenings.....	Cincinnati.....	4.00	.80	1.00	.60@ 1.00
Hocking lump.....	Columbus.....	4.50	3.05	3.05	2.85@ 3.25
Hocking mine run.....	Columbus.....	3.60	1.85	1.85	1.75@ 2.00
Hocking screenings.....	Columbus.....	3.10	.95	.90	.75@ 1.00
Pitts. No. 8 lump.....	Cleveland.....	3.81	2.55	2.60	2.10@ 3.00
Pitts. No. 8 mine run.....	Cleveland.....	3.56	1.90	1.85	1.80@ 1.90
Pitts. No. 8 screenings.....	Cleveland.....	3.31	1.05	1.00	.80@ 1.00

Big Seam lump.....	Birmingham..	3.95	3.75	3.75	3.65@ 3.90
Big Seam mine run.....	Birmingham..	2.60	1.95	1.95	1.75@ 2.15
Big Seam (washed).....	Birmingham..	2.75	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago.....	5.50	3.35	3.00	2.75@ 3.25
S. E. Ky. mine run.....	Chicago.....	4.25	2.25	2.25	2.00@ 2.50
S. E. Ky. lump.....	Louisville.....	6.75	3.10	3.00	2.75@ 3.25
S. E. Ky. mine run.....	Louisville.....	4.00	2.00	1.75	1.50@ 2.00
S. E. Ky. screenings.....	Louisville.....	4.10	.85	.80	.70@ .85
S. E. Ky. lump.....	Cincinnati.....	5.85	3.10	3.55	3.00@ 3.75
S. E. Ky. mine run.....	Cincinnati.....	4.25	1.55	1.55	1.25@ 1.75
S. E. Ky. screenings.....	Cincinnati.....	4.00	.80	.90	.50@ 1.00
Kansas lump.....	Kansas City..	5.75	5.00	5.00	5.00
Kansas mine run.....	Kansas City..	3.75	3.50	3.50	3.50
Kansas screenings.....	Kansas City..	2.50	2.25	2.25	2.25

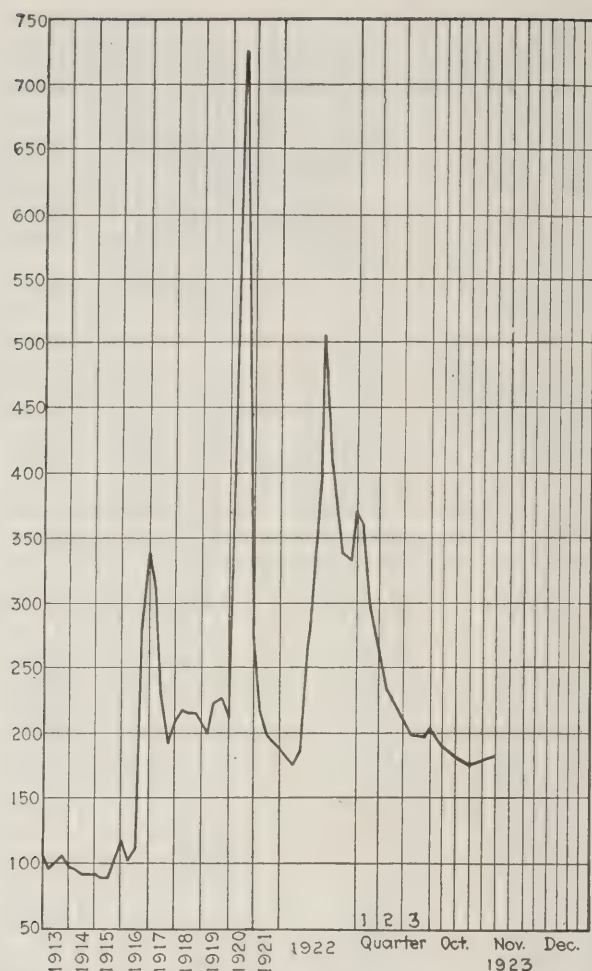
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922	Oct. 22, 1923	Oct. 29, 1923†
Broken.....	New York.....	\$2.34	Independent \$9.00	Company \$7.75@ \$8.25	Independent \$9.60
Broken.....	Philadelphia.....	2.39	.....	7.90@ 8.10	Company \$8.00@ \$9.25
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	8.75@ 9.25
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	8.90@ 9.25
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	8.90@ 9.25
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50
Ranges.....	New York.....	2.34	.....	8.25	9.00
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.15@ 6.65
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	6.35@ 6.60
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	2.50@ 3.50
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	3.00@ 3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	1.85@ 2.50
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.15@ 1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.50
Birdseye.....	New York.....	2.22	.....	2.10	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

Index	1923				1922
	Oct. 29	Oct. 22	Oct. 15	Oct. 8	Oct. 30
Weighted average price	184	186	185	346	
	\$2.23	\$2.25	\$2.24	\$4.19	

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

no bills on track and some of them seem unable to move any coal at all. Railroad tonnage continues light. The situation in the DuQuoin and Jackson County field is bad.

In the Mt. Olive district things are in a bad way. One mine of the Consolidated Coal Co. at Mt. Olive worked Oct. 5 and not again until the 24th, on account of failure to move the no-bills and scarcity of cars on the Wabash. On the Litchfield & Madison R.R. conditions are extremely bad on account of no cars. In the Standard field, mines are shutting down, there being no market for any size and several working mines are selling coal at a loss. A careful survey of the fields shows that some mines are having a hard time meeting payrolls.

Kentucky Is Stirring

Cold weather throughout the Central West with snow reported in some localities has created a better demand for prepared sizes, and Louisville jobbers and sales offices of mining companies report fair business on prepared coal, some houses showing increased sales over the earlier season, but business is being done on a narrow margin by brokers as well as operators due to the competition for business, good car supply and low prices. Screenings are made in great volume and have to move at give-away prices.

If statements from eastern Kentucky are correct relative to non-union mines cutting back to the 1917 wage-scale

basis, the outlook is poor for union mines in western Kentucky. About the only thing to brighten the outlook is that when the Lake and Northwest trade is supplied a lot of producers of prepared sizes will be forced to curtail, thus reducing overproduction of screenings. Right now there is practically no movement of mine-run, and that at very low prices. Some mine-run in distress has been reported selling at down around screenings prices over the past ten days, but it represented principally off grade stuff.

Practically no new mining ventures are under way in western Kentucky, there being one large stripper project under construction, but otherwise the field is at a standstill as regards development of new mines, although there has been a considerable amount of improvement at old mines to better fit them for supply prepared sizes.

Northwest Shipments Heavier

Shipment of all kinds of coal to the Northwest docks has been steadily on the increase lately, but demand throughout that region has not been stimulated much yet by the approach of winter. Bituminous markets are dull though hard coal and smokeless substitutes are in light demand continually. All-rail screenings in most regions, especially that around Minneapolis and St. Paul, are not so abundant. Stocks there are working off slowly and regular sizes are steadying a little in price.

Shipments to the Head-of-the-Lakes picked up during the week when forty-seven cargoes arrived. Of these eight were anthracite. Report of cargoes on the way from lower Lake ports shows that twenty-seven are coming up with three of hard coal included.

The Duluth market in bituminous is very dull. Everyone is playing a waiting game. Prices in bituminous remain unchanged, but there is every indication that the market will sag by the first of the year unless some spurt of buying commences. Reports of stocks on docks show 5,100,000 tons of soft and 150,000 tons of anthracite. This indicates that coal is piling up.

Increasing receipts by Lake is the only notable feature of the coal trade at Milwaukee. The October record will probably exceed that of any month since July. Receipts of anthracite aggregate 115,485 tons and soft coal 385,619 tons, making the season's receipts thus far 749,124 tons of the former and 2,470,963 tons of the latter. Both wholesale and retail markets are slow.

Cooler Weather Helps West

Cooler weather is having a slight effect on coal trade throughout the West and Southwest but nowhere is there real life to be observed. In Utah some operators assert that a partial shortage of cars is responsible for the short running time of the state, but generally it is admitted that market alone is responsible. Dealers are moving coal steadily, however, though industrial coal drags. In Colorado market improvement is noted, but it is small for this season of the year. Prices continue to bump bottom. Weakness in the demand for screenings is the main deterrent in the Southwest. The Kansas and Oklahoma lump market is fairly good but the mining regions are filling with no-bills of fine sizes.

Slight Upturn in Ohio Markets

Interest in the Cincinnati market is centered around a little upturn in inquiries following a touch of cooler weather. Domestic business was aroused slightly, turned over and then returned to the dragginess that has been noticeable for some time. Meanwhile the price on slack has been dropping and run-of-mine has been growing perceptibly weaker so far as day to day prices are concerned. The smokeless-coal situation continues practically unchanged. Prices of lump are being maintained while the prices for run of mine and slack has been governed in a high degree by the drop in high-volatile coals. For the first time in years sales of smokeless slack were reported around \$1 to wholesale dealers.

Increased demand for domestic coals was noticed in the Columbus market, but steam business continues dull. All heavy consumers appear to be stocked, and fill out by pur-

chasing distress coal. Steam grades are a drug on the market. Utility and railroad requisitions are not as large as they were. Retailers are replenishing their stocks only as needed, and prices are steady.

Retail dealers in the Cleveland market are fairly well stocked, domestic consumers not buying until the coal is actually needed. Steam-coal users have from four to six weeks' supply of coal on hand. Offerings of distress coal are not large, many operators preferring to run their mines from three to four days a week rather than ship their product into the present market. Altogether the trade is not optimistic.

Reports received from 442 mines by the Southern Ohio Coal Exchange show that during the week ended Oct. 13 there was an output of 166,750 tons, while the eastern Ohio field produced 426,000 tons during the week ended Oct. 20.

While the Pittsburgh market is in bad shape it is possible that it is in a slightly better condition than a week or two ago in the matter of price. The full range of quotations is much the same, but in point of tonnage there is not as much going at the extreme low prices as there was. Production, however, is poorer and is decreasing. There is much speculation as to how the market will act when the Lake season ends. It is evident that consumers expect it to be easier, but prices may be too low to stand any further decline. There are some observers who think the market will counter the expectations and grow stronger at the end of the Lake season.

Production in central Pennsylvania is still on the decline. Some operations are working less than half time.

No Improvement Seen in New England

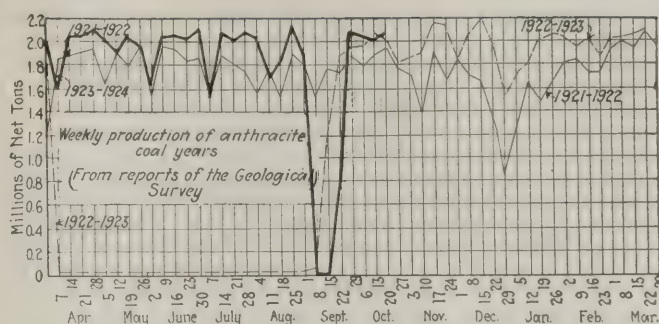
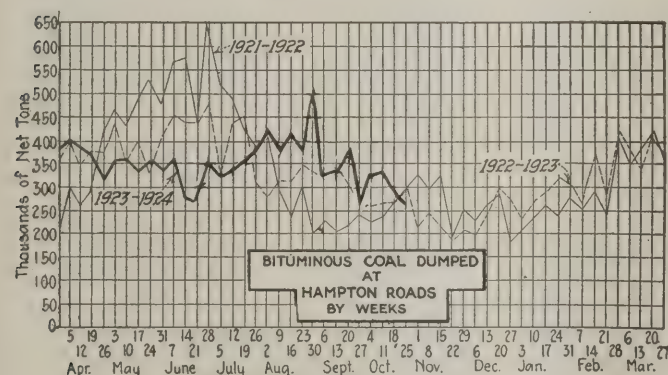
There are no indications of improvement in the New England steam trade. There is constant pressure on consumers to take coal, while reserves generally are nearly as great as in November, 1918. Market cargoes seem to be the rule, and due to heavy receipts by water the range of price on cars at this end is further depressed.

Pocahontas and New River, both No. 1 Navy standard and less choice coals, are selling down to \$4.35 per gross ton f.o.b. Norfolk and Newport News. Prices on cars at Boston are correspondingly low; while some agencies are asking \$6 there is at least one factor who is out for business at \$5.50. Doubtless the latter figure is made to hold trade and does not mean that the same coal at the Virginia terminals is being sold on so low a basis.

In the territory within seventy-five miles of Boston or other tidewater distributing points there is practically nothing doing now on coal all-rail from central Pennsylvania. In that part of New England that is exclusively all-rail very low quotations are heard, but the aggregate tonnage is less than during the summer.

Seaboard Markets Sagging Further

Demand and prices continue on the downgrade in the New York soft-coal market. Bids received by the U. S. Shipping Board for delivering f.a.s. vessels that harbor 1,800 gross tons of either Pool 9 or Pool 71 coal resulted in tenders ranging from \$4.18 to \$5.25 per gross ton, or on a basis of \$1.02 to \$1.97 per net ton f.o.b. mine. Dumpings at the local piers during the first five days of last week averaged around 260 cars daily.



In Philadelphia demand is extremely light and some of the larger users seem content to depend at present on their storage piles. Contract holders are not taking their full requirements and are apparently buying at the present low spot prices. This tendency has grown to such an extent that several large producers have reduced their contract rate of \$3.80 put into effect April 1 to \$3.50, some of them making it retroactive to Oct. 1. This has had a tendency to push prices still further down the scale. The better grades are in best demand. The Baltimore market is more or less spasmodic. Wholesale dealers received many offers from operators, but buying is light.

There was little or no improvement noticed in the commercial coal market at Birmingham but domestic buying picked up slightly last week due to cooler weather. As a result mine orders that were suspended have been reinstated. Lump coal is retailing at from \$7.50@10 per ton.

The soft-coal market at Toronto is bad and there is practically no demand. Pennsylvania smokeless is being quoted at \$7.20 delivered; steam lump, \$7.65, and slack, \$5.75.

Welsh Anthracite May Be Market Factor

Demand for anthracite domestic coals around New York and Philadelphia is centered chiefly around stove and chestnut, but both egg and pea are moving readily and without trouble. Most buyers find it easier to obtain the larger coals if they include in their order some steam size tonnage. While quotations in the New York market range as high as \$12.50 for egg, stove and chestnut, very little coal of that price comes to that market, most of it going to New England and line points, while it is said that Canadian buyers are obtaining tonnages at quotations ranging as much as \$1 less. The large companies and some independent operators are storing the steam coals. Demand for these coals is low and prices far below company schedules.

Dealers in Baltimore complain of the lack of stove coal and are pushing sales of egg, chestnut and pea as hard as possible.

The New England situation is expected to be greatly relieved by receipts of Welsh anthracite, orders aggregating nearly 140,000 tons having been placed last week with a Cardiff house at a price said to be around \$12 c.i.f. Boston harbor. Other quotations for Welsh anthracite range as low as \$11 c.i.f. Boston or New York harbor.

The market for hard coal in Toronto is brisk, and supplies are fair. Retail dealers are selling anthracite domestic sizes at \$16 and are able to fill orders of reasonable size.

For the fourth consecutive week production of beehive coke declined and a new low weekly-record for 1923 was established, says the Geological Survey. The total output for the week ended Oct. 20 amounted to 276,000 net tons, a decrease of 8,000 tons from the previous week, which was confined chiefly to Pennsylvania and Ohio. The Connellsville market is suffering from extreme lightness of demand.

Car Loadings, Surpluses and Shortages

	—Cars Loaded—	
	All Cars	Coal Cars
Week ended Oct. 13, 1923.....	1,084,458	194,963
Previous week.....	1,079,690	191,741
Same week in 1922.....	969,487	194,520
	—Surplus Cars—	
	All Cars	Coal Cars
Oct. 14, 1923.....	27,062	5,674
Same date in 1922.....	4,275	1,588
Oct. 7, 1923.....	34,138	7,098
	—Car Shortage—	
Oct. 14, 1923.....	15,920	4,179
Oct. 7, 1923.....	16,160	4,600

Foreign Market And Export News

British Coal Production at High Level; Welsh Market Still Unsettled

Great Britain's mines continue to produce large weekly tonnages, the output for the week ended Oct. 13 amounting to 5,625,000 tons, says a cable to *Coal Age*. This compares with 5,528,000 tons the previous week, and is the heaviest weekly production since June 16 of this year when it was 5,654,000 tons. It is 370,100 tons larger than the output for the week ended Oct. 14, 1922.

The Welsh coal market maintains its state of unsettlement. Stormy weather has involved serious tonnage delays and mine stoppages have become fairly frequent. Supplies are still pressing heavily on the market, and the excess over demand prevents improvement. France, Italy, Belgium, and South America are buying cautiously, the first three countries being influenced by the Ruhr situation, while coals are making competition in South America very keen.

Welsh operators are disappointed at not being given the contract for 150,000 tons for the Nord and Etat Railways of France. In some quarters the placing of this order in America is regarded as an attempt to "bear" Welsh prices.

Consumers generally are holding their orders to force Welsh prices to a still lower level.

The Newcastle market is in a better position than it has been during the past two months. Inquiry developed so that merchants are directing their attention to November loading, and business is coming forward satisfactorily. Prospects for December are regarded as good.

Hampton Roads Market at Low Point

Business at Hampton Roads last week, was at the dulllest point in the entire year and the price of coal dropped to a point where many shippers were not establishing quotations.

Movement in all directions slackened, particularly in coastwise trade. Bunkers was the only branch of the business that approached any degree of satisfaction. Shippers said that overproduction had flooded the markets with coal, and it might be a long time before it could be moved to a point where

normal conditions could be hoped for.

Fair export movement was noted, though the dumpings at the piers were lower than at any time for many months.

French Coal Market Quiet

The general trend of the French coal market is quiet. Domestic coals are in fair demand, with prices unchanged. The market for British coal is easier and it is obvious that so long as the rate of exchange remains high and unsettled, French consumers will not be inclined to buy on a large scale. Furthermore, the resumption of indemnity deliveries from the Ruhr is shortly expected to become normal.

During the first nine days of October 42,400 tons of coke were shipped from the Ruhr district to the S.C.O.F. This tonnage was taken from the reserve stocks as none of the French production of the occupied area has as yet been delivered.

United States September Exports by Custom Districts

	(In Gross Tons)	Anthracite	Bituminous	Coke
Maine and New Hampshire.....	2	6,076	370	
Vermont.....	244	903	912	
Massachusetts.....	91			
Connecticut.....	20			
St. Lawrence.....	73,623	222,873	1,011	
Rochester.....	17,405	65,984	20	
Buffalo.....	61,756	283,950	28,300	
New York.....	6,663	3,887	869	
Philadelphia.....	3,654	28,628	1,700	
Maryland.....	1,209	59,433	11,587	
Virginia.....	4	142,619		
South Carolina.....		25,181		
Florida.....		91	735	
Mobile.....		150	504	
New Orleans.....		351	10	
Sabine.....			2,999	
San Antonio.....	43	263	490	
El Paso.....	336	2,967	312	
Arizona.....	4	1,239	4,129	
Los Angeles.....	3	7		
San Francisco.....		403	14	
Washington.....	420	376		
Alaska.....		14		
Dakota.....	7,055	11,464	2,646	
Duluth and Superior.....	2,115	2,956	991	
Michigan.....	891	139,275	28,535	
Ohio.....	151	769,530	9,345	
Totals.....		175,689	1,768,620	95,479

United States September Coal and Coke Imports

	(In Gross Tons)	1922	1923
Anthracite.....		17,234	8,695
Bituminous (free.....)		1,123,188	3,654
(dutiable.....)			46,667
Totals.....		1,123,188	50,321
Imported from:			
United Kingdom.....		999,227	
Canada.....		93,307	46,729
Japan.....			90
Australia.....		28,950	3,500
Other countries.....		1,704	2
Coke.....		3,423	1,373

Export Clearances, Week Ended Oct. 27, 1923

FROM BALTIMORE	
For Cuba:	Tons
Am. S.S. Mangrove.....	5,449
For France:	
Belg. S.S. Gasconier.....	7,762

COKE	
For Chile:	
Nor. S.S. Cederic.....	5,375
FROM HAMPTON ROADS	

For Cuba:	
Dan. S.S. Phonix, for Antilla.....	3,213
Amer. S.S. Santurce, for Havana.....	2,287
Br. S.S. Berwindvale, for Havana.....	8,129
For Porto Rico:	
Amer. Schr. J. K. Mitchell, for Maunabo.....	584
For Holland:	
Br. S.S. Explorer, for Rotterdam....	8,876
For Brazil:	
Nor. S.S. Tilthorn, for Rio de Janeiro	8,491
For South Africa:	
Dan. S.S. Nordhavet, for St. Lucia...	3,314
For Chile:	
Br. S.S. Datchet, for Valparaiso.....	3,818
For Philippine Islands:	
Amer. S.S. Eclipse, for Manila.....	3,864
For West Indies:	
Nor. S.S. Songelv, for Castries.....	3,507

FROM PHILADELPHIA	
For Porto Rico:	
Am. Schr. Cornelius J. Callaghan, for Yubucan.....	
For Cuba:	
Am. Schr. Elizabeth Freeman, for Caibarien.....	

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 18	Oct. 25
Cars on hand.....	1,132	1,624
Tons on hand.....	70,531	96,158
Tons dumped for week.....	99,790	69,795
Tonnage waiting.....	500	4,500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,905	1,687
Tons on hand.....	112,450	102,200
Tons dumped for week.....	75,274	85,388
Tonnage waiting.....	3,900	12,314
C. & O. piers, Newport News:		
Cars on hand.....	2,048	1,606
Tons on hand.....	108,240	83,665
Tons dumped for week.....	70,342	76,208
Tonnage waiting.....	15,025	1,800

Pier and Bunker Prices, Gross Tons

PIERS			
	Oct. 20	Oct. 27	
Pool 9, New York.....	\$4.90@ \$5.25	\$4.50@ \$5.00	
Pool 10, New York.....	4.35@ 4.75	4.00@ 4.75	
Pool 11, New York.....	4.00@ 4.50	3.90@ 4.25	
Pool 9, Philadelphia.....	5.30@ 5.50	5.25@ 5.40	
Pool 10, Philadelphia.....	4.45@ 5.00	4.35@ 4.90	
Pool 11, Philadelphia.....	4.20@ 4.55	4.10@ 4.45	
Pool 1, Hamp. Roads.....	4.75@ 4.85	4.25	
Pools 5-6-7 Hamp. Rds.	4.25@ 4.35	4.25@ 4.40	
Pool 2, Hamp. Roads.....	4.50@ 4.60	3.85@ 4.00	

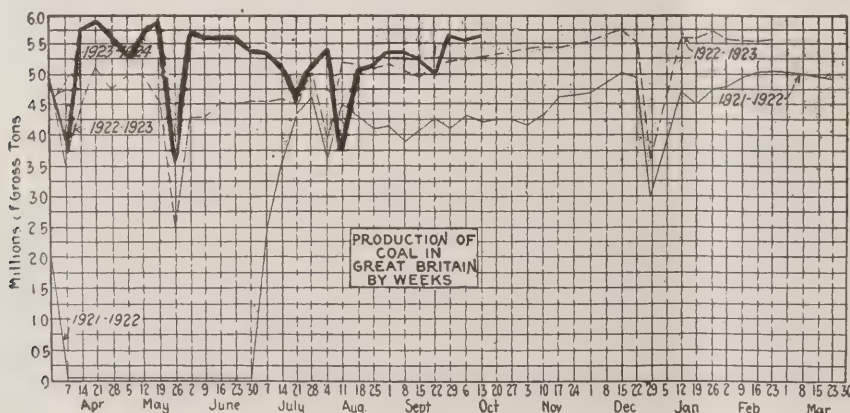
BUNKERS			
Pool 9, New York.....	5.20@ 5.55	4.80@ 5.30	
Pool 10, New York.....	4.65@ 5.05	4.30@ 5.05	
Pool 11, New York.....	4.30@ 4.80	4.20@ 4.55	
Pool 9, Philadelphia.....	5.50@ 5.90	5.40@ 5.80	
Pool 10, Philadelphia.....	4.95@ 5.30	4.85@ 5.20	
Pool 11, Philadelphia.....	4.50@ 4.80	4.40@ 4.70	
Pool 1, Hamp. Roads.....	4.75@ 4.85	4.25	
Pool 2, Hamp. Roads.....	4.50@ 4.60	3.85@ 4.00	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age		
	Oct. 20	Oct. 27
Admiralty, large.....	27s. @ 28s.	27s. 6d.
Steam smalls.....	18s.	18s. @ 19s.

Newcastle:		
Best steams.....	25s.	24s. 6d. @ 25s.
Best gas.....	24s. @ 24s. 6d.	24s.
Best bunkers.....	23s. @ 24s. 6d.	23s. 6d. @ 24s.

+ Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

ALABAMA

The Pratt-Warrior Coal Co. is building ten or twelve employee dwellings at its mine near Pumpkin Center, on the Warrior River, and also is erecting a store for the convenience of its employees.

While making an inspection of the Hamilton slope of the Tennessee Coal Iron & Railroad Co., near Pratt City, Oct. 17, J. M. McHugh, general superintendent of mines; G. W. Crane, superintendent Hamilton Slope, and Harvey McCrorie, superintendent of Pratt mines, were painfully burned about the face and upper portions of the body when a pocket of gas was set off by a lamp of one of the party.

The Gulf States Steel Co. has leased from the Pratt-Warrior Co. the mine of the latter at Ivey Bluff, on the Warrior River, in the southern part of Walker County.

ILLINOIS

The Gartside Coal Co.'s mine No. 4 at Murphysboro will be closed down and abandoned, according to information from that place. The entire mine, both top and bottom, including all machinery, equipment, etc., will be dismantled and disposed of. Robert Niggeman is president of the concern.

H. B. Wilson of Herrin, has opened a new strip mine on a farm north of Cambria. The mine is owned and operated exclusively by Wilson.

A voluntary petition in bankruptcy was filed in the United States District Court at St. Louis, Mo., by the Missouri-Illinois Coal Co., listing assets totaling \$151,185, and liabilities amounting to \$250,993. The assets consist chiefly of two mines in St. Clair County, valued at \$100,000, according to the schedule. The company is 35 years old. Officials of the company said that bankruptcy was brought about by the fact that there is no market for coal. The company, they said, lost \$100,000 during the last year sustaining a \$3,000 monthly payroll loss during that time. They said it cost them \$1 to collect each 75c.

INDIANA

A real estate transaction involving the transfer of more than \$1,000,000 worth of property was completed in Chicago recently, when Alfred M. Ogle, president of the Vandalia Coal Co., and K. L. Ogle, both of Terre Haute, Ind., exchanged 3,800 acres of improved farm land near Linton, for a flat building containing seventy-two furnished apartments in Chicago. The apartment building, seven stories high, is located at Forty-fifth Street and Drexel Boulevard, only a short distance from the South Shore Country Club. The Ogle farms, which had been in the family for more than fifty years, consist of some of the finest farm land in the state, according to M. R. Mosher, of Indianapolis, the real estate dealer who represented the Ogle family in the transaction. About 2,000 acres are planted in corn.

Judge John E. Cox in Superior Court of Vigo County has granted a petition to Clem J. Richards, receiver for the Sugar Valley Coal Co., asking authority to the extent of \$20,000 to pay labor claims and meet other expenses of the company. Frank M. Steiner with a \$5,000 claim, was the creditor who petitioned the company into bankruptcy. The mine, which is located a half mile west of West Terre Haute, is said to have in the past furnished more wagon coal to Terre Haute than any other mine in the vicinity. It is not a wagon mine, however, but it located on the Vandalia R.R. and last year had an output of from five to six hundred tons per day.

With the closing down of the Keller mine No. 2 and Crown Hill Mine No. 7 a total of seven mines are now idle in the Clinton field, and 1,800 miners are out of employment. Lack of orders is said to be the cause of the dullness of the mines. Having lost the contract for supplying coal to the steel industry, the mines now are obliged to depend upon the open market. Operators contend that they lost the steel company contracts because the miners put out dirty coal. The miners, on the other

hand, hold that the contract was lost because the coal in this field is in competition with that of non-union fields, and that the Pennsylvania and other fields receive lower freight rates than the Clinton field.

The Hickory Grove Coal Mining Corporation, a New York corporation, has qualified to operate in Indiana with a capital of \$50,000 preferred and 500 shares common stock no par. Charles M. DuPuy of Riley, is their agent.

Farmers in southern Pike County have been granted an injunction against the Enos Coal Mining Co. from damming the dredge ditch of the south fork of the Patoka River constructed at a huge cost. The Enos Coal Company operates three big strip mines, owns thousands of acres of rich coal lands, and operates eight miles of railroad. With less than 3 ft. of water in its fifty-acre lake, the Enos Coal Co. recently petitioned the board of Pike County commissioners for the right to dam the bridge ditch, so as not to endanger its big mines from shutting down for the lack of water. The board of commissioners refused the petition. The coal company started to dam the ditch anyway. Then came the injunction.

IOWA

The Equality Coal Co. has established general offices in Albia. The company's mines are located north of Buxton. The business of the Gold Goose Coal Co. will be handled through the same office in Albia as that of the Equality. The Gold Goose company maintains its mines at Hamilton.

KENTUCKY

The Dixie Gem Consolidated Coal Co., of Middlesboro, capital \$10,000, has filed amended articles increasing capital to \$60,000.

With a capital of \$30,000, the S. W. W. Coal Co., of Pike County, at Sutton, has been chartered by Nora C. and A. C. Walther, of Sutton, and J. M. Smith, of Uniontown, Pa. The same interests formed the Rockledge Development Co., capital \$20,000.

The Clearfield Cannel Coal Co., of Morehead, in Rowan County, capital \$100,000, has been chartered by Guy Snyder and G. H. Gerheat, of Clearfield and Drew Evans, of Morehead.

MAINE

Bangor retail coal dealers have advanced the price of anthracite. The increase ranges from 75c. on stove, egg and nut coal to 25c. on pea coal. The price of bituminous coal remains without change at \$11.25 a ton. The new schedule of prices is as follows: Stove, egg and nut, \$17.00; pea, \$15.50; and steam \$11.25. The prices are all subject to a discount of 2 per cent for cash, which the leaders absorb together with a part of the advance at the mines.

MARYLAND

A bridge is being erected by the Consolidation Coal Co. across Georges Creek near Midland, Md., at the Ocean No. 1 mine in order to run loaded hoppers across the stream to connect with the Cumberland & Pennsylvania R.R.

A plant costing \$350,000 is to be built at Baltimore for briquetting anthracite dredged from the Susquehanna River. The first unit will have a capacity of 60,000 tons per year.

MASSACHUSETTS

The Joint Special Coal Investigating Committee has begun an investigation into the two recent increases in the retail price of anthracite, by publicly calling upon the leading retail dealers of metropolitan Boston to justify their position under oath. Fifteen dealers have been summoned to appear before the committee, with books, papers and other records pertinent to the

inquiry, in response to the committee's request. Emergency Fuel Administrator Eugene C. Hultman and Assistant Attorney General James H. Devlin aided the committee in conducting the hearing, which marked the first occasion in which the committee has used the full powers granted to it last May. Witnesses were warned that they were not being compelled to testify, so that they may not claim immunity in the event that proceedings are later instituted by the Attorney General or the District Attorney. Before swearing the witnesses Senator John W. Haigis, chairman of the committee, read a statement outlining the situation leading up to the price increases. The closing paragraph of the committee's statement caused a stir in the hearing room. It read: "The public does not ask charity. It is willing to pay a fair price. It is unwilling to be gouged. The two recent increases, aggregating \$1 a net ton, appear to be in part, at least, unwarranted. If they are not unwarranted, the public wants to know why. The purpose of this hearing is to get the facts. We want, and the public wants, the truth, the whole truth and nothing but the truth."

As a result of investigations by the office of the Emergency Fuel Administrator relative to the burning of fuel in home furnaces and heaters, E. C. Hultman, the administrator, has issued a brochure containing information on preparation of equipment, kinds of fuel, use of anthracite and bituminous coal, and the use of coke. Much advice is included on how to obtain the best results and least waste.

George Otis Smith, Director of the U. S. Geological Survey and who was a member of the United States Coal Commission, speaking on the coal industry and situation at a meeting of the Boston section, American Institute of Mining and Metallurgical Engineers, at the Engineer's Club, Boston, on Oct. 9, declared the coal industry to be the most wasteful in the world, both of capital and man power. "It is wasteful," he said, "from any possible angle of view, and even taking average figures we find extreme inefficiency and waste. The task of alleviating such conditions I lay not to labor or to capital, but to the engineers. It looks like their job to me. One good thing I have found is that, independent of the commission, and largely, I think, through fear of them, the industry has been investigating itself of late."

MICHIGAN

The Detroit Stoker Co. announces the appointment of E. L. Beckwith as district manager in charge of the company's Chicago office, address Illinois Merchants Bank Building. Mr. Beckwith is an engineer with many years experience in stoker sales work.

The Columbus (Ohio) office of the Pittsburgh Coal Co., announces that it will open a Detroit office about Nov. 1 with Arthur W. Marshall, who has been a salesman with the company for the past 18 years, as manager. For the past few years he had held the position of assistant sales manager. The Detroit office will be in the First National Bank Bldg.

A new coal mine is about to be sunk in Rush township near Owosso by the Copper Coal Mining Co., of Saginaw. Thirty inches of coal under a 300-acre tract is to be opened through a shaft 128 ft. deep.

MISSOURI

T. S. Clark, since 1903 connected with the Western Coal & Mining Co. of St. Louis and the Consolidated Coal Co., and for several years past auditor for the Western Coal & Mining Co., has resigned to accept a similar position with the Consolidated Coal Co. of St. Louis, succeeding F. L. Dubois, who died recently.

The coal mine in Elmira is to open again soon, according to reports from officials of the mine. The plant had been closed for more than a month because of a controversy between the operators and the miners.

MONTANA

George N. Griffin, State Coal Mine Inspector, reports that the mines in Montana produced 3,140,837 tons of coal in the year ended June 30, 1923. This does not include the output of a few small mines that did not report. The coal mined in the state had a value at the mine of \$9,903,625, the greatest of any year since 1901 with the exception of 1920, when \$10,393,908 worth of coal was produced. The coal industry gave employment in 1923 to 4,047 men, of whom 1,364 were miners who were em-

ployed on an average of 181 days for the year. Sixteen lives were lost in coal mining compared to only 7 the year previous. There were 196,302 tons of coal produced for each life lost. One person was killed for each 256 persons employed. The mines of the state used 78,399 kegs of powder and 49,339 lb. of dynamite. Fifty-four per cent of the coal was mined by hand, the remaining 46 per cent being mined by the use of machines, the latter giving employment to 169 miners. The inspector finds that "very few, if any, of the coal mines in the state have done anything in the way of first-aid work during the past year. It is to be regretted that operating companies do not take more interest in this matter, for it is the opinion of the writer that money expended along this line brings good returns." He states that in his opinion "if a part of the money paid out in the form of compensation was used in safety-first and first-aid work, the results would be very gratifying both from a monetary and humanitarian standpoint." Miners themselves do not take the interest in safety work that they should, the inspector states, and he calls attention to the fact that safety first-aid work means more to the employees than to the employers.

The King Coal Mining Co. has bought and begun operation of the Star mine of the old Star (Musselshell County) Mining Co. Abe Douglas is superintendent in charge of operations. The company expects to employ about 100 men at the property within the next 30 days.

NEW JERSEY

An involuntary petition in bankruptcy was filed on Oct. 9 in Federal Court at Newark, against the Irvington-Hilton Coal Co., of which the late Mayor Edward R. Folsom of Irvington was president. Louis Folsom, vice-president of the company and son of the late Mayor, filed a petition previously with Vice-Chancellor Foster asking that a receiver for the company be appointed. Vice-Chancellor Foster issued an order directing parties interested to show cause why a receiver should not be named. Federal Judge Runyon appointed Herbert W. Taylor as receiver of the company under \$5,000 bond upon application of Barney & Larkey, lawyers, for the creditors.

NEW YORK

Walter B. Johnson, heretofore with Whitney & Kemmerer for twenty-four years, is now associated with McCann-Camp Co., Inc., 90 West Street, New York.

The National Exposition of Power & Mechanical Engineering, to be held at the Grand Central Palace, New York, Dec. 3-8, is planned in co-operation with the national societies interested in the economy of fuel and in the production and use of power. The exposition will parallel the annual meeting of the American Society of Mechanical Engineers, which will be held at the Engineering Societies Building, 29 West 39th St., the first four days of the week. To avoid conflict between the two events, the sessions of interest to those who will attend the Power Exposition have been set for the mornings of the meeting and the exposition will not open until one o'clock each day. This parallel arrangement will give engineers the desired opportunity to enjoy both events to the greatest possible degree. Some of the subjects to be discussed at the annual meeting of the A. S. M. E. are: "Factors in the Spontaneous Combustion of Coal," by O. P. Hood; "Economic Phases of Coal Storage," by F. G. Tryon; "Coal Handling and Coal Storage," by H. E. Birch and H. V. Coes.

The Power Exposition offers an opportunity for the operating man to become acquainted with the latest devices in his field. This opportunity will be seized by the National Association of Stationary Engineers, the New York Building Owners and Managers Association, the New York Building Superintendents' Association, the Blue Room Engineering Society and the Ocean Associations of Marine Engineers, who will attend the exposition in groups. The office of the management of the exposition is in the Grand Central Palace.

The committee on coal of the Brooklyn Chamber of Commerce has under consideration a resolution recommending government ownership of coal. Prior to the introduction of the resolution Former United States Senator William M. Calder, who is chairman of the committee, reviewed the coal situation in Brooklyn and offered three suggestions in the search for a remedy. One of these was his old plan providing for a government agency with which coal companies and dealers would be compelled to file their price schedules, including costs and

profits. The second suggestion was to put coal under the supervision and control of the Interstate Commerce Commission and the third, which he said was "almost radical," was government ownership. J. Whitney Richardson who introduced the resolution said he did not approve of government ownership, but that it appeared the one thing which might awaken the coal operators to the situation they were creating for themselves.

Albert S. Fisher has been appointed manager for Pittsburgh Coal Co. at Buffalo, with offices in the Ellicott Square Building, succeeding Seymour Whitley, resigned. P. F. Ballou, formerly connected with the company's Erie (Pa.) office, has been transferred to the Buffalo office. The changes became effective Oct. 15.

More than 20,000 tons of coal stored in pockets of the East River Gas Co. Long Island City, were consumed on Oct. 13 in a fire which started in the coal bunkers. The origin of the fire is not known.

The Emerson-Morgan Coal Mining Corporation, New York City, has been incorporated to deal in coal, etc.; capital, 2,500 shares of no par value. Directors: George W. Hinckley, Produce Exchange Building, New York City; Eleanor Tempny and A. M. Menkel, New York City. Attorney, G. W. Hinckley.

Directors of the Norfolk & Western Ry. have declared an extra dividend of 1 per cent on the company's common stock in addition to the regular quarterly dividend of 1 1/2 per cent due to be declared at this time. Both dividends are payable Dec. 19 to stockholders of record Nov. 30. With the extra dividend the company pays 6 per cent on its common stock.

The Pennsylvania Coal & Coke Co. reports gross earnings of \$662,309 for September, compared with \$1,019,344 for the same month last year. Net income, before Federal taxes, amounted to 14,768, compared with \$321,891 for September, 1922. Gross earnings for the nine months ended September 30, last, were \$6,787,349, compared with \$2,648,264 for the same period last year. Net income, before Federal taxes, was \$741,962, compared with \$96,334 for the same period last year.

Charles P. Tolman, for sixteen years chief engineer and chairman of the Manufacturing Committee of the National Lead Co. and a past president of the National Safety Council, has resigned to open an office as consulting engineer at 111 Broadway, New York City. His specialties will be dust and fume control, handling materials and products and manufacturing methods and processes. He becomes consulting engineer for the National Lead Co.

The Walter Engineering Corporation, composed of Raymond A. Walter and associates, is opening an office at 299 Broadway, New York City, to make examinations and reports. Raymond A. Walter for the past year was one of the two engineers of the U. S. Coal Commission. With his associates Mr. Walter will make examinations and reports on coal mining, including financing, mergers, reorganization, consolidation, income tax, modern mechanical mining and every phase of development, operation, distribution and marketing.

OHIO

The Morrison & Risman Co., manufacturer of railway track equipment, Buffalo, N. Y., has established a district sales office in the Ulmer Building, Cleveland, in charge of R. B. Morrison. Warehouses also are being established in Cleveland, in addition to warehouse connections at Philadelphia, Buffalo and Lebanon. The company's Philadelphia office has been discontinued.

The Cincinnati Chamber of Commerce completed a "good will" trip by some 100 of its members through the southeastern Kentucky coal fields on Oct. 25, having been gone for five days and visited the more important coal mining centers of Hazard, Harlan and the Jenkins districts. Considerable publicity was given to the great areas of coal that were viewed by these commercial enthusiasts.

The Maher Iron Ore & Coal Co., New Lexington, has been chartered with an authorized capital of \$12,000 to deal in coal and mineral lands and to operate coal mines. Incorporators are C. A. Maher, James Maher, William A. Allen, O. H. Trout and George A. Forquer.

The Fennac Coal Co., Cleveland, has been chartered with a capital of \$10,000 to mine coal and to deal in coal and coke, both at wholesale and retail. Incorporators are M. W. Fennelley, W. C. Graves, C. W. McNamara, Clara E. McNamara and Anne Fennelley.

PENNSYLVANIA

Anthracite miners complain that the 10 per cent wage advance recently granted is having an indirect effect on the cost of living in some sections of the region. The men say that since they are getting the higher rate, landlords have been increasing their rents. Barbers of the Lehigh section have increased the price of haircuts and shaves. Haircuts now cost 50c. at most shops and shaves from 20 to 25c. Haircutting was done heretofore at 35c. and the charge for shaves was from 15 to 20c., depending on the class of trade.

Rinaldo Cappellini, president of District No. 1, United Mine Workers, last week announced that on Nov. 1 a compensation bureau, to investigate and contest for all mine workers of District No. 1 will be established. With this announcement, he also made public these appointments for the important work: Garfield Lewis, of Old Forge, compensation investigator, and Miss Helen Bolton, of Scranton, secretary. Mr. Cappellini explained that the secretary of the mine local union has been instructed to supply the district office at Scranton with a true and accurate account of every mine accident on the day it happens. These cases will be listed, and investigations made. Witnesses will be secured. Medical service will be granted, and when these cases are brought before the compensation referee either in Scranton or Wilkes-Barre, they will be properly prepared, and a fight made to win a fair and just award.

A second conference between Governor Pinchot and Samuel D. Warriner, chairman of the Anthracite Operators' Policy Committee, and other members of the committee, scheduled for Oct. 24, has been postponed. Mr. Warriner notified the Governor at Harrisburg that it would be impossible for some of the operators to get to Harrisburg because of board meetings. No date has been set for the meeting.

The Hazle-Brook Coal Co., of Hazleton plans to make Raven Run colliery, in the Schuylkill field, one of the largest operations in the anthracite district. Raven Run has been taken over from another leasing corporation. It is one of the few operations left in the hard-coal section that have virgin seams to be developed. A new steel and cement breaker is going up, houses are to be built for the miners and it is thought that within ten months the plant will be in full operation.

The Fayette-Greene Coal Producers Association will hold a dinner meeting at the Uniontown Country Club Thursday evening, Nov. 1. The meeting will be addressed by Charles O'Neil, secretary-treasurer of the Central Pennsylvania Coal Operators Association.

The Sessler Coal Co. has been organized at Uniontown by James T. Sessler and associates, capital, \$30,000.

The Kimberly Crest Coal Co. is a new corporation at Somerset; capital, \$50,000.

A contract for uncovering coal measures stretching from Oneida colliery to the Green Mountain line of the Lehigh & Wilkes-Barre Coal Co., five miles away, has been awarded by the Lehigh Valley Coal Co. The project will require two years for completion. Steam shovels will be used to take the clay off the anthracite outcrops and a network of temporary railroads will be built to haul away the debris to dumps beyond the coal measures. The coal taken out will be hauled 11 miles overground to the Jeannesville breaker for preparation for market.

The proposed merger of the Philadelphia & Reading Ry. and the Central Railroad of New Jersey with the New York Central R.R., which was given much consideration at the annual meeting of the State Chamber of Commerce at Harrisburg last week, is being studied by a special committee of the state organization appointed by Alba B. Johnson, president of the State Chamber. Opposition to the merger was voiced in a resolution sent to the Committee on Resolutions which in turn reported out a resolution favoring further study of the matter and the appointment of the committee. Speakers announced that the plan, if carried out, would result in much of the anthracite being taken to the Port of New York instead of Philadelphia and that other traffic would be diverted. President Johnson named the following committee, which will meet with him at Harrisburg, Nov. 6: E. J. Poole, chairman, Reading, sponsor of the original resolution condemning the merger; Jesse S. Bell, Williamsport; Harry C. Graham, Pittsburgh; John S. Rilling, Erie; Worthington Scranton, Scranton; Vernon F. Taylor, Indiana; John Uhl, Wilkes-Barre; Charles P. Vaughan, Philadelphia, and F. W. Walker, Beaver Falls.

The Straub-Atkinson Coal & Coke Co., Pittsburgh has changed its name to the Arch H. Straub Coal & Coke Co.

WEST VIRGINIA

The Cagney Coal & Coke Co., of Fairmont, has filed notice of incorporation in the offices of Secretary of State Houston G. Young; capital stock, \$25,000; incorporators, Harry Marshall, of South Brownsville, Pa.; J. W. Davis, of Hopwood, Pa.; D. F. Fries, of New York City; S. J. Titus, of Jefferson, Pa.; John A. Allen, of Smock, Pa.; A. C. Lee, of Masontown, Pa.; George H. Krepps, of East Millsboro, Pa.; Lloyd W. Cagney, of Point Marion, Pa., and E. J. Newcomer, of Uniontown, Pa.

New River coal lands will be developed by the **Cap Smokeless Fuel Co.**, which has just been chartered with a capitalization of \$75,000. The offices of the company for the present are to be at Charleston. Identified with the new company are William W. Burdette and Anis Burdette, of Handley; C. A. Purcell, M. P. Albertson and W. A. O'Neal, all of Charleston.

No. 2 mine of the Low Moor Co., at Fayette, which had been closed down for a short time, **has resumed operations.** Preparations are under way at the No. 1 mine of the same company to screen the output owing to the better demand for prepared sizes.

That coal lands in the Glenwood section of Ohio County are to be developed is indicated by the organization of **Wheeling-Glenwood Coal Co.**, with a capitalization of \$50,000. Offices of the company are at Wheeling. Incorporators of the new concern are E. L. Peters, V. H. Crites, Frank Hembert, Harry Long and V. B. Travis, all of Wheeling.

Men well known in the coal industry have taken out a charter for the **National Coal Inspection Bureau, Inc.**, with a capital stock of \$50,000. There has been a good deal of discussion of such an organization in the trade recently, its purpose being to insure the shipping of coal of better quality and to put a stop to the rejection of coal of quality, all through a system of inspection much like that utilized in the lumber industry. Incorporators of the Bureau are Justus Collins, president of the Smokeless Fuel Co., Charleston; O. J. Cox president of the Kanawha Valley Coal Co., Charleston; L. B. Ramsey, of the Logan Fuel Co., Charleston; H. P. Elliott, general manager of the Stange-Elliott Coal Co., of Charleston, and W. D. Roberts, of the **National Coal Mining News**, Charleston.

Organization of the Jaunda Mining Co., with a capital stock of \$130,000, presages further development of coal lands in the Kanawha County field. The company will have its office at Charleston. Identified with the new enterprise are J. W. Keeney, of Eskdale; C. W. Estep, H. A. Stewart, Milton Crites and L. Jaffe, all of Charleston.

Work has been completed by the **West Virginia Coal & Coke Co.**, on its new store building and also on its new office building at Norton, in the Elkins field. The total cost of the two structures is about \$40,000. The company will also erect a new and modern tippie at its Junior plant when conditions justify it, to replace the one destroyed by fire.

The Pinnacle Coal & Coke Co., of Spring Forks, has been authorized to increase its capital stock from \$500,000 to \$750,000.

Operations in Pocahontas territory will be undertaken by the **Royal Pocahontas Coal Co.**, which has just been organized with a capital stock of \$20,000. This company will operate in the vicinity of Jaeger, which will be the headquarters of the company. Having an active part in organizing the new company were T. B. Lane and Carmie G. Lane, of Jaeger; H. H. Liegett, A. F. Meyer and Marguerite L. Marsh, of Cincinnati, Ohio.

WISCONSIN

Senator Irvine Lenroot, speaking at Marshfield on Oct. 12 announced he will **support governmental regulation of the anthracite industry** and control of coal prices that the public may be protected against profiteering, as recommended by the Commission created by the last Congress. Following closely the findings of the Commission, the Senator said there should be little or no increase in the price of anthracite by reason of the recent advance in wages, "for a reduction of the net profits of the operators to a reasonable basis will absorb nearly all of the increase in wages." Since the anthracite industry has been found to be an excessive profit-making monopoly it is proper that it should be brought within by the government, he pointed out.

WYOMING

The U. S. Land Office at Evanston, has been directed to offer for lease a tract of **480 acres of public land** in Unta County, 14

miles south of Kemmerer and about 1½ miles east of Cumberland, on the Cumberland branch of the Wyoming Western R.R., **containing several thick beds of high-grade bituminous coal.** Lease for this tract will be at a government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of \$75,000 during the first three years and a minimum production of 45,000 tons of coal a year beginning with the fourth year.

WASHINGTON, D. C.

Senator Oddie, of Nevada, has practically completed preparation of a bill creating a **Department of Mines**, whose head shall be a Secretary of Mines with a seat in the President's Cabinet. The Senator plans to submit the proposed bill to mining interests for analysis before its introduction when Congress convenes in order to obtain the advice and suggestions of those interested in the mining industry, as well as of government departments and bureaus to be affected thereby.

Walter D. Rogers has joined the National Retail Coal Merchants' Association as assistant secretary. He was with the U. S. Coal Commission and is one of the authors of the Commission's report covering the retail trade. He had charge of the Commission's investigation in Boston, Mass., last



WALTER D. ROGERS

winter and also made special cost studies for it in New York City and Washington, D. C. His experience as a Congressional secretary in Washington and his experience in New York City as an auditor and credit manager should make him a strong man for the association. Mr. Rogers served two years in the United States Army during the war, and for a year afterward was with the American Red Cross.

That research on mining problems be coordinated and that new work be undertaken on a co-operative basis has been proposed by the British government, and the plan has been approved by the American State Department. The Department of the Interior has been authorized to proceed directly by the British Board of Trade in the perfecting of the arrangement. The action of the British Government is an outgrowth of the recent visit to that country of George S. Rice, chief engineer of the U. S. Bureau of Mines. While in England Mr. Rice had frequent opportunity to point out the character and scope of the research being conducted in this country. British mining engineers were impressed with the fact that the research in that country was along almost identical lines. The arrangement is being entered into with the idea of avoiding duplication and making possible a greatly enlarged program. Mr. Rice was elected an honorary member of the British Institution of Mining Engineers. Lord Curzon, the Foreign Minister, has formally conveyed to the State Department the thanks of the British Government for the constructive suggestions and advice conveyed by Mr. Rice during his visit.

The U. S. Supreme Court on Oct. 22 denied a writ of certiorari sought by the **Sandford Coal Co.** of Illinois to review a decision of the lower courts awarding a judgment of \$41,409, including interest, to the Wisconsin Bridge & Iron Co. for a tippie at a mine in Williamson County, Ill. The judgment therefore stands. The coal company did not deny ordering the tippie, but in the suit set up a counter claim for damages on the ground that it had suffered losses due to delay in installing the tippie.

This claim the lower courts refused to entertain in the suit at issue. The tippie was ordered in November, 1919, to be completed July 1, 1920. In the meantime the development of the mine proceeded with a temporary wooden tippie of limited capacity. The steel tippie was not completed, the coal company alleged, until in December, 1920, although it was put into use in October previous. Because of this delay, the coal company alleged it had lost business as its output was restricted to 150 tons daily whereas with proper tippie equipment it could have raised, and sold, 760 tons daily.

The Federated American Engineering Societies announced that **Arthur P. Davis**, whose recent dismissal as Director of the U. S. Reclamation Service by Secretary of Interior Work caused a nationwide protest by engineers, **has been retained by the State Department as technical adviser** in connection with certain claims against the United States by British citizens which are to be tried before the Pecuniary Claims Arbitration Commission in London beginning Nov. 6. The arbitration of these claims was provided for by a special law of Congress to clear the docket of old pending claims which have not been settled. Mr. Davis sailed for England Oct. 23 to assist in the preparation of these cases prior to their consideration.

CANADA

The coal miners of Nova Scotia have requested the management of the Dominion Coal Co. to set a date at which a new wage contract will be discussed. Union officials have for some years been endeavoring to change the date for the termination of contracts from December to April, at which time all contracts in the American and Western Canadian coal fields terminate, but so far have not been successful.

F. A. Coombe, a Montreal steam and combustion engineer, chairman of the Fuel Committee of the Engineering Institute of Canada, has been engaged to make an **exhaustive report on the feasibility of establishing central heating plants in Canada.** The investigation will be conducted under the supervision of the Dominion Fuel Board, and the report must be completed within six months. Particular attention will be given to the saving that can be effected by the use of low-grade fuel in these plants.

The Dominion Coal Co. will spend \$2,000,000 in opening up a new mine at Lingan, construction of a branch railway to the site having been started. The new colliery will be equipped with the most modern devices. It will tap the Phelan seam and have a capacity of 2,000 tons daily.

J. B. MacLachlan, deposed district secretary of the United Mine Workers of America, was convicted at Halifax, Oct. 17 of **sedition and spreading false tales.** Throughout the trial MacLachlan maintained a confident air and the worst he looked for, apparently, was disagreement by the jury. At the conclusion of the hearing he was taken back to jail to remain until the last day of the month, when sentence was to be pronounced. The general feeling is that the verdict is a just one and that the prisoner could expect nothing else from an unbiased jury. It may be that counsel for MacLachlan will appeal the verdict, but it is questioned if a better decision could be had from the full bench. The trial of Dan Livingston, former district president of the U. M. W., has been postponed until the next sitting of the Supreme Court. He will be given hearing on similar charges to those on which MacLachlan was convicted.

JAPAN

A letter just received by H. Foster Bain, director of the Bureau of Mines, tells of the escape from injury of several prominent Japanese engineers who were in Tokio at the time of the earthquake, among them **Dr. Takuma Dan**, who is well known in this country. He was educated at the Massachusetts Institute of Technology and is one of the partners in Mitsui & Co. He developed the Manda coal mine in southern Japan. In the development of this mine the most modern mechanical equipment has been used. Owing to the large amount of water which had to be handled, Dr. Dan designed special pumps for it. When the designs were received by the pump manufacturers, they held up work on the order until they could cable to make sure that the decimal points were in the right places. As the pumps were the largest ever manufactured at that time, the manufacturers feared that someone had slipped a decimal point. Incidentally these pumps, after many years, still are being operated satisfactorily.

Obituary

John A. Clark, one of the best known coal operators of northern West Virginia, died Oct. 19 at his home at Fairmont, W. Va., after an illness covering a period of several years. Mr. Clark was born at Cumberland, Md., in 1855. After considerable experience he became an independent coal operator on April 1, 1891, when he organized the Clark Coal & Coke Co. with a mine at Pritchard on the Monongahela River Railway. Later he opened a mine at Anderson and a mine at Chiefton. He purchased the mine of the Pitcairn Coal Co. in 1910 and organized the Harry B. Coal & Coke Co., making his three sons his associates, Mr. Clark becoming the president of the company. A few years later he organized the Car-Diff Smokeless Coal Co. and the Dixie Mining Co., these companies being operated as separate concerns until the organization of the Clark Coal & Coke Co., in February, 1922. About 1899 Mr. Clark organized the Columbia Coal & Coke Co., at Columbia, and the Fairmont & Baltimore Coal & Coke Co., at Adamston, those companies later being purchased by the Fairmont Coal Co., now the Consolidation Coal Co. In 1901 the Waldo mine at Wilsonburg was opened as was the Goff mine, the New Chiefton and the New Randolph, which were operated as properties of the Madeira Hill-Clark Coal Co. Funeral services were held at the family residence at Fairmont, Oct. 21, burial being at Woodlawn Cemetery. His wife and three sons survive.

P. W. (Pat) Wickham, general superintendent of the mine properties of the New York Coal Co. in the Hocking field, died at Nelsonville, Ohio, Oct. 17, after a brief illness. He was 48 years old.

General James Lewis Caldwell, one of the pioneer figures in the development of the coal resources of southern West Virginia, died Oct. 18. General Caldwell, who was a veteran of the Civil War, president of the First National Bank of Huntington and head of the Dingress Run Coal Co., with extensive holdings in Logan County, succumbed to an illness covering a period of eight months resulting from an attack of influenza. General Caldwell was born at Elizabeth, in Wirt County, W. Va., on May 20, 1846. In 1862 he joined the Union forces and served until the end of the war. A few years after organizing the First National Bank of Huntington, of which he was president for almost forty years, Mr. Caldwell built the Guvandotte Ry., which is now a part of the C. & O. system, that road leading to the Logan field, where Mr. Caldwell acquired much coal acreage. The Dingress Run Coal Co., of which he was the president at the time of his death, is said to own 30,000 acres of coal land in Logan County on which twenty mines are operating. He also was secretary and treasurer of the Logan Cannel Coal Co. at the time of his death. Funeral services were held at the First Presbyterian Church of Huntington Oct. 20. The widow and six children survive.

Jake Brady, president of the Brady-Tucker Coal Co. died Oct. 22, following an operation for appendicitis at Christ Hospital. Mr. Brady was reared in the coal business, his father having been associated with several retail and wholesale companies of Cincinnati. He started with Kewett, Bigelow & Brooks as a lad of twenty and worked himself upward until his appointment as general manager of sales some fifteen months ago. After a re-arrangement of the selling department of that company Mr. Brady formed the Brady-Tucker Coal Co. with Larry Tucker, who had been with the Central Fuel Co., and his firm prospered despite the hard times that have beset the trade in the last year. He had been ill only a few days when the end came. He was thirty years of age.

Trade Literature

Welding and Cutting Equipment. Torch-welding Equipment Co., Chicago, Ill. Catalog 23. Pp. 40; 8x11 in.; illustrated. Cross-sectional views with detailed explanation of oxyacetylene welding and cutting apparatus, lead welding, soldering, brazing and decarbonizing units, gas-pressure regulators, automatic machines, generators and supplies are included.

Bethlehem Steel Co., Bethlehem, Pa., has issued an interesting little book, Publication No. 26, describing the nature and uses of **Mayari Pig Iron**. Some useful data compiled especially for the book by Dr. Richard Moldenke are included. Price, \$2.00.

Motorbloc — The Motor-Driven Hoist. Motorbloc Corp., Summerdale, Philadelphia, Pa. Bulletin S-101. A 6-page folder describing and illustrating the lightness and portability of the device.

Publications Received

Erection of Barricades During Mine Fires or After Explosions, by J. W. Paul, B. O. Pickard and M. W. von Bernewitz, Bureau of Mines, Washington, D. C. Miners' Circular 25. Pp. 27; 6x9 in.; illustrated. Contains short description of some of the gases found in mines, tells what to do at time of fire or explosion, with practical recommendations, and gives life-sustaining capacity of barricaded chambers. Experiences of erection of barricades at mines during explosions are included.

The Morse Chain Co., Ithaca, N. Y. has issued in book form the address by F. L. Morse at the 26th annual convention of the American Mining Congress on **"Power, Its Application from the 17th Dynasty to the 20th Century."** The book has 46pp., is 6x9 in. and well illustrated.

Analyses of Illinois Coals, by G. W. Hawley, Illinois Mining Investigations, Urbana, Ill.; prepared under a co-operative agreement between the Illinois State Geological Survey Division, the Engineering Experiment Station of the University of Illinois and the U. S. Bureau of Mines. Co-operative Mining Series. Extract A from Bulletin No. 27. Pp. 68; 6x9 in.; tables.

Traffic News

Rates on coal from Winton, Wyo., to destinations in various Western states have been found by the Interstate Commerce Commission to be unreasonable to the extent that they exceed the rates in effect at the time from the Rock Springs-Kemmerer group in which Winton was subsequently included. As a result of that decision, reparation has been awarded covering shipments made by the Megeath Coal Co.

The Interstate Commerce Commission will hold its **hearings into anthracite freight rates from Pennsylvania to Canada, New York and other northeastern states at Albany, N. Y., Nov. 5**, according to an announcement Oct. 17 by the New York Public Service Commission.

The Southern Appalachian Coal Operators' Association was **unsuccessful in its efforts to establish that freight rates charged from mines in its territory to Louisville, Ky., are unreasonable and preferential to competing coal operators in western Kentucky.** The Interstate Commission, in a formal opinion handed down Oct. 26, holds that the rates are not unreasonable or unduly prejudicial. The Commission pointed out that if the rates from western Kentucky to Louisville were increased, it would not benefit the Southern Appalachian operators but simply would give a greater advantage to mines served by the Illinois Central. The Commission points to the statement that Illinois mines are capable of increasing their tonnage intended for Louisville sufficiently to displace all coal now shipped to that city from mines on the Louisville & Nashville. The Commission also made the point that shipments to Louisville from Southern Appalachian territory are increasing, whereas those from western Kentucky mines are decreasing.

Hereafter, according to announcement just made, the **Norfolk & Western Ry. will accept privately owned cars as "assigned" or privately owned equipment.** Heretofore the N. & W. has steadfastly refused to handle privately owned cars as other than the general run of cars and has so allotted and distributed such equipment. In some quarters it is expected that the mining companies controlled by Henry Ford will take advantage of this opportunity to use D. T. & I. equipment. It is certain that more companies would have taken advantage of the new ruling if it had been made a year ago, when the spot market was stronger.

Hearing into the complaint filed by coastwise steamship and towing companies that charges for dumping, trimming and other port services at the three coal terminals at Hampton Roads are unreasonable and unjust were in progress at Norfolk all last week, before Examiner W. A. Disque, of the Interstate Commerce Com-

mission. The complaint was filed in April by the Coastwise Transportation Corporation, of Boston; the Southern Transportation Co., of Philadelphia; the Eastern Transportation Co., of Baltimore; the Staples Transportation Co., of New York; the Neptune Line, Inc., of New York, and the Thames Towing Co., of New London, Conn. Defendants in the hearing are the Norfolk & Western Ry., the Virginian Ry., the Chesapeake & Ohio Ry., the Lines Co., the Lamberts Point Towboat Co., and F. R. Barrett, stevedore. Witnesses for the complainants introduced testimony in efforts to substantiate the charge that the costs to the steamers and tows handling transhipped coal for New England were too high. Comparisons were made with the same services performed at Baltimore and Philadelphia to show that it was relatively higher at Hampton Roads than at those two competitive ports. Examiner Disque will report on the testimony taken and the decision is not expected for several months.

Coal rates to a large number of Indiana towns have been attacked by the Community Traffic Service Bureau, of Anderson, Ind. The Bureau claims that points east of Indianapolis and south of the line of the Big Four from Indianapolis to Union City, inclusively, have been paying a higher rate than is warranted. The destinations involved are located similarly to Indianapolis as far as service on West Virginia and Kentucky coal is concerned, it is claimed. Similar claims are being made as to rates on the Chicago, Indianapolis & Louisville north of Indianapolis as far as Monticello and to certain points on the Pennsylvania and Big Four west of Indianapolis. It is declared that certain points receiving switching service from Indianapolis yards have been compelled to pay the Chicago rate on coal, despite the fact that the latter point is 200 miles further away with a difference in rate over Indianapolis of 63c. a ton. It is stated that the rates from the Illinois fields and other territory into Indiana have been on a very much lower basis than the rates complained of. The whole situation is said to grow out of the zoning system put into effect by the Fuel Administration during the war. There are other special features involved, including alleged violations of the third and fourth sections of the act to regulate commerce.

The railroads on Oct. 17 moved more freight cars, both loaded and empty than ever before on any one day in history, according to a report by the American Railway Association. Fifty-two Class 1 railroads, representing about 90 per cent of the mileage for that class of carriers, on that day moved 1,029,428 cars. Between May 19 and Oct. 13, inclusive, the latest figures available, more than one million cars have been loaded with revenue freight in seventeen different weeks. In thirteen of those weeks the record loading which was made during the week of October 14, 1920, when the total was 1,018,539 and which stood until this year, has been exceeded. The present record loading of 1,097,274 cars was made during the week of Sept. 29 this year.

It is generally understood in coal circles in southern West Virginia that **D. H. Maher, president of the Norfolk & Western, will retire as such on Jan. 1, 1924**, having reached the age limit. Mr. Maher has been connected with Norfolk & Western for many years and ranks high as an executive. There is a good deal of speculation as to who will succeed the retiring president, in the event that he retires.

Reports just filed by railroads show that **only 151,332 freight cars out of a total number owned of about 2,300,000 were in need of repair on Oct. 1** this year, or 6.7 per cent. This compares with 216,011, or 9.4 per cent on Jan. 1. The railroads on Oct. 1 also had only 9,823 locomotives, or 15.3 per cent of the number on line, in need of repair. On Jan. 1 this year, 15,549, or 24.1 per cent, were in need of repair.

Coming Meetings

Harlan County Coal Operators' Association, Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Second National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, NOVEMBER 8, 1923

Number 19

Time to Clean House

THERE is a deal of difference between prices for coal set by the ordinary play of supply and demand and prices set by force. Most of the complaints about the high prices for coal in the past few years have had no other justification than that buyers, wanting coal faster than it could be supplied, bid up the price. Abnormal conditions accentuated the normal result of effect following cause. The operator increased his price with the market and the increase was passed on. But there is today an unnatural factor introduced into the trade in the East that brings no credit to those who resort to its exercise.

Bituminous coal is being sold with a club. And that club is putting an unwarranted premium on anthracite while cutting the heart out of the soft-coal market. Dealers are being forced to take bituminous coal or steam sizes of anthracite, often car for car, with deliveries of domestic sizes of hard coal. Of course the tonnage of anthracite that is thus marketed is small compared with the whole, but the effect on the trade is important and on prices is entirely out of proportion to the volume of business so done.

The dealers have little or no market for or ability to sell this steam coal, whether hard or soft, and they turn it back on the market, to be sold at any price that it will bring, thus depressing the spot price of steam coal. Their losses are made up by putting a premium on the egg, stove and nut anthracite they get. The soft-coal house, whether producer or wholesaler, that is lending itself to this practice is hurting its own business and adding to the discredit of the whole industry. At best but a very small fraction of the bituminous coal seeking a market can be forced on the trade in this fashion, and when as a direct result of the distress in which it finds itself some of that coal is publicly offered at a dollar a ton, the buyers are given an entirely erroneous idea of values.

But however complacent the buyer of steam coal may be as the coal man undermines his own prices, the buyer of hard coal has just cause for complaint. The present high price of independent anthracite is not warranted. Neither the production and deliveries to date this year nor the weather can be used to explain \$11 and \$12 hard coal to the dealer. "Backdoor" trading has always been a feature of the New York market. It is not an indictable offense, nor is it less outside the letter of the law when a seller dribbles out a portion of his product through a willing free-lance jobber to be sold at a price higher than he is willing openly to quote it.

Not only are ordinary good business ethics violated by such pandering to the desire for immediate large profit but the whole scheme is unsound merchandising. The trade knows these things, it knows who are the prime movers and pace setters, and who of good reputation have fallen. It is no cause for self congratulation that

the District Attorney and the Federal Trade Commission can "get nothing on them." The argument that it is fair to charge the "market" and unfair to suggest or to expect one to sell for less falls down when the buyer is blackjacked.

Misrepresentative Statistics

IT DOES not subtract from the distrust in which all coal men hold the Federal Trade Commission when that body resorts to such unfair tactics as are challenged by E. W. Parker in an open letter to Chairman Murdock. The Trade Commission is rendering the public—at the request of the President—current reports on anthracite showing the movement through jobbers and the commissions charged.

Mr. Parker is exposing a statistical trick used by the Trade Commission to conceal the meagerness of its returns, and, whether intentional or not, a trick that misrepresents the facts. The objection is to the use of percentages without showing the quantities or the relationship to the whole output, as when the last report of the Trade Commission said that one-third of the tonnage of anthracite was sold at more than \$12 per ton at the mine—an obviously incorrect statement with respect to the industry as a whole, but doubtless true of the sales on which the report was based, which may have represented but 1 or 2 per cent of the total business.

Taking Up Coal in a "Serious" Way

MRS. LOUIS REED WELZMILLER, Deputy Commissioner of Public Markets of New York City, is the economical, efficient kind of citizen that should be put in charge of all public work. For a small sum to cover a few days' expenses in the anthracite fields, she has given us a report on hard coal that for conciseness, definiteness, positiveness, and assertiveness puts to shame everything previously attempted.

Mrs. Welzmillier has "done" coal before. She investigated Somerset County during the 1922 strike and had her picture in the Hirshfield report to Mayor Hylan. It is surprising how much one with that experience was able to accomplish in investigating anthracite. What a waste the \$600,000 spent by the Coal Commission! And the time saved, too! And against such odds! Why the horrid coal companies refused to let her underground to see how much coal is left, but she overcame that hazard by disguising herself as a miner and with the assistance of a hardy union official stole past the minion at the portal—or should we say the cager?

How simple it all is, if one but has an open mind, a few days and sufficient disguise! Mrs. Welzmillier drew seven numbered conclusions that may easily be stated as follows: There is more anthracite than the public knows about and there are new deposits yet to be

found; the price is too high and freight rates must come down; the miners are not overpaid; and the industry should be regulated by Washington and the department of public markets for which Mrs. Welzmillier works.

Perhaps one should be more charitable toward the Coal Commission for not being so decisive.

Substitutes for Unions

LABOR federationists have again attacked the Mitten employee-representation and co-operative profit-sharing plan of the Philadelphia Rapid Transit Co. Mr. Mahon, president of the union of street railway employees, assailed it at a recent convention of this union as absolutely hostile to trade-union collective bargaining, adding that it seeks to destroy trade unionism itself.

The basis of the attack on what Mr. Mahon has dubbed "Mittenism" is that by providing a workable substitute for unionism, that form of collective bargaining has been superseded and is in effect displaced. What has been provided is a working arrangement that inspires the worker as well as the management to better service because they are all partners in the business. There is no place here for the three words that adorn the banner of the A. F. of L.—"Agitate! Educate! Organize!"

There need be no great fear that the Mitten plan is going to put the unions out of business at once. The employers require almost as much education in industrial relations as do the employees before that can come to pass.

Business Indicators and Coal Stocks

THE energetic coal man has already discounted this winter's business and is talking about the prospects for next season. With only the normal seasonal demand for household coal in sight, with the unusually heavy Lake movement soon to be cut off, and with steam-coal buyers heavily stocked there is no prospect of a market recovery. A heavy volume of steam coal is moving on contracts but it requires pressure to sell spot coal. The least tendency toward an upward turn in quotations would now cause buyers to withdraw and wait, leaning on their stockpiles.

Were it not for the uncertainty of what will happen next spring—the strike threat—there would be a slackening in demand and production of bituminous coal even this early in the winter. The coal buyer is more fearful of a strike next April than is the coal producer. This feeling on his part has prompted in large measure the steady buying of steam coal this autumn. The only thing that will dispel the feeling is a new contract, signed, sealed and delivered. Industry weathered the 1922 coal and railroad strikes and prospered because of heavy stocks. The lesson has not been forgotten.

It is a long shot to look into next year, but there are a few factors now apparent that will affect next summer's coal history. Production of goods into the manufacture of which coal enters in quantity is quite generally on a declining rate. Pig iron, steel, textiles, paper, flour, and packing-house products, all heavy coal users, are below the level of activity of the midyear. The textiles, indeed, are less active than at this period last year.

Notwithstanding this evidence of slowness, November

opened with the business world optimistic, the stock market after months of dullness spurting upward, everywhere confidence in good business this winter. The better business is this winter, the more avid the industrial consumer and railroads will be in holding to and even increasing coal stocks against next April. The size of that stockpile next March will be the biggest argument to be faced when a strike is being considered, and it will likewise, in the event of no strike, be the largest single factor in setting the level of coal prices for the next coal year.

Who Will Read Them?

FROM time to time wonderment has been expressed at the volume of the reports issued by the U. S. Coal Commission and gloomy prediction made that the public would never know their contents. The coal industry has a heavy investment in these reports and wants the people to know more about coal. Interest on the outside is such that former strangers to coal are interpreting the Coal Commission's findings to large sections of the public.

An instance in point is the publication in the Northwest of a series of specially written articles on coal in *The Farmer*, which claims to reach 130,000 farmers in that region. Two articles dealt with anthracite, the third with bituminous coal. The writer of the series gave a fair interpretation in popular language of what the Coal Commission had published up to the time the articles were written.

The farmer will learn from the articles that the full-time worker in hard coal gets from \$2,700 to \$3,200 per year and the great majority of the men between \$1,700 and \$2,000 a year. He is told that the miners had a weak case this year and the "public is not likely to have much patience with it." The hard-coal operators are charged with having a large part also in the high price the farmer of the Northwest pays for his anthracite. The monopoly sections of the Coal Commission's report are quoted.

The writer of these articles for *The Farmer* closes that on anthracite with a little punch of his own as follows:

What is needed most, however, is a little real temper on the part of the long-suffering and too patient public. What is needed is an insistent public demand that legislation to regulate profits and to curb the arrogant dictatorship of union mine labor shall be passed. What is needed is a little more knowledge that anthracite is not the only kind of coal, a little more co-operation in buying during the summer season, and a whole lot of independence in seeking and using substitutes, such as soft coal and oil.

When the public gets busy, and only then, our domestic fuel problem will be solved. And there is a widespread suspicion that the public is going to get so busy this coming winter that Congress will be forced to legislate some of the excess profits and needless shortages out of the anthracite industry, and legislate into it some decent business practices and some respect for the public interest.

The article on bituminous coal is a liberal interpretation of the Coal Commission's ideas and theories. It is summed up with the assertion that the only remedy for the major ills of the coal industry is government regulation, but if not, "then the only alternative is government operation, and the people of this country are not in favor of that."

Thus does John Brown's Body Go Marching On.

Coal Commission Suggests

Ways of Operating Mines That Would Lower Cost

Machine Loading Has Been Proved Efficient—Introduced in Half of Our Coal Mines It Would Save \$200,000,000 a Year—Concentration of Output Would Make Supervision Easier and More Effectual

IN every industry certain organizations have surpassed others in the skill and initiative in which they have handled their management problems. The development of science in industry, moreover, has proved conclusively that certain general principles of management—principles recognized as fundamental only within the last few years—are of universal application in all industries. It is thus evident that it is practical and worth while to examine underground mine conditions both on the basis of the best managed mines and also in the light of the developments that have taken place in industry as a whole during the last fifteen years.

The vital relation of such developments to harmonious labor relations lies in the elimination of causes of friction and the substitution of facts for opinions.

Strictly confining ourselves in this study to underground management, features of vital importance to the future of bituminous coal mining are:

(1) Development of machinery to replace the irksome and solitary operation of hand loading. In this lies the greatest opportunity, not only for lowering costs but for the improvement of mining conditions and the reduction of accidents. The importance of this can be realized when it is appreciated that with the introduction of machine loading and the incidental developments accompanying installation of machines, the total cost of coal at the mine in many cases may be reduced by

THE FOLLOWING is a reproduction of the document with which the National Coal Commission submitted the report on "Underground Management in Bituminous Mines" to the President:

To the President and the Congress of the United States:

As a result of its engineering study on Underground Management in Bituminous Mines, the U. S. Coal Commission believes that reductions can be made in the cost of production through improvement of operating methods, without any reduction in wage rates, by the:

Development and efficient application of mechanical devices to replace hand loading;

Better control and co-ordination of underground operations, particularly cutting, loading, and haulage;

Standardization and co-ordination of the work of the individual mine worker;

Standardization of details of construction and dimensions of mine cars, locomotives, track and all other equipment; and

Multiple shifting of work in the mines and preparation plants, thus obtaining greater production with the same plant investment.

The detailed report on Underground Management in Bituminous Mines follows. It was prepared by Stanford E. Thompson, of the Thompson & Lightner Co., of Boston, in consultation with Howard N. Eavenson, and assisted by George T. Haldeman, under the direction of C. E. Leshner and Raymond A. Walter, engineers of the Commission.

as much as 30 per cent of the present costs. This may be shown by actual operating results. Assuming such reduction possible in only one-half of the bituminous mines the actual net saving in money value would amount to over \$200,000,000 per year.

(2) Control of underground operations. Both in machine- and hand-loading mines progress must be toward functional methods of planning and control of the work of the men and machines, such as have been introduced in industries other than coal mining. Instead of leaving the distribution of miners' cars to the motorman or assistant foreman, instead of a hit-or-miss supervision of cutting machines and of company men, more definite planning and control of transportation and of all other underground operations is needed. This must include not merely a morning schedule, such as is now thought out in some mines, but a positive control continued throughout the day to include not only the directing of the mine cars to the miner and the regulation of locomotive trips but also the correlating of the operation of cutting machines and all the company work with coal loading. Increase in output at the mines will naturally follow such developments and also afford a saving in overhead and a gradual cost reduction with increased contentment of the workers through the elimination of lost time.

(3) Improvement in the work of the individual. Analyses of the operations and a determination of the

best methods and times for accomplishment will result in larger performance by company men, will provide a basis for the more thorough co-ordination of the work, reduction of delays, systematic handling of dead work, development of standards of production for company men as well as loaders, and eventually balanced earnings, not from the standpoint of uniform wages and piece rates as at present, but such as will give each man a square deal and a reward for his individual performance.

(4) Standardization of equipment, such as mine cars, motors, weight and gage of track, electrical equipment, etc., with determination of the best for each individual mine.

The foregoing features in this study omit consideration of the effect of railroad-car supply and excess mines on operating problems as these are treated elsewhere in the report of the Commission, but it may be said here that where more than one shift has been found practicable, an appreciable saving and a reduction in overhead expense has been attained.

MANAGEMENT MAKES—OR BREAKS—MINES

The effect of improved underground management on the miners is strikingly illustrated by a comparison of two mines thirty miles apart, in the same district, extracting the same seam, having similar physical conditions and afforded a similar railroad-car supply, both being union mines. In the one, plenty of miners are available at all times; in the other, such a scarcity prevails that the mine is running only at part production. The difference lies in the methods of managing the underground operations, the distribution of mine cars, the co-ordination of cutting machines, the handling of dead work, the supervision of company men. And yet the handling of the better-managed mine, and in fact even of the larger and better-equipped mines throughout the various fields, is found, at least in underground methods, to be generally behind that in some of the other major lines of industry.

So greatly do conditions vary in different mines with respect to the thickness and character of the seam, the quantity and nature of the slate, the condition of the roof and floor, the drainage, ventilation, etc., that no two mines are alike and many important differences in operating details are necessary. After giving due consideration to the breadth of the territory embraced by the industry and the different physical difficulties encountered, it appears, however, that the general scheme of handling work underground is quite uniform, perhaps even remarkably so, and as uniform, in fact as that in many other large industries, although the opinion of many mining men is to the contrary. Because of this basic uniformity it seems possible through a careful analysis of a comparatively few mines located in representative states and districts, and a broad general survey of the field, supplemented by the studies of other Commission investigators, to present specific conclusions and recommendations.

In the studies at the mines the field parties have received the cordial co-operation of the representatives of the operators and of miners, who exhibited evident appreciation of the constructive possibilities of a better management of mining operations.

The contentment of the miner during his working hours and the regularity of his remuneration while the mine is operating depend upon the underground management. With the advent of electric haulage, electric

lights, ventilation and safety appliances, management methods more and more are being recognized as properly controlling, in a measure formerly considered impossible, the effect of varying physical conditions in the mines.

The profits of the operator, also, to a larger extent than is generally recognized, are dependent upon his management of the mine. Assuming, for example, a 15c. profit per ton; if he can reduce his cost of mining only 5c. per ton, with the same selling price, he automatically increases his profit one-third. The consumer benefits as soon as such cost reductions become general, or even before, as the seller reduces his prices in competition.

This designation of management as a major feature is made with full appreciation of the vital importance to the industry of the railroad car supply, the number of mines, and the storage of coal. In fact, all these inevitably affect the management in the mine, because of the direct effect of each of them on the working time of the miner and the cost to the operator. However, except as these indirectly affect the management of the mine, their consideration is left to other divisions of the Commission's report, and we take up here the means for cost reduction and for improving the miner's physical and financial condition through the treatment of the management problems at the mine.

Strange as it may seem to those acquainted with the industrial developments in factory management during the last decade, though the initial layout and development and equipment and plan of haulage are worked up in great engineering nicety to fit local conditions and physical characteristics, the operation of the underground work is frequently under the absolute control of the mine foreman or mine manager, as he is sometimes called, with his assistant foreman or face bosses.

MINE FOREMAN HAS A LEGION OF DUTIES

As the mine foreman is the chief underground official, the problems in underground management in a bituminous mine may best be understood by a brief consideration of the work of these officials and their assistants.

The supervision of the miners, or loaders, as they are usually called, who work alone one man to a room or to an entry or two men working alternately in two or three rooms involves a visit, usually twice a day, to inspect the quality of the work, see that refuse is properly gobbled, see that only clean coal is loaded and that the miner is gobbing his bone, advise him on location and slant of shotholes and the loading required, examine the track in the room, inspect his timbering, sound the roof, listen to any complaints, dicker with him as to the amount of work, if any, on slate or rock which is to be done by the day or job, reach an agreement on all claims for allowances for dead work and take up grievances with the pit committee.

As the loaders and also the machine cutters are paid by the mine carload, or on a tonnage basis, the foreman is relieved of the necessity of driving the men and his relations with miner are generally cordial. The assignment of the men to their working places is simpler than might be supposed, because a miner, having once been given a room, remains in it day after day, advancing it so slowly that he may remain in his place for several months before it is completed.

The foreman must settle any disputes or complaints with reference to the conditions at the working place

and arrange for the substitution of new men if for any reason the loader quits. The foreman must supervise the cutting machines, co-ordinating in the miles of underground workings which he supervises, the blasting, cutting, loading, and hauling of coal so that delays will be reduced to a minimum. He must lay out, follow up and inspect the work of the company men who excavate rock in entries, lay track, place trolley wire, set timbers, build permanent walls for roof support, build temporary walls for ventilation and place brattices.

Added to these duties, the foreman and his assistants direct traffic. The supply of cars to the miner, one of the most vital operations in underground management, is handled chiefly by the motormen, with supervision, when necessary, from the foreman, or his assistants. To a large extent the motormen in hauling the trips on the main line as well as the motormen in gathering cars use their own judgment as to the number of cars in a trip, the number of trips, and time of making trips, with a view to satisfying the requirements of the miner and the convenience of the operating crew at the tippie or at the bottom of the shaft.

The foreman and his assistants must supervise the removal of the pillars in second-mining or pillaring operations. The development plans, including the size of the rooms and width of pillars, are generally determined by the engineers and officials. Many questions of local nature having to do with the daily operation are of necessity left to the judgment of the foreman.

Generally also the foreman has the responsibility for endless other details such as pumps and drainage, ventilation, the roadbed, the decision as to the quantity and location of timbering, the care of the injured, and the clean-up of rock falls. He must always bear in mind the safety of the employee, the protection of the mine and the obtaining of the largest and most economical production possible.

Some companies insist upon a high standard of qualifications for assistant foremen or face-bosses. Frequently they are required to hold certificates of competency—given only after rigid examinations in accordance with requirements of the mining law. Other companies are not so exacting and the men for these

positions are selected by observation for their experience as miners and ability to direct the work of others. Unfortunately in only too many mines even these requirements are ignored and the assistant's sole qualification is his mining experience. The responsibilities of the position are too great for any but the best men available, and the presence of so many incompetent men indicates a sore need for better underground management, especially seeing that as many as 150 men may be working under one of these assistants.

MORE FOREMEN OR GREATER CONCENTRATION

The solution at first thought, would be in a larger number of foremen. Our examination, however, showed that conditions are by no means satisfactory even where a few are found working under the supervision of a face boss. The solution of the problem of more efficient underground management must be found rather in developing such machinery and advanced methods of planning and control of standardized production as will correspond more nearly to those being worked out to such a high degree in many industrial establishments.

In most industries remarkable progress has been made during the last century in the development of machinery to replace slow and arduous hand labor and to reduce production costs. The bituminous-coal mining industry is reducing manual labor through the introduction of machinery and in that process has at last reached the final stage. The first was the use of undercutting machinery. The importance of the problem, both to the workman in lessening his toil, and to the consumer in reducing the cost of coal, is evident when we consider that some 70 per cent of the cost at the mine is labor and more than one-half of this labor is for cutting and loading coal into the mine cars.

This transition will, of course, decrease the human labor needed at any given point or for any given production. This is inevitable and desirable. However, unlike the introduction of other automatic machines into industry, such as the spinning frame, the transition naturally will be slow because the machinery will have to be adapted to the physical condition of different mines. Furthermore, instead of requiring labor of less skill the miners left will be of a higher type, for to

Mine Parting

Always the despair of superintendents, mine foremen, miners and efficiency engineers. Heretofore is lost by men and locomotives alike. Here the old problem of the railroad yard is duplicated but not solved. It can be corrected only when double track replaces single so that going traffic does not interfere with returning. At the mine here illustrated much effort has been made to avoid the delays and heartaches that the word parting spells.



operate the machines will require greater initiative than is demanded of those who ply the pick and shovel, which is now the principal tool of the coal miners. Furthermore, the surplus labor, if any, will not go a-begging. In other industries men are needed who are trained to perform such work as shoveling coal.

The industry will slowly substitute mechanical for hand loading just as it will also develop coal storage, thus regulating production and lowering its costs. Development of enough low-cost operation to supply the demand will automatically eliminate the high-cost mine, the snowbirds and the wagon mines which under existing conditions in periods of car shortage absorb such a large portion of the transportation service as to lower the working time of the better mines, thus unduly increasing their costs.

As will be brought out later in this report, the change in the method of mining from man to machinery, while yet in its infancy, has been accomplished already. Among the mines observed, two were practically machine-operated as far as the cutting, drilling and loading of coal were concerned. In one of these only four hand loaders remained on special work, and the other mine was doing all its loading by machinery. In a number of other mines machine loading was in varying degrees of operation. In one mine machines had been used for loading during a period of nearly ten years. One company has purchased seven loading machines to use in a new opening.

Semi-Bituminous or "Smokeless" Coal Best As Substitute for Anthracite

SEMI-BITUMINOUS coals, embracing the "smokeless" Pocahontas, New River and Georges Creek coals of Virginia, West Virginia and Maryland and the smokeless Clearfield coal of Pennsylvania, probably are the best adapted of any "soft coal" for use as a substitute for anthracite, states Rudolf Kudlich, assistant to the chief mechanical engineer of the Bureau of Mines, in Serial 2520 of the Bureau, recently issued. If properly fired and drafts properly regulated, these coals can be burned without smoke and will deposit very little soot in the furnace and smoke pipe or chimney.

These smokeless coals are available in practically all the Eastern markets where anthracite is the customary fuel. They are higher in heat value and usually contain less ash than anthracite, and as a general rule can be bought considerably cheaper. Because of the higher heat value, if such coal is sold at two-thirds of the price of anthracite, the purchaser actually gets almost twice the amount of available heat for his money. With proper care in operating his furnace he can realize this saving entire, but even with careless handling much expense will be saved.

All coals of this class are extremely friable and cannot be graded in size like anthracite. A large proportion of the coal as delivered will be in small sizes grading down to dust. Many people not accustomed to this coal are reluctant to accept it, considering the fine sizes as dirt. As a matter of fact, this fine coal contains less ash and will give off more heat than the large pieces. This coal has the property of "coking," that is of fusing together when heated, so that if properly fired it will form large pieces which do not fall through the grate to the ash pan. Because of its large percentage of fines,

this coal is somewhat dust and dirty to handle dry. If well wet down before it is put in the cellar, and if the front of the pile in the bin be kept moistened with an occasional bucket or two of water, this dirt can be largely eliminated.

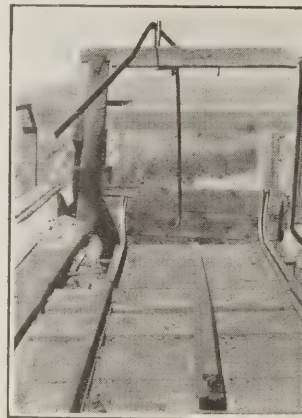
Device for Prying Open Endgate of Car

BY CECIL ROWE

Mining Engineer, Kinney Coal Mine, Tokay, N. M.

FREQUENTLY when discharging end-dump cars on a horn dump, the gate hook will fail to engage the lugs on the car door and the car will tip over with the door closed. When this happens it is necessary to use a bar or some other instrument to pry the door open. Usually the rock comes against the door with such force that the latter is opened only with difficulty. Much time is lost even if a satisfactory pry is at hand, which is not always the case. To overcome this difficulty I have used the device shown in the illustration, with excellent success.

It consists of two 2 x $\frac{3}{4}$ in. pieces of band iron, one piece forming the handle with two holes drilled in it, one hole for bolting to the upright irons and the other for fastening to the second and hooked piece of band iron. The hook is engaged in one of the door lugs, and by pulling down on the handle enough force is exerted on the door to pull and hold it open until all the rock has left the car. At the movable joints $\frac{1}{2}$ -in. bolts are used.



HOOK FOR OPENING CAR DOOR

Most hooks are planned to open the car door as it drops forward in the dump. This is intended for opening the car when tipped.

It will be noted in the illustration that no gate hook has been provided. In this case the cars were dumped into a long chute and all cars were tripped over with the door closed because dumping with the door open caused the rock to jump over the sides of the chute, endangering nearby workmen. The procedure consisted of pushing the loaded car of rock into the horn dump, allowing it to tip, and then prying the door open with the device shown. Wooden cars were used with a small hole cut in the upper center of the door, this hole serving to engage the hook.

WOULD DISSOLVE COAL AND USE IT AS OIL.—In an address given at Birmingham, England, Oct. 15, K. N. Moss, professor of mining at Birmingham University, stated that a Japanese worker claimed to have discovered a solvent—hydro-naphthalene—that would dissolve 70 per cent of the coal substance. Mr. Moss called attention to the progress being made in researches aiming at the conversion of coal dust into liquid fuel by the use of solvents. In the mining department of Birmingham University the hydrogenation of coal was being investigated.

THE WEIGHT OF 1 CU. FT. OF SIZED COKE is as follows for the various sizes: Egg, 30 lb.; stove, 34 lb.; nut, 36 lb.; pea, 38 lb.; run-of-oven, 31 lb.; foundry, 25 lb.; water gas, 30 lb.



*Pikeview Mine of Pikes Peak Consolidated Fuel Co.**

At Pikeview Mine Pillar Drawing Raises Extraction to 95 per Cent; Formerly Only Two-Thirds as Much

Cutting Back Abandoned Coal 30 Ft. at Time, Allowing Roof to Cave by Sections, Works Well in Lignite Mine of Pikes Peak Consolidated Fuel Co., Giving Property New Lease on Life

NINETY-FIVE per cent extraction! What a production record that is for an underground coal operation! And how few mines attain it! The Pikeview mine of the Pikes Peak Consolidated Fuel Co., in the edge of Colorado Springs, Colo., is one of the few. There, extraction has been raised to approximately 95 per cent by a method of pillar pulling. The owners are getting all the coal any reasonable and well-informed mining man could expect out of the property—a good deal more than had ever been hoped for until Henry Thomas, mine superintendent, took charge. Today vast areas of thick pillars, long abandoned as lost coal, are being pulled in regions close enough to the main shaft to effect a marked reduction in underground haulage costs.

The 130-ft. shaft of the Pikeview mine, five miles north of Colorado Springs and in plain sight of Pikes Peak, the best known mountain in Colorado, taps the 12-ft. Laramie seam of lignite at a point not far from the southeasterly edge of the coal deposit. The mine is an old one, and operations had been carried back under the foothills to the northwest of the shaft nearly two miles in a rather narrow and restricted zone. Haulage was getting long. This was a consideration even though the grades against the loads were not heavy.

Extraction was not a bit better than the average for lignite operations in Colorado—something like 60 per cent at best. This figure may look quite satisfactory

to many a coal operator in fields such as those of Illinois and Indiana, where little more than 50 per cent of the coal is removed and where one well-known string of mines runs down to the extreme of 39 per cent extraction. But it looked bad to the Pikes Peak Consolidated Fuel Co.

LEFT NEARHAND COAL AND SOUGHT MORE REMOTE

The mine was operated on the room-and-pillar system with 21-ft. rooms, 300 ft. long laid out on 45-ft. centers. This left the “worked-out” areas full of 24-ft. pillars. To extract the average 300 tons of coal a day in those years it became necessary to work far back under the hills. Something had to be done.

An effort at one time was made to rob some of these pillars. Machines went in and made long rib cuts from the old faces out toward the room necks. Some easy coal was recovered. Then, disliking to work machines in rooms where pillars were growing thin, the men began a little solid shooting, by which they made breakthroughs at 40-ft. intervals in each pillar and by which the remaining sections of the pillars were nibbled so that they were finally left with long, uneven, bias faces (Fig. 1).

The roof over this coal is a crumbly sandstone covered by a strong cap rock a few feet above. Ordinarily 18 to 24 in. of top coal is left to hold it. Little effort was made in the first pillar-drawing experience to brush this roof coal. The characteristic bottom under the

*Mountain to rear of mine is Pikes Peak, 14,147 ft. high.

FIG. 3

Bottom Landing

Taken from load side. Fourteen hundred tons can be caged in eight hours with the same equipment that used to handle 700 tons at best. The main entry has been concreted back 100 yd. and painted white. Henry Thomas, mine superintendent, is standing on extreme right. He believes a neat appearing mine makes the miners disposed to keep their workings in shipshape order.



FIG. 4

Removing Pillar

Note how the ribs were left arching the roadway. The pillar is being drawn back from room to room. The coal obtained is largely lumps which are well suited for the demands of the domestic market. When this coal and that from roof and floor is loaded the working place is left till the roof falls. The stratum over the coal is a crumbly sandstone, but a strong cap rock occurs a few feet above. Note how two cars are placed at one time, making the placing and gathering of cars an easy task.



FIG. 5

A Gathering Unit

The high car makes possible a narrow and short car of 3,500 lb. capacity. Note the braces on the side of the car to give support to a flat flare, giving increased carrying capacity. The illustration gives a good idea of the character of the roof.

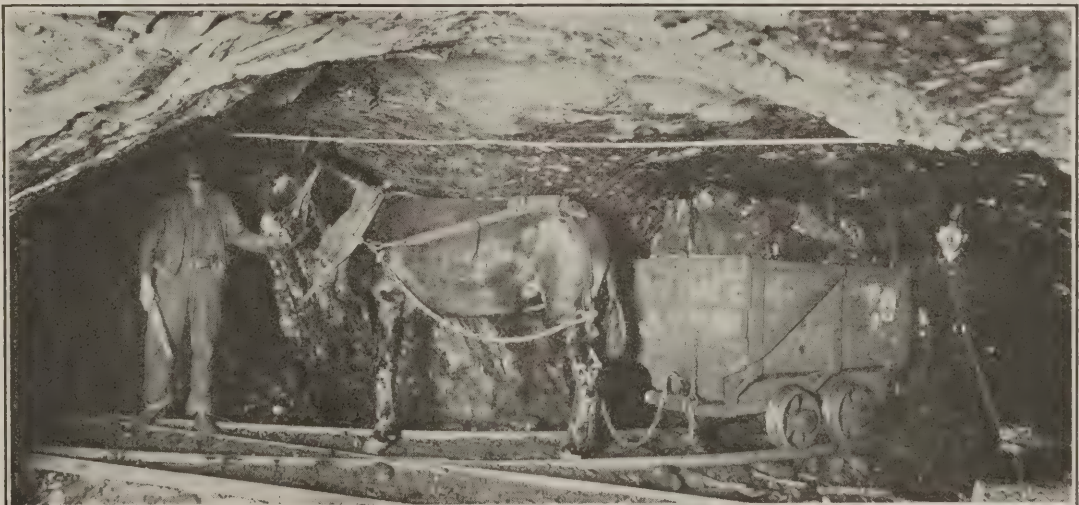




FIG. 6

Fleet of Coal Trucks

The size of the local domestic coal business of the Pikes Peak Consolidated Fuel Co. can be judged by the fleet of trucks. About 70 per cent of the coal goes to keep the home fires burning. The fine coal is used to reduce the gold ore of the Cripple Creek region. The coal eventually may be pulverized and used in that form or possibly a portion of it will be made into coke.

volume of screenings is taken by a local gold-ore reduction mill operated by the interests that control the coal mine. That particular supply, which averages 6,000 tons a month, fills a need for a long-flame coal for use in furnaces roasting Cripple Creek ore.

The lignite from this mine contains 22.04 per cent of moisture, 42.10 of volatile matter; 48.34 of fixed carbon and 9.56 per cent of ash. It has a thermal value of 10,441 B.t.u. It has given satisfaction even as pulverized fuel. During a recent American Society of Mechanical Engineers code test at Pueblo, Colo., with a 456-hp. Stirling water-tube boiler this particular coal was fired for the prescribed length of time. The engineers' report showed a boiler and furnace efficiency of 68.67 per

cent. There is a possibility that some day an electric power plant will be built at the mine to burn pulverized Pikeview coal. The company also is convinced that this lignite will coke successfully and that if the market develops a large volume of it can be put through the ovens with profit.

So there is a vital company interest in what Superintendent Henry Thomas and his two foremen, H. O. Knapp and C. Meerdink, are doing out at Pikeview mine to recover great tonnages of abandoned coal. And it is with great interest that the company has seen the mine develop under Thomas' direction, from a 700-tonner to an operation having twice that daily capacity.

Experience in Creosoting Mine Timber

IN RESPONSE to inquiries, Thomas R. Clark, of the Clark Coal & Coke Co., who wrote the article "Creosoting Experience at Two Small Mining Plants," appearing in the issue of *Coal Age* of Sept. 6, p. 357, informs us that: "We find a number of men are unable to work around creosote on account of its pungent odor, and this is particularly true when that preservative is heated. We have met this difficulty by employing different men at the treating plant and we have found several that the creosote does not in any way affect, and these men have been assigned to the duty of dipping the timber.

"Carbosota, the preparation of creosote that we have used exclusively, penetrates timber easily and does not leave it sticky like many treated railroad ties I have seen. By allowing the timbers to stand out in the weather for thirty or sixty days, the creosote is entirely absorbed by the wood and treated and untreated timbers can be handled without any noticeable difference. Strange to say I have found some men to whom the smell of creosote is attractive.

"Speaking of the effect of fire on creosoted timber the preparation we use is highly inflammable, as we discovered when we attempted to burn out some of the iron barrels in which it was shipped. Undoubtedly the timbers are more easily fired than the untreated

ones, but it seems that in the mine they soon become damp and, therefore, not susceptible to any small flame. At the Hanna City mine water is running down the sides of the shaft at practically all times, so that it would be almost impossible for this material to be set on fire."

Propose Adoption of 20-Ton Cars In Movement of Welsh Coal

An important step has just been taken by one of the British railway groups with the view of effecting economies in the rail transportation of coal. The Great Western Ry., which has practically a monopoly of the Welsh coal traffic, has been employing cars of ten-ton capacity, but having experimented with cars that will carry twenty tons, is satisfied that these higher capacity vehicles should be brought into general use without undue delay. A census taken by the Board of Trade in 1918 disclosed that there were approximately 116,000 privately owned coal coars in south Wales, mostly of ten tons capacity, and it is recognized that before any change can be made many difficulties have to be overcome at the pits and at the docks. As an inducement to the wagon owners, and irrespective of the fact that railway operating economies will not accrue until a considerable number of high-capacity cars are available, the Great Western Ry. announces that it is prepared at once to allow a rebate of 5 per cent on rates in respect of coal class traffic conveyed wholly over its system in fully loaded 20-ton cars.

How Skillful Use of Drill Press Minimizes Consumption Of Time in Repair Work

Shaping the Drill for Efficient Work—Changing the Cutting Edge for Soft Metals—Preparing the Work and Locating Hole Centers—Making a Flat Drill

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TO GET the most out of the drill press the tradesman's methods of operation should be employed. Construction and repair work on broken castings and damaged frame parts of mine mechanical equipment will generally call for drilling holes. When repairing mine machinery it will be found that several types of metals are used in their construction. Soft and hardened steel, cast steel, cast iron, bronze, brass, malleable iron and aluminum are all very commonly used in the construction of mine equipment. Therefore to get efficient results from a drill press it is essential that the drilling qualities of these metals be understood.

Several types of power and hand drilling machinery are used by tradesmen when doing repair work. It is important for the mine repair man to become acquainted with those tools, as it makes the planning and completion of a job much easier. Styles of these drills are shown in Fig. 1.

The hand drill is one of the most useful tools in the repair shop for drilling holes up to ¼-in. diameter. When drilling holes of small sizes the drill must be driven at a high speed to prevent the drill point from breaking. Many hand drills are supplied with a set of twelve drill points which are held in the wooden handle when not in use. This type of drill is much better for small drilling than the combination post drill, as a greater drill speed can be obtained and the feed pressure more easily controlled.

When it is impossible to get the job to the combination post drill when drilling holes ¼ to ⅜ in. in size, the breast drill is used. If holes larger than ¼ in. are being drilled to any depth in cast iron or soft steel a ½-in. hole should be drilled first with the hand drill. This operation makes drilling with the breast drill much easier. A spirit level is frequently supplied on this type of drill to assist the operator in drilling straight holes. When making holes larger than ⅝ in. considerable pressure must be applied to the drill to make it cut. The Armstrong Packer ratchet drill is designed for the larger sizes of drills. A brace is provided to support the ratchet and drills, the pressure being applied by the threaded nut on the top of the ratchet.

When drilling holes in pipe work, where a chain can be passed around the work, the chain drill attachment is used. It is driven by an ordinary carpenter bit brace. The feed to the drill is obtained by a screw arrangement which tightens against the chain. This tool will be found useful in drilling holes ranging from ⅝ to ⅞ in.

Many styles and sizes of post drills are on the market, but the one provided with a hand and power drive with automatic feed will be found as effective as any. When it is not necessary for the average mine shop to be provided with the best of these post drills a medium priced machine will give good service.

To make it possible to get the best service from the post drill press a few drills and tools must be provided. Fig. 2 shows several such tools. If the shop is provided with this equipment the heaviest or most delicate drilling job should not be too difficult. Post drill presses of different design require drills with special shanks. Care should be exercised when ordering drills to be sure that they fit the press for which they are ordered. Notice the shank design on the Coes drill and the Prentice drill. The other four styles are standard, but they require chucks or holding sleeves, and are not commonly used on this type of drill press.

The taper shank drill is held in the drill press spindle with the steel sleeve. This is the type of drill used in most commercial shops. The straight-shank drill is held in a chuck. They come in sizes from No. 60 up. It is not good practice to use straight-shank drills larger than ½ in. Chucks are provided with a shank that fits into the drill-press spindle. The straight-shank drills should be used in the mine shop. Justification for recommending the use of the straight-shank drill up to ½ in. for the mine repair shop is the large range of drill sizes for taps. The cost of this drill also is lower. If the shop is going to drill and tap holes for machine screws, such as found on power and mining equipment, it is obvious that the correct sized drills must be on hand.

The sizes of screws are somewhat confusing, as there are several standards existing, which many times makes the task of replacing screws on repair work an unpleasant and unprofitable job. To explain how the size of a medium screw is gaged and the drill chosen for the tap we can remove a screw from a job and by noting it in the drill tap gage, as shown in Fig. 2, it

TAP DRILLS				
(Drill Sizes for Specified Taps)				
Diameter of Tap, Inches	No. Threads to Inch	Drill for V Thread	Drill for U.S.S. Thread	
1/16	16	5/32	1/16	1/16
1/8	18	3/16	1/8	1/8
3/16	20	15	3/16	3/16
1/4	12	1/4	1/4	1/4
5/16	13	W	5/16	5/16
3/8	14	3/8	3/8	3/8
7/16	12	7/16	7/16	7/16
1/2	14	1/2	1/2	1/2
5/8	10	5/8	5/8	5/8
3/4	11	3/4	3/4	3/4
7/8	12	7/8	7/8	7/8
1	10	1	1	1
1 1/8	8	1 1/8	1 1/8	1 1/8
1 1/4	7	1 1/4	1 1/4	1 1/4
1 1/2	6	1 1/2	1 1/2	1 1/2
1 3/4	5	1 3/4	1 3/4	1 3/4
2	5 1/2	2	2	2
2 1/4	5	2 1/4	2 1/4	2 1/4
2 1/2	4 1/2	2 1/2	2 1/2	2 1/2
2 3/4	5	2 3/4	2 3/4	2 3/4
3	4 1/2	3	3	3

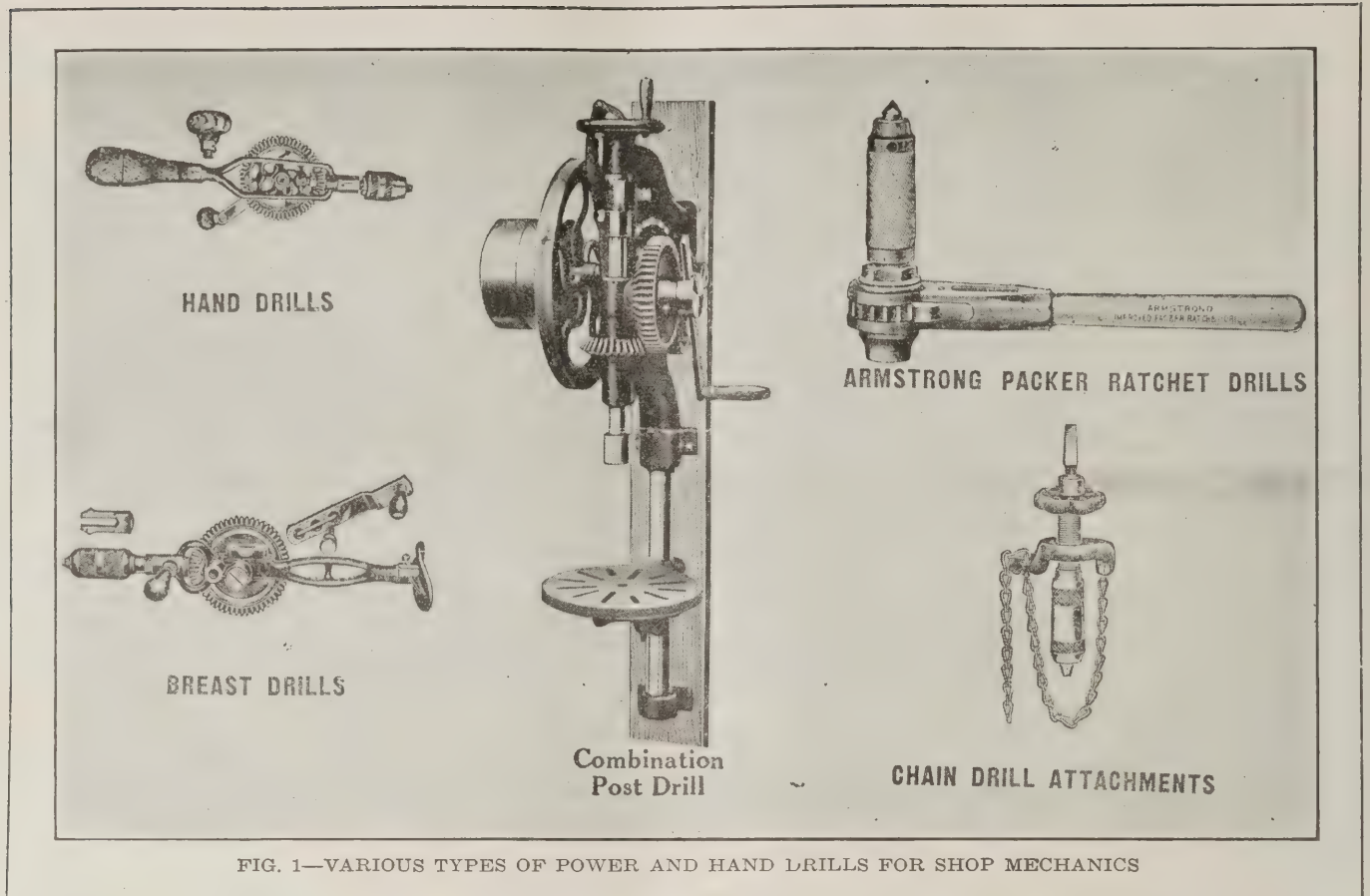


FIG. 1—VARIOUS TYPES OF POWER AND HAND DRILLS FOR SHOP MECHANICS

is found it fits in a certain hole. On referring to the machine-screw list we find that this is the body size for a No. 12x24 screw, meaning number 12 size and

24 threads to the inch, requiring a tap drill No. 15. This means that if this job is to be done a straight-shank drill, as shown in the drill-block set, must be supplied, as these sizes are not made with special shanks. These drills are sized in numbers ranging from 1 to 60, and are sized to fit all standard machine screws.

A simple and convenient way of measuring these drills is by using the L. S. Starrett drill and tap gage, which is used to determine the size of screw, tap drill and body drill. Notice the sizes of machine screws and the tap-drill sizes marked on this gage. Drills used to drill a hole for tapping are called tap drills. Another useful tool is the fractional drill gage. This is used to measure drills from $\frac{1}{8}$ to $\frac{1}{2}$ in. by $\frac{1}{32}$ in. These gages are not expensive and will be found useful in the tool box of any mechanic.

Flat-head screws require a countersunk hole; the countersinks shown are provided with a straight shank for a drill chuck and a bit-brace shank for the carpenter brace. For light countersinking the breast drill is oftentimes used to drive the countersink.



FIG. 2—DRILLS AND DRILL-PRESS EQUIPMENT NECESSARY FOR THE SMALL MINE MACHINE SHOP

In Fig. 3 three types of drill chucks are shown. The two chucks on the platen of the drill press cannot be used in the post drill unless the spindle has been bored out so that the taper chuck shank will fit. On this machine this has been done and the little time consumed on this operation has been worth while. The practice of having a setscrew on the spindle of a drill press is obsolete and is very dangerous. A tragic story could be written on the many accidents the setscrews on drill spindles has caused.

The post drill should be clamped to the post or wall with four $\frac{3}{4}$ -in. carriage bolts with washers. It should be located so that the chuck will be level with the operator's chest. This permits free operation.

Few operations on tools in a shop are more important than the grinding or sharpening of drills. To

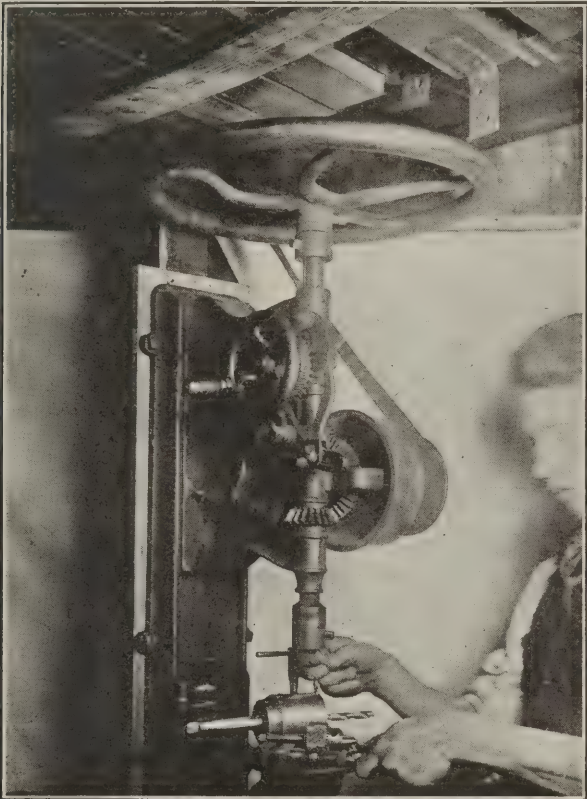


FIG. 3—THREE DIFFERENT TYPES OF DRILL CHUCKS COMMONLY USED

obtain satisfactory performance the cutting edges must have a proper and uniform angle of 59 deg. with the longitudinal axis of the drill. They must be of exactly equal lengths, and the lips of the drill must be sufficiently backed off or cleared. If this clearance is insufficient or imperfect, the drill will not cut. A simple method of determining the clearance is to set the point of the drill on a flat surface, holding a rule parallel with the drill; by revolving the drill its clearance can be checked, as well as the height of the cutting lip, which should be equal.

DRILL LIST FOR TAPS FOR AUTOMOBILE MANUFACTURER'S PRODUCTS					
(S. A. E. Standard Thread)					
Size of Tap, Inches	U. S. Threads per Inch	Size of Drill, Inches	Size of Tap, Inches	U. S. Threads per Inch	Size of Drill, Inches
$\frac{1}{8}$	28	$\frac{7}{16}$	$\frac{1}{4}$	18	$\frac{1}{2}$
$\frac{1}{4}$	24	$\frac{1}{2}$	$\frac{3}{8}$	16	$\frac{3}{4}$
$\frac{3}{8}$	24	$\frac{5}{8}$	$\frac{1}{2}$	16	$\frac{3}{4}$
$\frac{1}{2}$	20	$\frac{3}{4}$	$\frac{3}{4}$	14	$\frac{1}{2}$
$\frac{5}{8}$	20	$\frac{7}{8}$	1	14	$\frac{1}{2}$
$\frac{3}{4}$	18	1	...	..	..

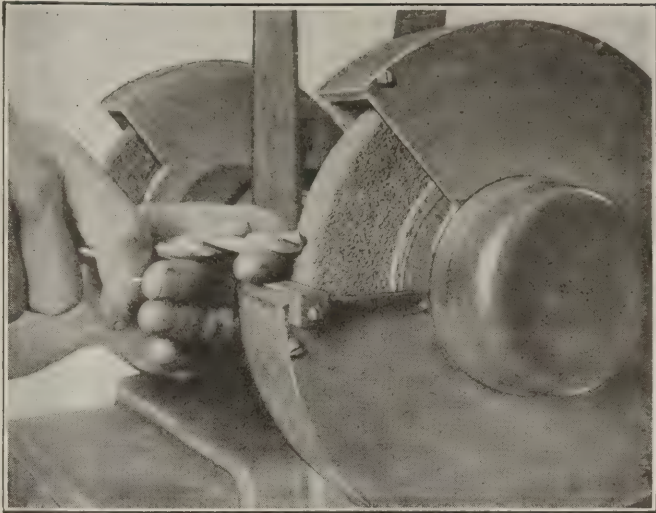


FIG. 4—GRINDING THE CUTTING EDGES
Most drills work best when the cutting edges are ground at an angle of 59 deg. with the longitudinal axis.

When grinding a drill, support the drill on the index finger, as shown in Fig. 4. By doing this a grinding balance and position are more accurately maintained. It is a good plan to have a drill in the shop that has never been reground for use as a sample to gage by. When grinding, do not draw the temper on the drill. To prevent this it is always good policy during the grinding operation to place the drill in water to cool it. Endeavor to preserve the original form of the drill. It has been ground by the manufacturer to insure rapid and satisfactory work.

Many times when a drill has been considerably shortened through use, the center becomes thicker, which causes the drill to work hard. Drills are made with the center thicker toward the shank to strengthen the drill. To overcome this, the center should be thinned, care being taken to remove equal amounts of stock on each side, so that the point will be kept central.

Drilling brass and babbitt requires the changing of the drill-lip clearance angle; often an operator finds difficulty in drilling these metals. The angle of keenness causes the drill to dig into the work. This crowds the drill to the point of jerking the work from the platen or throws the belt. To prevent this, eliminate

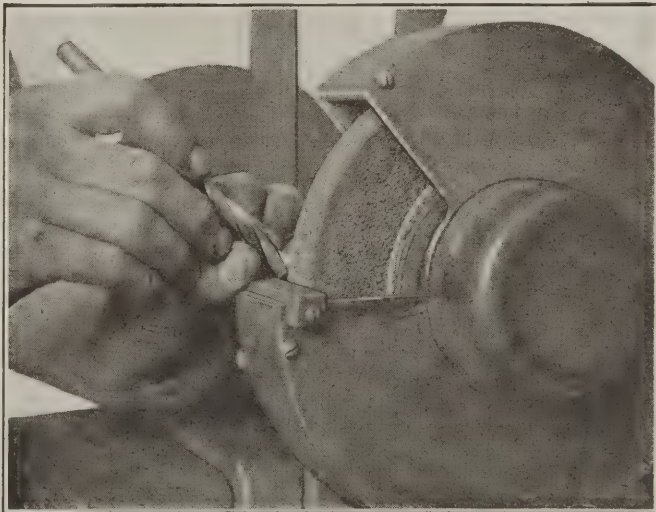


FIG. 5—CHANGING THE LIP EDGE FOR DRILLING SOFT METALS
Grinding the lip edge in a plane parallel to the axis of the drill changes the angle of keenness so that the drill has the scraping action necessary for cutting the softer metals.

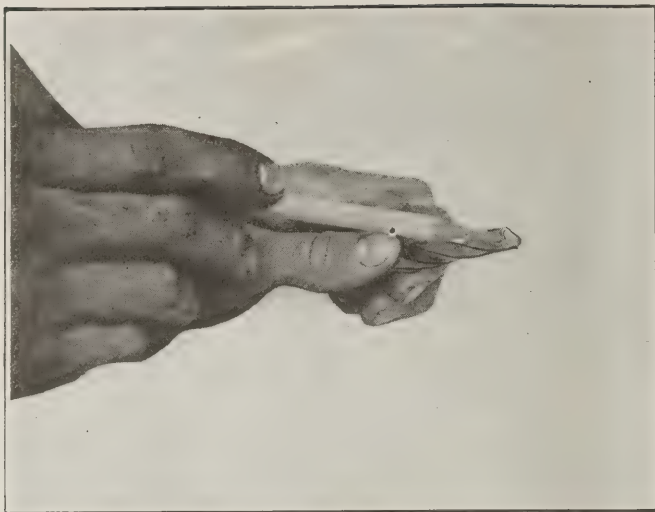


FIG. 6—DRILL PREPARED FOR CUTTING BRASS

The cutting edges of the drill look flat when properly shaped for cutting brass. This allows the drill to have a scraping action and thus operate without chattering.

the angle of keenness on the drill lip by grinding the lip edge parallel with the axis of the drill as shown in Fig. 5. Note that the grinding is being done on the side of the wheel and not on the face. It must be understood that if the drill after being ground for brass is to be used for steel or iron drilling, it must be reground as explained in Fig. 4. When grinding a drill for brass a close inspection should be made after the grinding operation. Note in Fig. 6 how the cutting edge of the drill looks flat. A flat surface gives the scraping action which eliminates all the trouble when drilling soft metals.

Some results of improper grinding are shown in Fig. 7. If a drill has been ground with the point in the center but the angles of the cutting edges are different, the drill will bind on the side of the hole opposite to that side of the point which is cutting, which results in too large a hole and all the cutting will be done by the one cutting edge, as shown in Sketch A. If the drill is ground with equal angles but with the cutting edges of different lengths the hole will be drilled too large, as shown in B.

When making repairs on machines it often is necessary to join broken castings with steel brackets or straps. One of the common difficulties in making this type of repair is to drill the holes accurately. Inaccurate drilling makes it impossible to insert bolts or cap screws without filing out the holes. This indicates that not enough care was exercised in locating the drilling centers. Locating the drill center for a bracket job

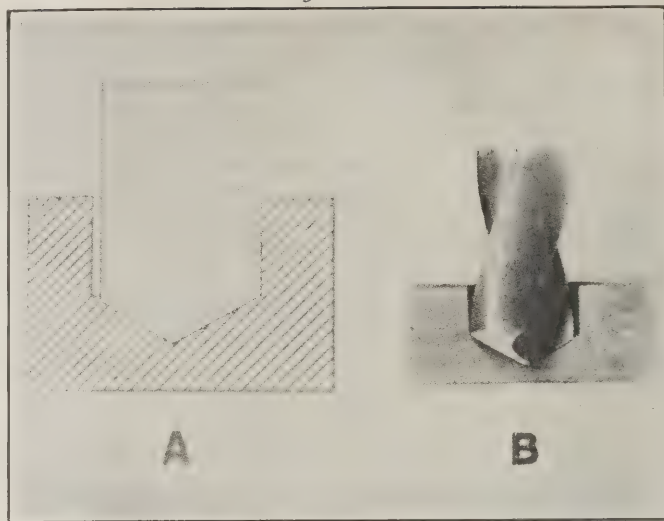


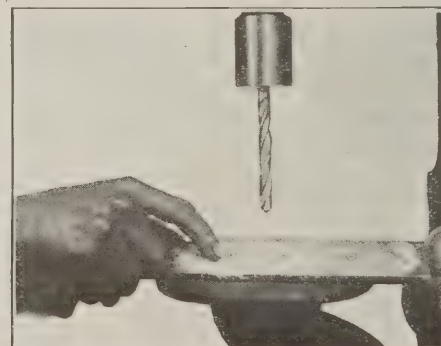
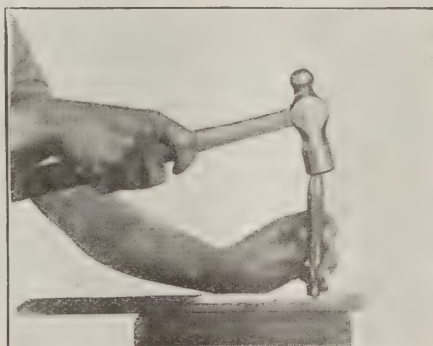
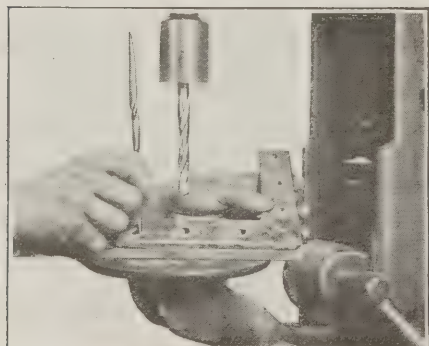
FIG. 7—IMPROPERLY SHARPENED DRILLS

A shows how the drill crowds to one side when the angle of the cutting edges are different. B shows the results of a drill ground with the cutting angles equal but the edges of different lengths.

such as is shown in Fig. 8 can be made a short job by following the practice of the trained mechanic. If the holes have not been previously drilled in the bracket, this should be done.

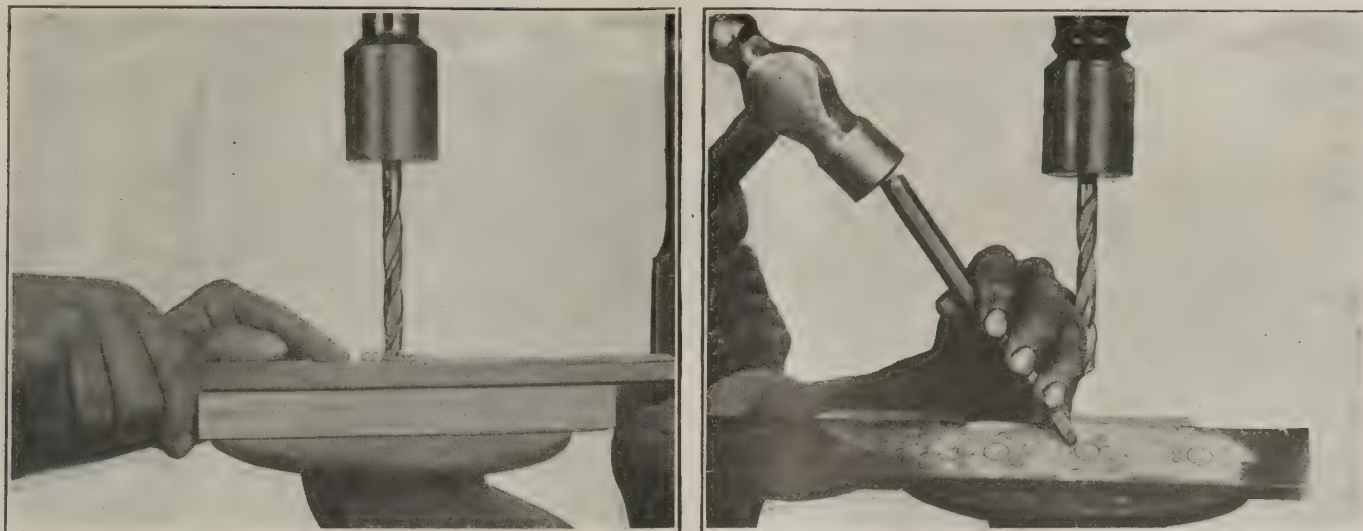
Good judgment must be used in properly locating these holes in relation to the part being patched. The surface on the job where this drilled bracket is to be located should be well chalked with starch or carpenter's chalk. The bracket should be put in place next and with a scribe or scratch awl the outline of the holes made on the chalked surface, as shown in Fig. 8. If these holes are going to line up with the holes in the bracket, it is obvious that the hole must be drilled in the center of this layout. Too many times jobs of this kind are not properly prepared for accurate drilling. Never drill a hole in a job unless the location desired for the hole is established by a center punch mark. The center punch is shown in use in Fig. 9. The finished layout is shown in Fig. 10.

This job is now ready to be drilled, but only to a depth which will permit checking the drilling center with the layout. It is common for drills to "run" or change the drilling center from the original layout. This is the cause of many difficulties when fitting bolts or screws in the drilled holes. The holes do not line up, so it becomes necessary to file until a fit is made. To guarantee a good alignment of holes it is necessary to keep the drill within the layout circle. To do this the drill should be fed into the work to a depth of half the height of the drill point, as shown in Fig. 11. After



FIGS. 8, 9 AND 10—PREPARING THE JOB AND LOCATING CENTERS FOR HOLES

After chalking the metal, holes are scribed from the template and the centers for the holes located and punched.



FIGS. 11 AND 12—STARTING THE WORK AND CORRECTING THE CENTER

The drill is fed into the work about half the depth of the hole. If the hole centers are not in the proper location they may be shifted with a round-nosed chisel.

this is done the drill is lifted from the work and the drilling center is compared with the layout circle. If the drill has "run," it will show up very clearly, as the partly drilled hole will be to one side of the layout circle.

Our problem, then, is to bring the drilling position back to the correct center. This is done as shown in Fig. 12, where a round-nose chisel is used to change the center. This operation is known as drawing a hole. A hole cannot be drawn if the drill has penetrated the metal to the full diameter of the drill. It has been stated that the drill should be fed into the work only half the depth of the drill points. In doing this several attempts can be made in the drawing operation before the hole is drilled to full diameter. After the drilling position has been drawn to the center of the layout circle, the hole is ready to be drilled.

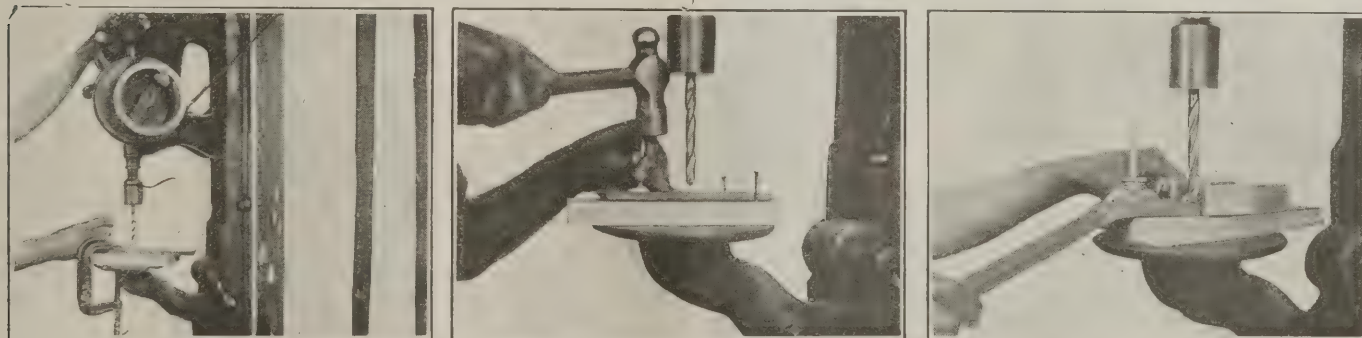
In reviewing the drilling job we have followed the trade practice of the mechanic: (1) Lay out the hole, from template or drilled bracket, using scriber or scratch awl; (2) center the job with the center punch; (3) drill the hole to check for position. If the drill "runs," the correct position is regained by using the round-nose chisel or gage. With the drilling position correct, the job is now ready to drill.

The speed and feed of drills used in mine repair drilling can be determined by actual practice and by exercising sound judgment. In commercial-shop practice when drilling steel a peripheral speed of 30 ft. a minute; for cast iron, 35 ft.; for brass, 60 ft., using a

feed of 0.004 to 0.007 in. per revolution for drills larger than $\frac{1}{2}$ in. diameter is the prevailing practice. Another example of speeds for drilling is the comparison of the $\frac{1}{4}$ -in. drill revolving at the rate of 611 r.p.m. and the $\frac{3}{4}$ -in. drill revolving at a rate of 203 r.p.m. This speed will give the peripheral speed of 40 ft. per minute.

Often the work done on a drill press is large enough so that it will not move under the action of the cutting drill. However, many drilling jobs necessitate clamping the job to the platen of the drill press to insure accurate drilling and to prevent the breaking of drills. One of the most convenient clamps is the malleable iron screw clamp shown in use on the drilling job in Fig. 13. Note that on this job a block of wood is being used under the job, which protects the drill-press platen. Another scheme that is used on short pieces of stock being drilled is shown in Fig. 14. Many times pieces like this are held with the hand, but this is bad practice. If the drill should catch, there might be danger of injury to the hand. In drilling small holes the job may be held by hand, but it is good practice always to clamp a job when drilling holes larger than $\frac{1}{8}$ in. and thus avoid any possibility of accident or damage.

Many drills are broken and hands injured by drilling a bent bracket without holding it with a wrench or clamp. In Fig. 15 a typical job is shown. This type of job is known to the tradesman as one of the most dangerous of the drilling operations. It is better, then, in order to prevent the breaking of drills, that all



FIGS. 13, 14 AND 15—THREE METHODS OF HOLDING THE WORK ON THE PLATEN

A good mechanic can usually be recognized by the ways he handles his materials and prevents accidents and damage to equipment. Many jobs require special means for clamping or holding on the drill press.

TAP DRILLS FOR PIPE TAPS					
(Drills to be followed with Pipe Reamer, and threaded with Pipe Tap)					
Size, Inches	No. of Threads to Inch	Diameter Drill, Inches	Size, Inches	No. of Threads to Inch	Diameter Drill, Inches
1/8	27	1/16	1 1/2	11 1/2	1 1/2
1/4	18	3/16	2	11 1/2	2
3/8	18	1/4	2 1/2	8	2 1/2
1/2	14	5/16	3	8	3
5/8	14	3/4	3 1/2	8	3 1/2
1	11 1/2	7/8	4	8	4
1 1/8	11 1/2	1 1/8			

bracket jobs be securely clamped to the platen or the job held firmly with the monkey wrench.

Hardened steel may be drilled by using turpentine or kerosene; on soft steel and wrought iron, use lard oil or machine oil; with malleable iron, lard oil or machine oil should be used, and for aluminum and soft alloys, kerosene. Cast iron should be worked dry.

In Fig. 16 a job on hardened steel is shown on the drill press; a 3/8-in. hole is being drilled. The drilling of hard metal is facilitated by using turpentine as a cutting compound and by grinding off the sharp angles of the cutting edge of the drill, as explained for cutting brass and soft metals. This permits a heavy feed without chipping the edge. Practice will prove that somewhat slower speed of the drill will be required for drilling hardened steel than for soft steel.

In drilling holes in glass, use a brass pipe having an outside diameter equal to the size hole required. This pipe should have a peripheral sped of 100 ft. per minute. Use carborundum 80 to 100 grit or a valve grinding compound with oil. This mixture should be placed between the end of the pipe and the glass.

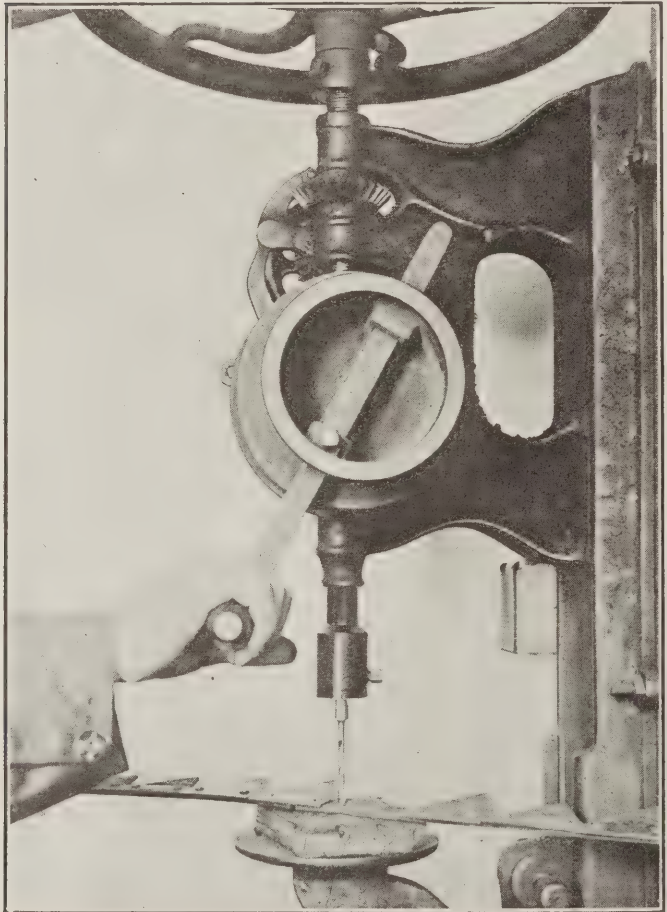


FIG. 16—DRILLING HARD STEEL

For hard metals a heavy feed is necessary at a slower speed than for soft steel.

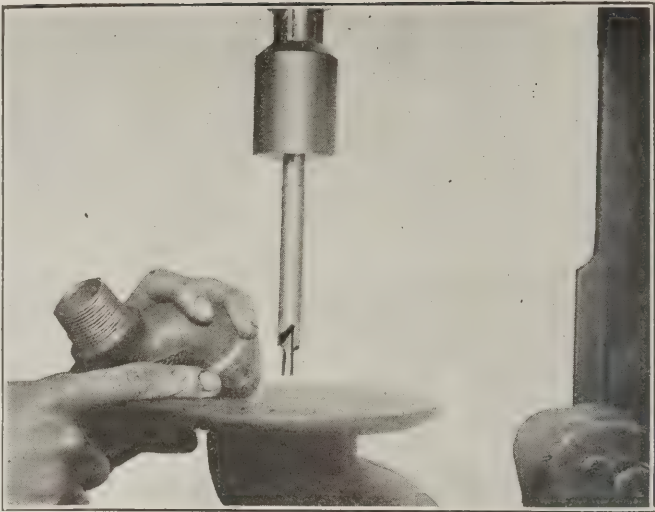


FIG. 17—SPOT FACING

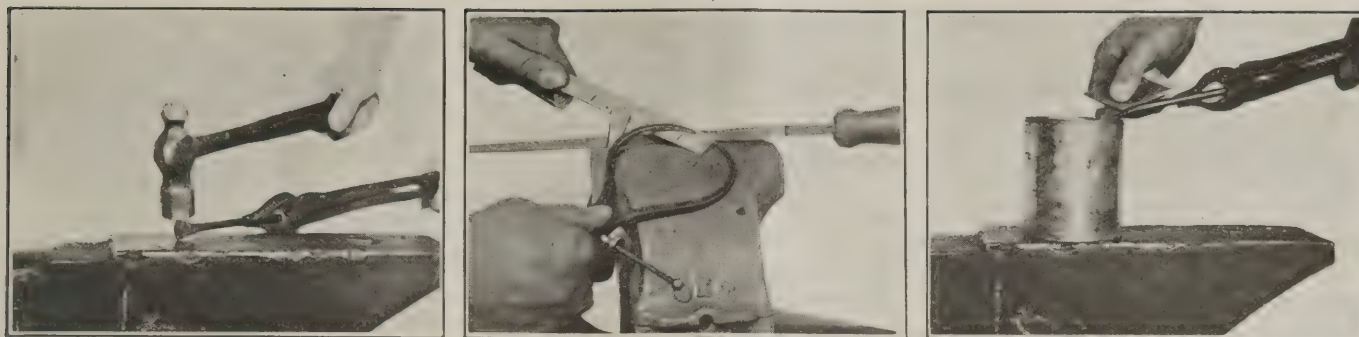
This is done with the counter-boring drill. The pilot should fit the hole closely so as to prevent shifting.

The glass must be supported by felt or rubber cushions not much larger than the hole to be drilled. When filing glass use turpentine. Holes up to 1/2 in. in diameter can be drilled in glass with a flat drill properly hardened. Use a mixture of turpentine and camphor for the lubricant.

Machined spots around a hole on machine frames are provided to give a true flat surface for the head of the screw. This operation is done with the counterboring tool shown in use in Fig. 17. This tool is provided with a pilot which guides the tool. Sizes of counter bores are gaged by the diameter of the surface it will smooth up and the size of the pilot. This tool has a shank that fits the drill chuck and is driven at about the same speed as a drill of equal size.

It sometimes happens that a hole must be drilled, but that a drill of the required size is not on hand. A shop that is equipped with a forge, however, can make up the size drill required. It is common practice for a commercial shop to make a flat drill to take care of

TABLE OF DECIMAL EQUIVALENT—PARTS OF AN INCH			
1-64.....	0.0156	33-64.....	0.5156
1-32.....	0.0313	17-32.....	0.5313
3-64.....	0.0469	35-64.....	0.5469
1-16.....	0.0625	9-16.....	0.5625
5-64.....	0.0781	37-64.....	0.5781
3-32.....	0.0938	19-32.....	0.5938
7-64.....	0.1094	39-64.....	0.6094
1-8.....	0.125	5-8.....	0.625
9-64.....	0.1406	41-64.....	0.6406
5-32.....	0.1563	21-32.....	0.6563
11-64.....	0.1719	43-64.....	0.6719
3-16.....	0.1875	11-16.....	0.6875
13-64.....	0.2031	45-64.....	0.7031
7-32.....	0.2188	23-32.....	0.7188
15-64.....	0.2344	47-64.....	0.7344
1-4.....	0.25	3-4.....	0.75
17-64.....	0.2656	49-64.....	0.7656
9-32.....	0.2813	25-32.....	0.7813
19-64.....	0.2969	51-64.....	0.7969
5-16.....	0.3125	13-16.....	0.8125
21-64.....	0.3281	53-64.....	0.8281
11-32.....	0.3438	27-32.....	0.8438
23-64.....	0.3594	55-64.....	0.8594
3-8.....	0.375	7-8.....	0.875
25-64.....	0.3906	57-64.....	0.8906
13-32.....	0.4063	29-32.....	0.9063
27-64.....	0.4219	59-64.....	0.9219
7-16.....	0.4375	15-16.....	0.9375
29-64.....	0.4531	61-64.....	0.9531
15-32.....	0.4688	31-32.....	0.9688
31-64.....	0.4844	63-64.....	0.9844
1-2.....	0.5	1.....	0.1



FIGS. 18, 19 AND 20—MAKING THE FLAT DRILL

It is important that the material for the flat drill be forged at the correct temperature and the lips shaped to the proper angle by filing. The temper color is made more easily visible by first cleaning with emery.

some drilling job that requires drills of special size. Flat drills must be made from high carbon steel. An old round file can be made into a flat drill. The stock can be forged to shape as shown in Fig. 18, but care must be exercised in working the steel at the correct temperature. The diameter of the stock regulates the range of the size drill that can be made.

The newly forged drill is next filed to size, checking the size with the caliper, as shown in Fig. 19. The angles are the same as the twist drill. It will be an advantage to have a twist drill by the job to check the angles and cutting edges during the filing operation. The next operation is the tempering of the newly shaped drill. When tempering for steel drilling, heat the drill point to a cherry red and dip in water; enough

heat should be left in the shank of the drill to draw the temper. The point can be polished with emery cloth to make the temper color more visible. Quench when the temper shows up a light straw. These are the same operations that are followed when tempering a cold chisel, except that the temper color of the chisel is blue. If a flat drill is used for drilling glass, heat to a cherry red and harden in sulphurous acid.

The drill tables will be found useful around the drill press and in the mine shop. This is the type of information the commercial shopman has around him to help solve his drill-press problems. These tables give an opportunity for the mine-shop workman to take advantage of this valuable information and have it always available for any kind of drilling.

French Mines Soon Will Be in Full Operation

REMARKABLE progress has been achieved in the reconstruction of the French mining industry, systematically destroyed in war-time by the invading Germans, according to George S. Rice, chief mining engineer of the Bureau of Mines. Mr. Rice has just returned to this country, after completing a study, occupying several months, of conditions in the mining industries of France, Great Britain, Belgium, Germany, Poland, and Czechoslovakia. As a result of the splendid engineering skill employed in the restoration work, some of the finest coal-mining plants in the world have been constructed in the north of France. Thousands of miners' houses have been built, replacing those destroyed. These houses are quite attractive and most of them have gardens, which have been redeemed from trenched and blasted ground.

Much attention has been paid to welfare projects, with the result that the miners of northern France are undoubtedly better housed than those in any other part of the world. Underground, the mines have been recovered to such an extent that they are producing about 70 per cent of the normal coal output. When all the water has been pumped out of the mines, the coal production of northern France will be much greater than before the war.

World's Coal Output, January-June, 1923, Well in Advance of Last Year

World production of coal during the first half of 1923 amounted to approximately 666,000,000 metric tons, according to a summary of data received by the U. S. Geological Survey up to Oct. 15. This is an increase of about 79,400,000 tons, or 13.3 per cent over the corresponding period of last

year. All the countries listed, with the exception of Austria, Czechoslovakia and Germany, have increased their production. The most notable increases were in the United States, the United Kingdom and Poland. The proportion contributed by the United States was 44 per cent of the total.

The world total of 666,000,000 tons includes an estimate for Germany based on complete data for January and February and incomplete data thereafter. It also includes estimates for those countries, representing about 5 per cent of the whole, for which no figures of production were available. The following table, prepared by W. I. Whiteside of the Section of Foreign Mineral Reserves, is subject to revision as final official figures are received. Lignite and brown coal are included; where possible they are shown separately.

PRODUCTION OF COAL IN PRINCIPAL COUNTRIES OF THE WORLD, JANUARY—JUNE, 1923
(In metric tons of 2,204.622 lb.)

Country	Metric Tons	Per Cent of Total
North America:		
Canada.....	7,912,610	1.19
United States.....	294,261,000	44.18
Other countries.....	(a)	(a)
South America.....	(a)	(a)
Europe:		
Austria: Coal.....	74,698	0.01
Lignite.....	1,242,196	0.19
Belgium.....	11,127,700	1.67
Czechoslovakia: Coal.....	5,919,835	0.88
Lignite.....	8,725,861	1.31
France: Coal.....	17,659,350	2.65
Lignite.....	433,741	0.06
Germany: Coal (b).....	(c)	(c)
Lignite.....	(c)	(c)
Hungary.....	3,807,521	0.45
Netherlands.....	2,686,246	0.4
Poland.....	21,680,056	3.25
Russia.....	5,609,000	0.84
United Kingdom.....	143,051,102	21.50
Other countries.....	(a)	(a)
Asia:		
British India.....	10,074,000	1.51
Japan.....	13,745,000	2.06
Other countries.....	(a)	(a)
Africa:		
Rhodesia.....	250,447	0.04
Union of South Africa.....	5,222,674	0.78
Other countries.....	(a)	(a)
Oceania.....	(a)	(a)
Total.....	666,000,000	100.00
(a) Estimate included in total.		
(b) Includes 2,688,654 tons from Saar.		
(c) Estimate, based upon incomplete reports, included in total.		

New Equipment

Reel and Trolley Switch Combined In Locomotive Controller

THE new type LM 67 controller recently developed by the Goodman Manufacturing Co., of Chicago, combines the motor controller and a transfer switch for use with locomotives having both trolley and cable reel. This transfer switch is operated from the same shaft as the reverse lever, the switch reverse lever and controller handle being within 10 in. of each other. When the controller is on any of the running points it is impossible to operate the transfer switch. In this way the danger that always attends the throwing of the switch from the reel to the trolley, or vice versa, when taking power, is eliminated. Larger space is provided in the cab of the locomotive by the use of this controller and the elimination of the large transfer switch usually found on most trolley and cable-reel locomotives.

Adding the safety switch has taken nothing from the operating results of the controller itself. Interlocking the control and reverse transfer handle prevents changing the direction of the locomotive travel or switching the source from which the power must be taken—trolley or reel—without first moving the controller handle to the "off" position.

The three contacts and fingers making up the working parts of the safety switch are interchangeable with other fingers and contacts of the controller. In other words, all fingers and contacts of the main cylinder, reverse drum and safety switch are interchangeable. Easy adjustment of all fingers is made by screws, specially treated to resist rust. These screws keep the fingers always in proper position.

A large blowout coil in the bottom of the controller concentrates great energy where the large

arc is formed. Before the arc of either switch or controller cylinder has strength enough to do severe damage, it is destroyed. This blowout coil is heavily insulated and is very rugged, in order to stand up to the duty required.

Power-Operated Blacksmith Hammer

THE blacksmithing hammer is a comparatively new device which is finding a place among the labor-saving equipment used around the coal mines. This mechanical helper will replace one or two human strikers in any blacksmith shop. The hammer strikes a maximum blow about four times as heavy as that of the average striker and is intended particularly for forging work that is too small to be done under steam hammers. The smith has complete control over every blow by means of a treadle running around the anvil.

As high as 140 blows per minute can be struck and for this reason work can be done more quickly and with only one heating. The anvil is of special patented design, having a planed base and a stand with adjusting screws to move the anvil forward or backward as required. The hammer requires but 1 hp. to drive and on a line shaft with other tools the power absorbed will average less. The individual motor-driven unit is most compact and offers numerous advantages. The motor is mounted on a small stand in the base and geared to a large driving gear on the main shaft.

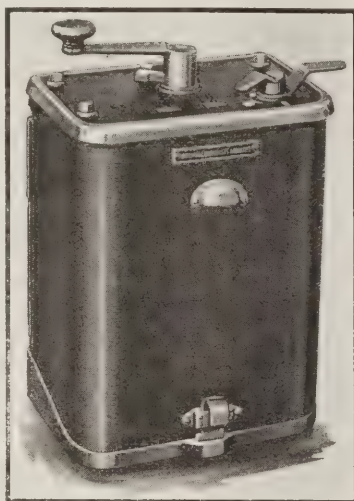


FIG. 1—CONTROLLER
WITH COVER

Note how conveniently the transfer switch handle is located with respect to the control handle, with which it is interlocked.

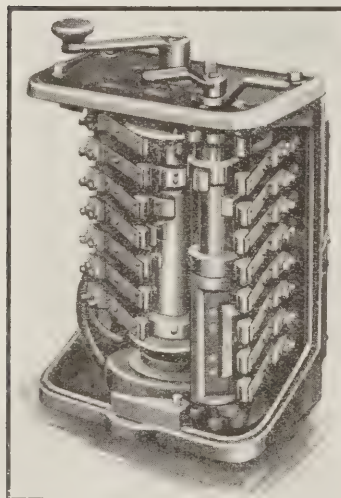
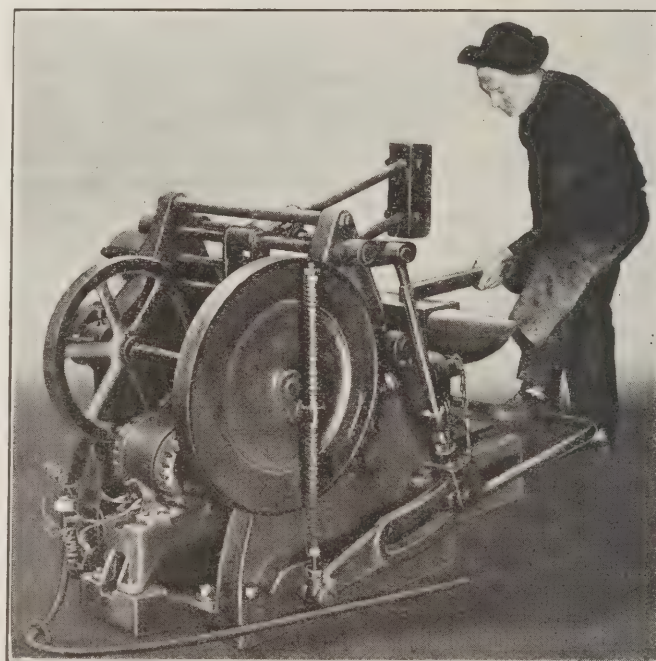


FIG. 2—INSIDE VIEW, ARC
DEFLECTOR OFF

To operate the transfer switch, which permits taking power through the trolley pole or reel cable, the control handle must be in the "off" position.

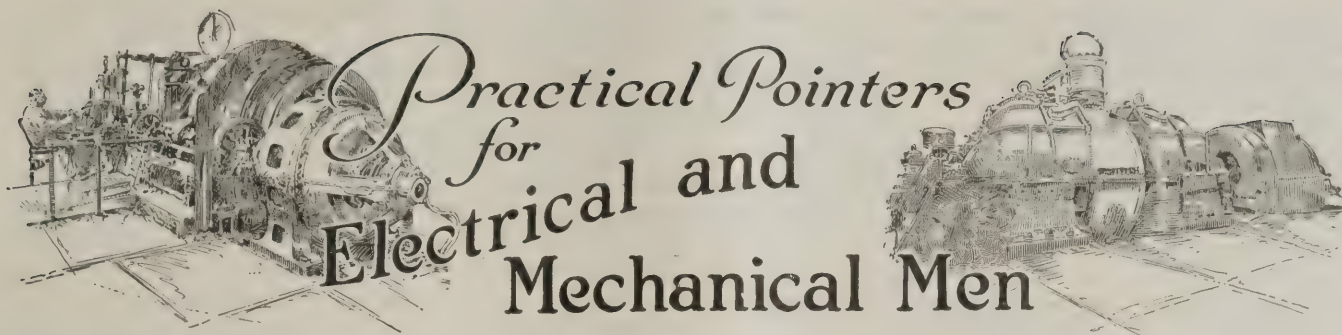


MOTOR-OPERATED BLACKSMITH HAMMER

When labor is short and overhead costs are high, such a device as this hammer works wonderful results and economies.

The striking is very similar to that of a hand swung sledge, the head first rises then strikes its blow and rebounds quickly from the metal. Operations requiring careful work can be performed with greater ease as the blacksmith has control of each blow of the hammer. As a consequence heavy welds, as well as light jobs, can be performed with great rapidity.

The Blacker Engineering Co., Inc., Grand Central Terminal, New York City, is the manufacturer of the complete outfit.



Severe Sparking at Trolley Wheel

WE ARE operating a Baldwin-Westingshouse locomotive rated at 250 volts, and are having trouble with the trolley wheels. Copper appears to burn off the trolley wire and deposit on the trolley wheel; this is accompanied by a constant glow from the wheel and severe sparking. Our track circuit is well bonded and there is no moisture on the wire.

I would appreciate some discussion on this subject from *Coal Age* readers.

New Castle, Ala.

FRANK PARKER,
Mine Foreman.

Sparking at the trolley wheel may be caused by any one or a combination of troubles. The first thing to do would be to investigate the electric circuit. This would consist of a thorough test of the voltage when the locomotive is drawing a heavy current, to determine whether or not the motors are receiving approximately proper voltage, then a test of the return circuit, which although well bonded may be open-circuited at important points.

Series-field troubles exist in many locomotive motors and frequently go unnoticed for years. Short-circuits in the fields can be located by testing as described in the Aug. 9 issue of *Coal Age* and by reading the voltage drop across each coil by means of a voltmeter.

After testing the locomotive equipment, including the motors, controller and resistance, it will then be proper to look at the trolley wheel. The composition of the

metal in the trolley wheel should be such as will resist wear and sparking. Some metals blister and burn whenever an arc is formed upon them. The burned material usually is forced into a flaky mass which packs itself down into the groove of the trolley wheel and thus increases the resistance to the current which is taken from the trolley wire. The increased resistance causes more heating at the wheel and further aggravates the tendency to spark.

Obviously, anything which would prevent the gathering of this burned material would give better contact at the junction of the trolley wheel and wire. This is sometimes accomplished by deepening the groove in the trolley wheel into a narrow V shape, as shown in the cut herewith. This allows the wire to have a wiping action on the side of the groove, thus giving a clean low-resistant contact with the wire.

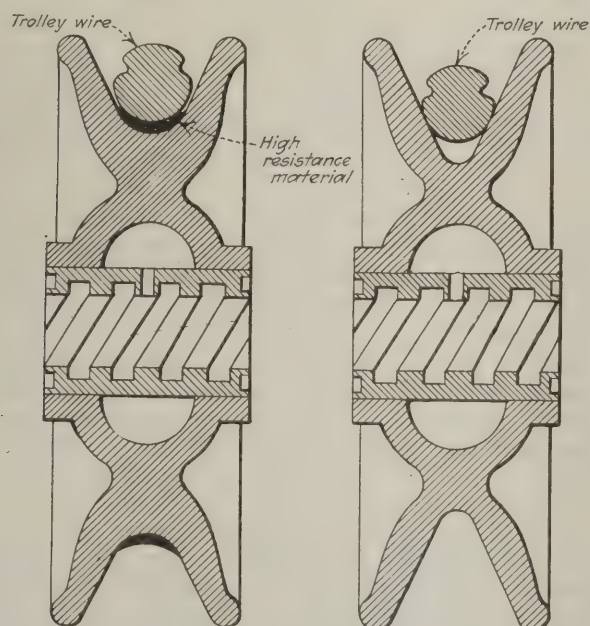
Court Rules with Reference to Equipment Bought Without Written Warranties

THE question of when and under what circumstances a buyer of machinery will be justified in relying upon the warranties and representations of a salesman as to its condition has been the cause of many lawsuits. And while the question cannot be answered by the statement of a hard and fast rule, because each case of this kind must necessarily be decided in the light of the particular facts involved, yet it may be stated broadly that where such a purchase is reduced to writing the buyer should not rely upon any warranties which have been previously made, unless they also appear in the writing.

This is true because it is an elementary rule of law that prior oral warranties and representations are deemed to have been merged in any subsequent written contract, which precludes the latter from being changed or varied by such prior oral warranties or representations. It follows that where a written order for machinery is given, such order will be deemed to constitute the contract, and as a general rule only the terms as they appear therein may be considered by a court or jury in the event of later dispute.

The application of this rule of law and the danger to the industrial executive in losing sight of it when machinery or equipment is being ordered is illustrated in a most striking and interesting manner in a recent West Virginia court case between a coal company and a Virginia equipment company.

The facts and circumstances out of which the action grew were as follows: The coal company, the plaintiff, purchased from the equipment company, the defendant, a second-hand coal-cutting machine to be used in its mine. This machine was purchased from a traveling



TROLLEY WHEEL WITH DEEP, NARROW GROOVE

These figures show how the high-resistance material packs itself into the groove and how the groove may be shaped to have a wiping action on the trolley-wire contact.

salesman in the employ of the defendant who, it appears, brought the machine to the attention of the plaintiff. The contract of purchase was reduced to writing and provided as follows:

"—— (name of equipment company), —— (name of city), West Virginia. Date July 1, 1921, bill —— (name of coal company), address ——, W. Va., ship to same address, same custom on No. ——, ship freight, when, terms, salesman. —— Type coal-cutting machine, second hand, f.o.b. ——, Alabama, freight allowed, sight draft at \$3,500. Signed —— (name of coal company). ——, Superintendent."

At this point it should be noted that the above contract is in the form of an order, complete within itself in respect to terms and subject matter, though it does not contain any warranty or representations relative to the condition of the machine ordered. The order, as will be noted, simply stipulates for the shipment of one —— type coal-cutting machine; price \$3,500; sight draft attached.

The machine in question was shipped, and received by the plaintiff, who paid the sum of \$3,500 upon its receipt. Upon trial, however, the machine proved unsatisfactory in a number of respects, and a dispute resulted between the plaintiff and the defendant which culminated in the plaintiff instituting a lawsuit in an attempt to recover the purchase price.

In this action the plaintiff, among other things, sought to recover upon the ground that the salesman had warranted the machine as being in a certain condition, and that upon receipt the machine was not as represented. The authority of the salesman to warrant the machine was denied by the defendant, and evidence was introduced to show that the machine was in fact sold subject to inspection and prior sale, and that the defendant had refused to warrant the machine in any way.

In the face of the contention of the plaintiff and the conflicting evidence introduced by the parties the outcome of the case turned upon the question of whether or not the evidence relative to the alleged warranty of the salesman should be received in view of the fact that the negotiations for the machine were subsequently reduced to writing and, as noted above, this writing did not contain any warranties whatever. The case reached the Supreme Court of Appeals of West Virginia on appeal, and in passing upon this point the court decided as follows:

"The authority of the salesman to warrant the condition of the machine is specifically denied. The written order signed by purchaser contains no express warranty of this machine. The only description given is '—— type coal-cutting machine, second-hand.' Can plaintiff ingraft a warranty upon this written order to conform to the statements of the salesman as to the condition of the machine? We think not. . . . If plaintiff had desired, at the time of signing the written order, to have the condition of the machine guaranteed, as represented by the salesman, he should have written the same in the order. . . .

"The contract is complete and unambiguous. . . . This order, stripped of its superfluous verbiage, means that a second-hand coal-cutting machine was to be delivered to the plaintiff f.o.b. Birmingham, Ala., freight to be paid by the equipment company, and a sight draft for \$3,500 was to be attached to the bill of lading, the shipment to be traced and hurried. This, after being accepted by the defendant, constituted the contract, and

contemporaneous oral statements of the salesman cannot be ingrafted upon it. . . ."

In conclusion, after considering other points not material to the subject of this discussion, the higher court affirmed a judgment that had been rendered in the lower court in favor of the defendant, holding, as outlined in the opinion, that the plaintiff was not entitled to recover the money it had paid for the machine, on the strength of oral warranties alleged to have been made by the traveling salesman of the defendant, when such warranties did not appear in the written order as subsequently signed.

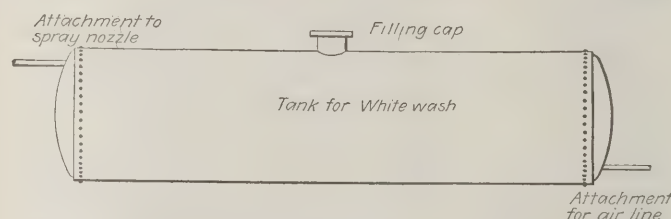
The above case was well considered and constitutes a valuable decision on the point decided. It illustrates in a striking manner the importance of having all the terms, warranties and representations relative to the condition of machinery or equipment embodied in the final contract when reduced to writing. Truly, in the light of the facts involved, the above decision becomes one well worth having in mind by every industrial executive when ordering machinery or equipment under circumstances similar to the one in the case reviewed.

LESLIE CHILDS.

Making Whitewashing Easy

AT MANY of our mines there always is a considerable amount of work being done in whitewashing the foot of shafts, barns, pumprooms, and safety holes on planes and slopes. In several places a small hand pump is used to force the liquid from a tank through a nozzle onto the object to be whitewashed. This is a slow and tedious task especially for the man who works the hand pump.

To overcome this difficulty we have built a small truck and mounted on it an unserviceable hot water boiler, or even a large pipe will do. We cut a large hole into the upper side of the boiler, so that the liquid can be poured into it. When the tank is full the cap is screwed back



WHITEWASH TANK WITH AIR PRESSURE CONNECTION

The air pressure forces the whitewash to the hose and nozzle attachment and the work of whitewashing is done both quickly and effectually.

to prevent any whitewash leaking. To one end of the tank is attached a hose connected to an air line; the other end of the boiler has an attachment to the nozzle. When all is ready the air is turned on and regulated by means of a valve attached to the air line. By this arrangement the liquid is forced from the tank through the nozzle by the air pressure. With an air hose and a small auxiliary line on the nozzle a large area can be whitewashed in this way in a very short time.

STUDENT.

IN CONNECTION WITH MINE VENTILATION studies being made at the experimental mine of the Bureau of Mines, Bruceton, Pa., 152 tests recently were made with variations in the velocities and conditions in the airways. Relative velocity heads were determined for timbered entries, entries obstructed with loaded cars, entries obstructed with empty cars, cut-throughs with and without brattices, and for various vanes for conducting air around right-angle turns.



Problems of Operating Men

Edited by
James T. Beard



Working Three Seams of Coal With Rock Partings

Three Letters Suggest Various Methods—
Main Features Maximum Extraction of Coal
and Elimination of Waste Material Handled

REFERRING to the inquiry signed "Presto," which appeared in *Coal Age*, Aug. 9, p. 219, and asked for the best method of working three seams of coal separated by slate and shale partings of considerable thickness, permit me to offer the following:

Summarizing the case presented, we have a hard sandstone roof covering the upper seam, which will average 42 in. of hard splint coal." Below this is a hard sandy shale averaging 60 in. and under that a second seam of coal having an average thickness of 33 in. Then comes another parting of medium hard slate averaging 21 in., beneath which is a soft clean coal 12 in. in thickness.

In all, we have an average of 7 ft. 3 in. of coal, the mining of which will require the handling of 6 ft. 9 in. of rock forming the two partings in these three seams. This is almost a fifty-fifty proposition of coal, and rock and the space left after the coal has been extracted appears to be hardly sufficient for storing the waste material a portion of which would have to be hauled out of the mine.

ESSENTIAL FEATURES SUGGESTS PROPOSED PLAN

In my opinion, to work this as one seam would be a dangerous undertaking for the safety of the workmen, owing to continual falls from the coal face and the sides. While there are doubtless various methods of working these seams, the essential features to be considered are the complete extraction of the coal, as far as that may be practicable, and the elimination of the waste material requiring to be handled.

Briefly explained, my plan would be to develop the bottom and middle seams first. I would adopt the panel system of working, leaving enough pillar to comply with the requirements of the surface conditions, which are not mentioned in the inquiry. These two lower seams will average 45 in. of clean coal, with an average of 21 in. of rock parting, making a total height of 66 in. and affording plenty of room to gob the refuse.

When the work in the two lower seams has been developed sufficiently, I would drive a rock panel up through the 5 ft. of hard sandy shale, on a grade that would afford easy haulage from the top seam. The haulage roads in that seam can be laid out directly over those in the lower seam if that is well timbered; or, as some will prefer, the roads in the top seam can be centered over the pillars in the lower seam.

This plan will eliminate having to blast the hard sandy shale, which in my opinion makes a fine roof

for the working of the two lower seams. Besides eliminating the necessity of handling this 5 ft. of rock, the plan insures that the top coal will be absolutely clean if proper care is taken in its mining.

As quickly as a panel is finished in the top seam, the work of extracting the pillars in that seam can be started and when that is well under way similar work in the lower seam can be undertaken. It is my belief that, by this means, it will be possible to get out most all of the coal and leave the refuse in the mine.

Clinton, Ind.

W. W. H.

MY PLAN of working the three seams under discussion in *Coal Age*, while having in view a maximum percentage of production per man per day and economy of working, would be to follow somewhat the outline given by the inquirer, in the issue, Aug. 9, p. 219, though differing from this method in certain details.

Starting in the combined bottom and middle seam, I would drive an entry and air-course on the double entry system, turning rooms on 90-ft. centers to the right and left of the main heading. These rooms should be opened out to a width of 40 ft., leaving 50-ft. pillars of coal between them. I would lay single tracks on the entry and air-course and double tracks in all rooms.

All entries and rooms should be driven to the boundary, or to the meeting point, taking out all the coal in the two lower seams and stowing the waste material of the parting between the two tracks in each room. When the entries have reached the boundary line and the rooms worked to the limit on each side, my plan would be to start the work of retreating, by dropping the shale parting and taking down the top coal, lifting the track as the work proceeds. The coal can be loaded off the shale just as it falls. In doing this, it will be unnecessary to handle or break up the parting material, which will save much work that would otherwise be required.

Then, when the work has been carried back to the entry, I would split the 60-ft. pillars separating the several rooms, by driving a 30-ft. room in each pillar. As these rooms reach their limit, I would follow the same plan in retreating, taking down the top coal and loading it off the shale where it has fallen.

The two 10-ft. pillars remaining in each case can then be abandoned, as their extraction would be too dangerous and difficult to undertake and the value of the coal lost would not warrant the risk.

A. G. BUCHANAN.

Flattop, Ala.

THE plan of working three seams of coal separated by thick partings, as suggested in the inquiry signed "Presto," *Coal Age*, Aug. 9, p. 219, does not appeal to me as feasible. He suggests keeping the workings in the two lower seams a little ahead and then dropping the hard sandy shale to get the top coal. Not only is there too much stone to handle in this manner,

but there are too many hazards in the undertaking and when the whole weight comes on it would be difficult to control.

It is my belief that the best way to get out this coal is to handle the three seams as two distinct propositions. In my opinion, the top seam should be worked out on the advancing longwall plan. When the main entries have been driven far enough from the shaft or the slope, cross-entries should be turned to the right and left while keeping the main entries going.

When the main roads have reached a point, say 100 ft. beyond where the cross-roads were turned, the former should be widened into a "mothergate." This should be driven forward at a width of 10 or 12 yd. At the same time, cross-headings should be started to the right and the left, driving these 10 yd. in width. Tracks should be laid in the center of each opening.

GENERAL PLAN OF LONGWALL WORK

As in all longwall work, the top should be brushed on the roads and the waste material used for packs to support the roof. On the cross-headings, gateways should be turned every 10 yd. and driven parallel to the mothergate. In this plan, the mothergate will be making a loose end for each breast. This will continue for ten gateways on either side of the mothergate. At this distance, 100 yd., a chute should be driven back across 100 ft. of solid coal to reach the cross-headings previously mentioned. When this has been done, the coal beyond can be taken out through this chute and the old road abandoned. Also, new cross-headings should be started from the mothergate at intervals of 60 yd. and driven right and left, each cross-heading cutting off the gateway below as it advances.

As development proceeds, the chute just mentioned should be extended to meet the next pair of cross-roads driven from the mothergate. If this plan is followed, it will permit all of the coal to be taken out in the top seam. In the meantime, the middle seam can be worked out, taking the bottom seam along with it on the "bord-and-wall" or room-and-pillar system. In my opinion, that method is better than the block longwall or long-wall panel system. The partings of medium soft slate varying from 18 to 24 in. will form good material for stowing in the bords as waste. I believe the hard sandy shale varying from 48 to 72 in. in thickness will make a good roof in working the lower seam and the plan will be far less dangerous than to attempt to work the three seams as a single proposition.

Neffs, Ohio.

PICKS.

Novel Plan of Wetting Bug Dust

Application of water to cutterbar on machine—Plan approved by Mine Inspectors Institute—Scheme requires machine sent to shop for cutting groove.

WHEN reading the report of the last annual convention of the Mine Inspectors Institute of America, held at Pittsburg, Kans., *Coal Age*, July 19, p. 113, and continued on page 149 of the following issue, I was pleased to note the remarks of Frank Hillman, safety engineer, Woodward Coal & Coke Co., regarding the application of water to the cutterheads of the mining machines, in the mines of the T. C. I. & R.R. Co.

The scheme, as briefly described by Mr. Hillman, would seem to be more simple of application than is actually the fact. He states that the plan is to loosen

the plate on the cutterbar of a mining machine and lay, in the groove therein, a half-inch pipe by which water is conveyed to the cutting teeth. When the machine is running the water mixes with the fine dust, converting it into mud and rendering it harmless.

ROTARY DUMPS INSTALLED UNDERGROUND

As a safety measure, the plan is certainly a great success. It was originally intended to eliminate the dust trouble that grew out of the installation of rotary dumps, by that company, on their shaft and slope bottoms. The coal is dumped from the mine cars into hoppers and loaded into skips for hoisting.

These dumps being situated on the main intake air-ways, large quantities of dust were previously carried into the mine on the air current when the cars were being dumped. Some of the dumps are operated by electric motors, which increase the danger from the possible arcing of the current in the presence of the dust-laden atmosphere. By the adoption of the scheme of applying water to the cutterbars of the machines the dust problem is practically solved.

It is well known that the use of mining machines creates a dangerous percentage of dust, which is thrown into suspension in the air at the working faces. The result is that a dust explosion is liable to be caused, at any moment, by the blowing of a fuse or the sparking of the motor. Attempting to eliminate the danger by spraying has not proved satisfactory.

MINE INSPECTORS APPROVE THE PLAN

It is gratifying to note that the convention of mine inspectors mentioned went on record by a resolution approving the plan of applying water to the cutterheads of mining machines when in operation. It is only fair, however, to explain that the adoption of the plan is not as easy as may be supposed. It will be found that the removal of the top plate is quite a serious matter, as it involves taking out sixty-five half-inch rivets and three $\frac{3}{4}$ -in. rivets, in the shop on the surface.

Moreover, when the plate has been removed, there is no groove in which to lay the half-inch pipe, and it is necessary to cut a slot from 5 to 7 ft. in length, in a slotting machine. Comparatively few mines have machine shops suitably equipped for doing this class of work and only those companies who are safety enthusiasts will undertake the job of remodeling their machines in the manner described.

In my opinion, what the T. C. I. & R.R. Co., has accomplished in this respect has solved the problem for all machine mines. I believe the scheme they have evolved will prove a valuable help in bringing such mines close to being 100 per cent dust proof, particularly if the further precaution is taken of spraying the coal after shooting. My observation is that much fine dust covers the coal shot down and, unless spraying is done after shooting, this dust is distributed on the roads.

A brief outline of the work of remodeling a machine for the purpose of applying water at the cutterhead in the manner mentioned will no doubt be of interest. As stated, the top plate is removed by taking out the sixty-eight rivets and the bar sent to the slotting machine. A groove is cut in the bar, starting 3 in. in front of the gear housing and making a turn of 45 deg. inward when reaching a point about 9 in. from the sprocket wheel, between the left and right sidebars.

In this slot, a copper pipe is laid allowing the end of the pipe to extend 6 in. beyond the end of the groove.

This 6-in. extension is made to run parallel to the right-hand sidebar and made to point toward the kerf, so that the water flowing from the pipe under pressure will play on the teeth of the sprocket wheel and be carried by it and its own pressure to the cutting bits in contact with the coal.

At the other end, a hole is drilled in the top plate and a short nipple inserted, which is attached to the copper pipe beneath. To this nipple is connected a half-inch pipe, having a 1-in. strainer and a stop valve. This half-inch pipe is carried along the side of the gear housing to which it is attached by metal straps. The connection between the pipe and the nipple on the cutterbar is made by rubber tubing, which with the piping is protected from injury by an auxiliary housing of sheet steel bolted to the gear housing with spacers between.

The water is supplied from the regular spraying system, which is kept close up to the face of all working

places. The system consists of 4-in. pipe on the main entries, 1½-in. pipe on the cross-entries and ½-in. pipe in the rooms. The water is that discharged from a pump under a pressure head of 250 ft. Each machine runner is supplied with 50 ft. of hose to connect his machine with the spraying line. This length of hose enables the machine to cut rooms 35 ft. in width.

The closest supervision is maintained by the company over all its workmen. The firebosses make two visits a day to each working place. They and other officials are instructed to observe the condition of the machine cuttings and report if any are found dry. Each machine runner is instructed to consider his machine out of commission if, for any reason, the water fails to pass through the pipe with sufficient pressure and in quantity to keep the bug dust thoroughly wet when cutting. Instant dismissal is the penalty for failure to comply with instructions.

Bayview, Ensley, Ala.

JOHN WALLS, SR

Inquiries Of General Interest

Ignition of Gas by Sparks from Falling Rock Possible

Hard Siliceous Roof Rock Falling Emits
Sparks of Great Intensity—Cause of Bellevue Mine Explosion and Other Disasters

WE ARE anxious to obtain reliable information in regard to the possible ignition of gas by sparks that may be struck by pieces of rock falling from a hard sandstone roof in a mine. Assume a drift mine opened in a 5-ft. coal seam and developed to an extent such that there is a large robbed-out area covering approximately 660,000 sq.ft. Again, suppose a general fall of roof occurs in this area some distance back from the edge of the pillars, which are being drawn.

We will say there is a small amount of inflammable gas hanging in the roof of this section from which the coal has been mined. Is it reasonable to suppose that this gas can be ignited by sparks struck by rock falling from the roof? Or, is it possible for the fall of the rock to stir up a cloud of dust that could be ignited by the same spark? Any information that will make clear the possibility of such an occurrence will be much appreciated.

G. R. LUKE, General Foreman,
Benham, Ky. Wisconsin Coal Co.

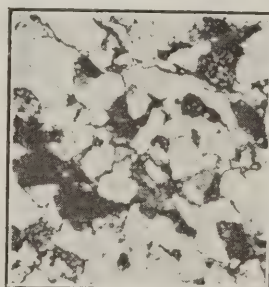
As early as 1896, when an explosion occurred in the Maindy Pit, Glamorgan County, South Wales, the disaster was attributed to sparks struck by rock falling from the roof in an abandoned area of the mine. It was well known that gas was present, it being difficult to keep the place free from such accumulations. At that time and since when a mysterious explosion has taken place and the suggestion made that the ignition was caused by sparks struck by flinty rock falling from the roof, it has always been met with expressions of doubt and even ridicule.

In the explosion at the Maindy Pit, Nov. 8, 1896, a

practical test was made to prove that the assumed cause of the disaster was not only possible but probable, no other source of ignition being known to be present in the mine at the time. By way of experiment, a box measuring about 3 ft. on the cube was equipped with a rotating spindle to which pieces of the rock in question were attached. Similar pieces of the same rock were fastened to the sides of the box in a manner to be struck by the rock attached to the spindle. The box was then filled with an explosive mixture of gas and air and a violent explosion followed when the spindle was rotated. The same experiment was repeated with the box filled with an atmosphere of dust-laden air, no gas being present. The fact that no explosion followed in this case suggested that the sparks struck by the rock were not of sufficient intensity or volume to ignite the dust-laden air in the absence of gas.

Another instance in which the cause of the explosion has been attributed to the ignition of gas by sparks struck by rock falling from the roof is that of the Bellevue mine explosion, which occurred Dec. 9, 1910, when 37 out of 47 men, who were in the mine at the time, lost their lives. The Bellevue mine is one of a group of three mines worked by the West Canadian Collieries Co., Alberta, Canada. A series of explosions had occurred in this mine from seemingly mysterious causes, within three months of each other. In the first explosion, Oct. 31, 1910, and in the third explosion, Jan. 28, 1911, there was no one in the mine at the time. An

account of this explosion is found in *Coal Age*, Vol. 2, p. 457. The seam consists of 13 ft. 2 in. of coal containing three 1-in. bands of bone coal and dirt. The coal is underlaid with a hard floor, while the roof is a hard siliceous sandstone, the accompanying illustration at the left being a microscopic section of the rock.



MICROSCOPIC SECTION
OF ROCK

When a specimen of this roof rock is struck a glancing blow with a hammer, the portion struck will glow red hot, for an instant, in the dark. An analysis shows that the rock contains some bituminous matter, the apparent combustion of which would account for the observed glow when the rock was struck, sufficient heat being generated by the blow to cause the ignition of the bituminous matter.

or the gas generated from it, when the hammer fell. Two pieces of the rock when struck together caused sparks to fly from the contact. A piece of the rock held against a steel flint mill produced a shower of sparks.

According to the statement of miners engaged in drawing pillars in the Bellevue mine, when a cave occurred the glow of the sparks from the falling rock would light up the place and make the timbers visible, the miners' lights having been extinguished by the rush of air from the fall. These facts and the experiences of the men who worked in the mine leave not

the shadow of a doubt regarding the source of the ignition of the gas.

Safety when working under such conditions must depend on the thorough ventilation of the working places to keep them free from accumulations of gas, and the adoption of a method of working that will reduce to a minimum the liability of heavy falls of roof. The report on this explosion, as made by Mine Inspector, John T. Sterling and Professor John Cadman, of the University of Birmingham, England, is found in the Transactions of the Institute of Mining Engineers, Vol. 44, p. 740.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—In a mine where 50,000 cu.ft. of air per min. is furnished, in which 3 per cent of gas was detected, what was the total flow of gas per minute?

ANSWER—Assuming that the given volume (50,000 cu.ft. per min.) is measured on the return airway and includes both air and gas, as the question seems to imply, the gas forming 3 per cent of this volume, the quantity of gas generated is $0.03 \times 50,000 = 1,500$ cu.ft. per min.

QUESTION—A counter-gangway is 1,680 ft. long, on a pitch of 10 deg.; what will be the horizontal distance measured on the mine map?

ANSWER—The corresponding horizontal length of the gangway is $1,680 \times \cos 10 \text{ deg.} = 1,680 \times 0.9848 = 1,654.46$ ft. Since the law requires (Art. 3, Sec. 1) that the mine map be drawn to a scale of 100 ft. to the inch, the measurement on the map would be 16.54 in.

QUESTION—What is a regulator as applied to mine ventilation?

ANSWER—In mine ventilation, a regulator is any means employed to divide the air current proportion-



TWO FORMS OF MINE REGULATORS

ately between two or more splits. The most common form of regulator is a brattice or partition erected in the airway and having an opening the size of which can be adjusted by a movable shutter to meet the desired requirements. This form is known as the box regulator and is located on the back entry near the end of the split where it will not obstruct haulage operations. Another form is a door regulator in which a door is erected at the entrance of a split and swung to one side or the other of the passageway so as to control the quantity of air entering the split in any desired proportion. These two forms of regulators are shown in the accompanying figure.

QUESTION—If the horsepower of a fan is 40 and the water gage 1.75 in.; what quantity of air would you expect to obtain, supposing the useful effect of the fan to be 50 per cent?

ANSWER—If the fan develops 40 hp. having an efficiency of 50 per cent, the power on the air is $0.50(40 \times 33,000) = 660,000$ ft.-lb. per min. Then, since a water gage of 1.75 in. corresponds to a pressure of $1.75 \times 5.2 = 9.1$ lb. per sq.ft., the quantity of air produced by this fan is $660,000 \div 9.1 = 72,527$ cu.ft. per min.

QUESTION—What horsepower will give a current of 60,000 cu.ft. per min., in a mine having four splits, each split being 6 x 8 ft., in section, and 5,000 ft. long?

ANSWER—The quantity of air passing in each split is $60,000 \div 4 = 15,000$ cu.ft. per min. The rubbing surface in each split is $2(6 + 8)5,000 = 140,000$ sq.ft., and the sectional area $6 \times 8 = 48$ sq.ft. The pressure required to pass 15,000 cu.ft. per min. in each split is,

$$p = \frac{0.00000002 \times 140,000 \times 15,000^2}{48^3} = 5.7 \text{ lb. per sq.ft.}$$

The horsepower then required to circulate a total of 60,000 cu.ft. of air per min., in four splits against this pressure is,

$$H = (60,000 \times 5.7) \div 33,000 = 10.36 \text{ hp.}$$

QUESTION—What quantity of air would be required for the following organization: Coal loaders, 310; motormen, 22; trackmen, 8; general foreman, 1; assistant foremen, 6; pumpers, 4; electricians, 3; company men, 75? Show the solution.

ANSWER—The Alabama Mining Law (Sec. 40) requires the circulation of 100 cu.ft. of air per minute. for each person employed in the mines, and 500 cu.ft. per min., for each mule. In this case, there is a total of 429 persons, and it may be assumed that the coal is all gathered and hauled by motors and no mules are employed underground. In the absence of any special conditions regarding gas and dust that would require a larger quantity of air, the volume necessary to comply with the mine law is $100 \times 429 = 42,900$ cu.ft. per min. A fair estimate would place the circulation required in this mine at, say 45,000 cu.ft. per min.

QUESTION—What kind of a system of shotfiring would you recommend, in a gaseous mine where electric cap lamps are used?

ANSWER—Shotfiring, in such a mine, should be performed by competent shotfirers appointed for that purpose, the work to be done after all the men have left the mine except the shotfirers. The safest plan is to have all holes drilled by the miners examined, charged and fired by the shotfirers, using permissible powders, and examining every place for gas before firing a shot therein. No miner should be permitted to fire a shot or have in his possession materials for that purpose.

Testimony Completed in Assigned-Car Rehearing; Oral Argument Set for Dec. 17-19

Virginian Official Stresses Need of New Coal Branch—
Demurrage Ruling Issued—Carriers Reject Plea to Cut
Wheat Rates—Anthracite Rate Hearings On in East

After ten days devoted to the taking of testimony, the Interstate Commerce Commission on Nov. 1 closed its rehearing of the assigned car case. The dates for oral argument have been set for Dec. 17, 18 and 19. Briefs are to be filed by Dec. 1.

A rumor is in circulation that the effective date of the order is to be deferred until April 1. So far as can be learned, there is no basis for such a report. It is evident, however, that there will be some delay, since Commissioner Aitchison announces that he must undergo a surgical operation which he expects will keep him away from his desk for three weeks.

It had been taken for granted until recently that the private-car interests would carry the case to the U. S. Supreme Court, were the ultimate finding in the case not to their liking. Grave doubt now is expressed as to whether or not this question is justiciable. As the question involved appears to be one of regulation, only, some are of the opinion that it is not a matter which the federal courts will entertain.

MUCH OPPOSITION TO ASSIGNED CARS

Almost the whole of the last day of the hearing was taken up by witnesses opposed to assigned cars of all classes. Among those who testified in opposition to assigned cars, filing exhibits intended to show that discrimination was shown as between mines loading assigned cars and those loading unassigned cars, were Charles O'Neill, secretary of the Central Pennsylvania Coal Producers Association; C. D. Boyd, traffic manager of the Hazard and Harlan Coal Associations; W. L. Hammond, vice-president, White Star Mining Co.; John Marland, general superintendent of the King Harlan Coal Co.; H. B. Tyree, fuel agent, Detroit Edison Co.; W. D. Ord, president, Empire Coal & Coke Co.; T. F. Farrell, vice-president, Pocahontas Fuel Co.; A. R. Yarborough, traffic manager, Kanawha Coal Operators Association, and S. C. Higgins, secretary, New River Coal Operators Association. Mr. Hammond's company is a subsidiary of the Detroit Gas Co. and Mr. Marland's company a subsidiary of the Detroit Edison Co. W. D. McKinney, secretary of the Southern Ohio Coal Exchange, had offered exhibits and testimony along the same lines Oct. 30.

John D. Battle, traffic manager of the National Coal Association, testified briefly on behalf of the association in connection with the railroad-fuel assigned car, confining his remarks to the present railway situation as reflected in the progress reports released by the American Railway Association, and a number of tables were filed with the Commission indicating that for several years past non-coal producing roads either do not own a sufficient number of cars to protect the tonnage that actually moves on their rails, or coal cars moving to the rails of non-producing roads are not returned promptly. Figures were filed showing the large number of cars on line compared with ownership.

Charles M. Schwab, chairman of the board, Bethlehem Steel Corporation, stated that his companies resorted to the purchase of privately owned coal cars only after all of the methods had failed to get a regular and suitable supply of coal. James A. Campbell, president of the Youngstown Sheet & Tube Co., followed Mr. Schwab with practically the same kind of testimony. Both agreed that private cars, as an investment, is not a good one but that they are necessary in order to operate their plants successfully. Robert Hobson, president of the Steel Co. of Canada, and Harry Colby, a member of the firm of Pickands-Mather Co., testified along the same lines as did Messrs. Schwab and Campbell. L. H. Bihler, on behalf of the United States Steel

Corporation and its subsidiary companies, testified to the effect that without the use of private cars they had experienced great difficulty in getting their fuel.

A witness for the Pittsburgh Plate Glass Co. said that he did not desire any preferential movement or service from the carriers during a shortage of transportation facilities other than cars. Edward J. Berwind, testifying on behalf of the Berwind-White Coal Co., made the same declaration and put considerable evidence in the record as to the displacement of coal by fuel oil in the East, stating that his company alone, this year, estimates its loss at 1,200,000 tons of coal to fuel-oil competition. Many witnesses testified that they had not been able, in the past, to get a suitable supply of coal regularly until they acquired their own cars.

One of the strong witnesses of the concluding sessions of the rehearing was Van A. Bittner, who appeared as the personal representative of John L. Lewis, president of the United Mine Workers. Mr. Bittner told the Commission that the United Mine Workers is squarely opposed to assigned cars. "While assigned cars secure an ideal condition for a small minority of coal miners at particular mines," said Mr. Bittner in the course of his testimony, "it creates an altogether different condition at the majority of mines where the majority of the men work." Evidence had been submitted previously to show that the labor turnover was much greater at comparable mines when one was served with assigned cars.

Mr. Bittner laid at the door of the assigned car no small measure of the responsibility for the overexpansion of coal mining. If the practice is abolished, he predicted that only a short time will be required to drive out of business the uneconomical mine. If only the more efficient mines live, it will do much toward stabilizing the industry, he said.

A new point was made by one witness who contended that coal for household consumption should have first call on cars if the practice is to be continued. A spokesman for the Associated Industries of Massachusetts urged that nothing be done which would interfere with the right of the railroads to use their own cars as they see fit and that nothing be done to add to the price which the railroads will have to pay for their fuel. Abner Kunsford, operating the mines of the Fordson Coal Co., in eastern Kentucky, admitted that it doubled the cost of production when assigned cars are not available.

Hix Says Virginian Ry. Will Dry Up Unless It Can Build New Coal Branch

Testifying before Director Mehaffie, of the Bureau of Finance of the Interstate Commerce Commission, at Washington, Oct. 31, C. H. Hix, vice-president of the Virginian Ry., said that unless the road was permitted to develop fully its resources in the bituminous coal fields it would dry up for lack of business.

The hearing was on the Virginian's and Pocahontas Fuel Co.'s petitions for reconsideration by the commission of the order denying the Virginian authority to extend its lines a little more than one mile in Wyoming County, W. Va., to coal fields owned by the Pocahontas Fuel Co. The commission held the Virginian had not been able to furnish the number of cars ordered by the coal mines already opened and dependent on it in whole or in part for car supply.

This conclusion reached by the commission was emphatically denied by Vice-President Hix, who asserted that, with

the exception of the period from July, 1922, to June, 1923, inclusive, when abnormal conditions existed on account of the strikes of bituminous-coal miners and railway shopmen, the Virginian had adequately met the demands on it for service and at various times and for considerable periods had had a surplus of empty coal cars.

Declaring the company in 1922 had over 8,000 coal cars, Mr. Hix said, in April this year 1,500 additional cars were ordered, 1,000 of which will be of 120 tons capacity and 500 of 70 tons capacity. He said the company had 123 freight locomotives in 1922, and had acquired this year fifteen heavyallet locomotives.

The Virginian has increased its coal handling facilities at Sewalls Point at a cost of \$3,250,000 and has contracted for the electrification of 134 miles of its line at a cost of \$13,000,000, Mr. Hix said. These improvements will greatly increase the company's facilities for handling increased coal shipments, the witness said.

Railroads Refuse to Reduce Wheat Rates: No Decision on Coal Tariffs

The Committee of Railroad Executives appointed at the conference in New York on Oct. 30, consisting of Samuel Rea, president of the Pennsylvania; Howard Elliott, chairman of the Northern Pacific; J. E. Gorman, president of the Rock Island; W. H. Finley, president of the Chicago & Northwestern, and H. E. Byram, president of the Chicago, Milwaukee & St. Paul, notified the Interstate Commerce Commission Nov. 1 that they declined to accede to the request of President Coolidge that the carriers voluntarily reduce rates on wheat for export.

Nothing was given out about coal rates, but it was unofficially said the roads are adverse to changing the differential between export and domestic coal rates.

The American Farm Bureau Federation takes exception to the decision of the railroad men, and insists that the Commerce Commission cut wheat rates. The American Mining Congress has filed with the Commission a request that if wheat rates are to be examined, rates on all basic commodities be included in the study.

Retail Coal Prices Unaffected by Freight Rates, Vermont Dealers Testify

The people of Massachusetts want no charity, but they want absolute assurance that the factors entering into the final cost of coal are equitably assessed, including the railroad rate, said Representative Henry L. Shattuck, of the Massachusetts Coal Commission, testifying Nov. 2 at Boston before Chief Examiner Butler, of the Interstate Commerce Commission, who is investigating rates on anthracite on Eastern railroads.

Eugene Hultman, Fuel Administrator, suggested that the rate from the mine to tidewater might be lowered and that a large proportion of the coal coming to eastern Massachusetts might be brought by water, 32 per cent being so transported at the present time. He called attention to the disparity in rates, saying the rate to Montreal, a distance of 405 miles, is \$4.96 per gross ton on the Delaware & Hudson, the largest coal carrier to New England, while the rate to Lawrence, Mass., 378 miles, is \$5.04.

H. A. Taylor, counsel for the Eastern group of roads, urged that the roads should not be asked to stand any reduction on coal rates, saying that since key rates were established by the commission in 1916 the net increase in coal rates to Boston has been only 5.7 per cent, while on other commodities the increase has been 81 per cent. Meanwhile, he said, freight operating expenses of the Eastern rate group have increased 117 per cent per 1,000 net ton miles from 1916 to 1922.

Taxes have increased since 1916 more than 89 per cent and wages have gone up per man 118 per cent since 1915, exclusive of increases due to punitive overtime rates of pay, said Mr. Taylor. Many materials have increased in the same period over 100 per cent.

Representatives of the New Haven and the Boston & Maine supported Mr. Taylor's contention.

The 10-per cent freight-rate reduction on anthracite of July, 1922, had no effect on the retail price, according to the testimony of every retail dealer but one called as witnesses at the inquiry held at Montpelier, Vt., Oct. 31, by the Interstate Commerce Commission. H. M. Odell, of Montpelier, Vt., said that his company had given the public the benefit of the reduction. F. L. Platka, of Burlington, stated that his company, the E. S. Adsit Coal Co., received only \$4.31 per ton for its anthracite after deducting from the retail price of \$16.50 the cost of the coal at the mine and the freight charges.

Former State Fuel Administrator H. J. M. Jones declared that the root of the evil in the coal situation lay in the prices charged by independent operators, which ranged from \$18 to \$20 per ton as against \$15 charged by the "old line" producers.

Hearings were to be held in Albany, N. Y., Nov. 5 and 6; Rochester, Nov. 7, and in New York City, Nov. 9.

I. C. C. Examiner Rules on Demurrage

Reporting in the case of the Tidewater Coal Exchange vs. the Baltimore & Ohio R.R., Interstate Commerce Commission Examiner Butler rules that:

Demurrage assessed against complainants during eighteen months under the average plan and monthly settlements made without objection or request for any other plan for assessing demurrage where many thousands of cars were handled on a basis of five days per car free time, are not entitled to have demurrage charges reassessed under straight demurrage, because no average demurrage agreement was signed by them. Demurrage charges on cars at tidewater detained loaded with bituminous coal is unreasonable to the extent that the cars were not unloaded in the order of their arrival or substitution of time of detention allowed on accruals during the monthly periods for settlement. Reparation awarded.

Where a demurrage tariff provides that cars shall be released from demurrage at the time the vessel registers for the cargo, of which the coal dumped into the vessel is a part, the shipper is not entitled to have cars released from demurrage at the time the vessel registers unless he is in a position to accept delivery of the coal.

Under the tidewater coal demurrage tariffs, which provide for an average of five days per car free time, shippers are entitled to have excess credits for free time accumulated during a calendar month applied to the cancellation of debits for demurrage accruing during the same month on cars that remained unreleased at the end of such month.

Southern Illinois Men Talk of Shipping Coal by Water

A few of the coal operators in southern Illinois are working hard for water transportation of coal out of Franklin County to the Mississippi by way of the Big Muddy River. They made their appearance again during the late October hearings held in the Middle West by the Senate committee that is gathering information on the Great Lakes-to-the-Gulf project covered in the McCormick 9-ft. channel bill now before Congress. Joseph Leiter, lessor of the Zeigler coal properties operated by Bell & Zoller, is a leader in the Big Muddy movement.

He and State Senator Sneed, of Herrin, and various citizens of Franklin County said it would cost \$4,280,000 to dredge the Big Muddy and build docks to handle several million tons of southern Illinois coal output to the Mississippi. The Big Muddy project is not now included in the McCormick bill for the Great Lakes-to-the-Gulf development. They argued that the expenditure is justified as a freight-rate reducing measure and because the country's future need for coal demands a better outlet from southern Illinois than merely railroads.

C. F. Richardson, of Sturgis, Ky., head of the West Kentucky Coal Co., said that coal from his region can be shipped to Chicago by water cheaper than by rail, and he spoke after long experience in barging coal on the Ohio and Mississippi.

Strikes Menace Hard-Coal Output

Succession of Walkouts Emanate from Trivial Grievances—Hudson Trouble Scarcely Settled When 10,000 Pennsylvania Coal Co. Miners Quit.

The strike menace in the anthracite field is looming as the hard-coal operator's greatest problem in the effort to bring production to higher levels. This has been especially true since the signing of the new wage agreement and is causing no little consternation among anthracite producers. In a recent statement the Anthracite Operators General Committee declared that twenty strikes, involving 30,000 men, had occurred in the anthracite mines since the 10-per cent wage increase settlement through Governor Pinchot, and a loss of 125,000 tons in production had been the result. This statement covered a period of but one month. Since that time about a dozen more strikes have taken place.

In most cases the strikes originate from trifling grievances concerning one or two of the workers. A colliery is laid idle due to hasty action of the grievance committee and the committee's apparent belief that a strike is the remedy for all ills. The coal companies are solid in their policy to discuss no grievances while the men are idle, and after a few days of idleness the workers usually return to their posts. In the meantime thousands of tons of anthracite are lost to the market and thousands of dollars in wages are lost to the men.

GRIEVANCE COMMITTEES DISREGARD UNION OFFICIALS

An instance of the manner in which the general grievance committees dominate the workers and utterly disregard the wishes or apparent wishes of the officials of the United Mine Workers was made plain in the recent general strike of Hudson Coal Co. mine workers in Lackawanna and Luzerne counties. At a meeting of the general grievance committee several local union representatives of the Hudson collieries reported grievances. At the meeting officials of the district union requested the committee to have the grievances taken up through the regular channels and if necessary have the board of conciliation pass upon their merits. This was agreed to after some argument. A week later, however, with no district union officials present, the grievance committee met again and declared a general strike effective at once. Eighteen of the Hudson company's twenty-two collieries were thrown idle. The strike continued for three days.

After it had become plain that the company officials would not negotiate while the operations were idle, the committee called a meeting and declared the strike at an end. The strike was a costly one to the anthracite market and to the miners. Over 60,000 tons of coal was left unmined and the pay envelopes of the workers were short by thousands of dollars.

At the end of the short period of two weeks following the conclusion of the Hudson general strike, the general grievance committee of the Pennsylvania Coal Co. unions in the Pittston field met and declared a similar unsanctioned general strike. In answer to the strike call about 10,000 miners left work Thursday, Nov. 1, and nine operations were made idle.

At a meeting lasting six hours the grievance committee of the Pennsylvania Coal Co. voted Nov. 2 to call off the strike and send the men back to work Monday, Nov. 5. President Cappellini addressed the meeting, urging the men to return to the mines and scoring men who worked only a few hours a day.

In the latest general walkout evidence of a new angle was presented in the conflict within the ranks of the mine workers, and to those familiar with the situation the impression is that the strike was called more in defiance of the present union officials of District 1 than for a settlement of grievances. The coal company and the consuming public were the "goats." It is true, however, that many grievances have been reported by the general grievance committee and action in their settlement has been slow.

The apparent split within the ranks of the miners' union

was occasioned by the action of Rina'do Cappellini, president of District 1, in overlooking the Pennsylvania Coal Co. union leaders when recommending the appointment of four new organizers for the district. It was the Pennsylvania company men who placed Cappellini in the field for president this year. He was supported heartily throughout the Pittston region and received his majority from that section of the district.

When the meeting of the general grievance committee of the Pennsylvania unions was called to consider grievances and threats of a strike were heard, Cappellini appointed his vice-president, George Isaacs, to attend the meeting and express the views of the district officials on the general strike question. Isaacs attended the session and voiced the opposition of the district officials to general and unsanctioned strikes. He was not received very warmly and his advice was ignored.

The labor situation in the anthracite field has assumed a volcanic aspect. Strike eruptions have been frequent. Hardly a week goes by without three or four petty strikes breaking out, existing for a few days and subsiding. In every case the walkouts are not sanctioned by the district union officials, but nevertheless they have their effect on the coal market, the comfort of the consumers and the miners' pocketbooks.

Wadleigh Resigns as Coal Division Chief

Francis R. Wadleigh, Chief of the Coal Division of the Bureau of Foreign and Domestic Commerce and former Federal Fuel Distributor, tendered his resignation to Secretary Hoover Nov. 2 on account of "the necessity of returning to private commercial life." He will associate himself with the C. E. Tuttle interests.

Mr. Wadleigh's retirement from the commercial intelligence service of the government is another instance of the unfortunate effects of salary limitations and other restrictions in a field of government activity which is feeling most directly the competition of the business world in its demand for the services of high-grade commercial experts, according to Director Klein of the Bureau of Foreign and Domestic Commerce.

Mr. Wadleigh was appointed head of the Coal Section of the Bureau of Foreign and Domestic Commerce in October, 1921. During the coal miners' strike in 1922 he acted as assistant to Secretary Hoover on all matters pertaining to coal and was a member unofficially of the President's Coal Committee. In September, 1922, Mr. Wadleigh was appointed assistant to the newly created Federal Fuel Distributor, C. E. Spens, and on the latter's resignation, Jan. 1, 1923, was appointed Federal Fuel Distributor. Upon expiration of this office by limitation of law, September, 1923, Mr. Wadleigh resumed duties as chief of the Coal Division of the Bureau of Foreign and Domestic Commerce.

Dr. Klein and other officials of the Bureau of Foreign and Domestic Commerce expressed the highest appreciation of Mr. Wadleigh's work as chief of the Coal Division and stated that "the resignation was accepted with keen regret."

Dr. Edward T. Devine has written to *Coal Age* calling attention to an error in an editorial published in the issue of Oct. 4, page 504, on "What Do Miners Earn?" The statement was made that "to a subcommittee, Commissioners Neill and Devine, were assigned the studies of labor, including that of earnings." Dr. Devine calls attention to the fact that it was Judge Alschuler who was appointed to this subcommittee with Dr. Neill. It was so reported in *Coal Age* of Nov. 30, 1922, page 887, and the reference in the issue of Oct. 4, is an error. Dr. Devine adds "You misstate the facts again when you say that the only credit that attaches to the Commission is for selecting highly competent people to do the work, a purely technical and highly complicated job. I share your high estimate of the credit which should be given to the statistical experts who made the study of earnings; but Miss Bezanson and her associates would tell you that Commissioner Neill deserves personal credit for a very active part in planning and carrying through this technical and complicated job."

Need of Dictator in Coal Industry Again Emphasized

Pittsburgh Coal Producers Association Resigns from National—Move May Prove Significant When Congress Takes Up Coal Legislation

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

That the coal industry needs a dictator has been emphasized again by the action of the Pittsburgh Coal Producers' Association in tendering its resignation from the National Coal Association. Incidentally the resignation has not been acted upon. The difficulty may be ironed out. At any rate the National's revenues will not be affected, since practically all of the companies making up the Pittsburgh Association are taking out individual memberships in the National. Nevertheless, the incident is regarded here as one of much significance. The legislation which will be enacted at this session of Congress will depend to a great extent on the conduct of the coal industry during the period between the issuance of the reports of the Harding Coal Commission and the time when coal legislation will be brought on to the floor of the Senate or the House of Representatives.

If those who favor federal regulation of the industry can point to the fact that the industry is even incapable of maintaining a representative national association, they would have evidence to substantiate their contention that there is not enough unity among the producers to make probable any constructive accomplishments within the industry to make it function better.

COAL INDUSTRY'S CHANCE TO SHAPE ITS FUTURE

On the other hand, were the producers in a position to go before a committee of Congress and point to the fact that they had selected a highly qualified man from among their number to act as the industry's premier, and that he had been given broad powers and was possessed of those requisites of personality and prestige to insure united action along constructive lines, the unquestioned reaction on the part of a majority of the legislators would be to give the industry a chance to work out the program which it had launched.

Such a leader might have been able to persuade the operators in Somerset County and the Connellsville district that it was not the constructive thing to cut wages to the extent they did, at just that time at least. He might have been able to obtain a pledge from the non-union operators that they would make only a proportionate cut were the union operators successful in getting a small reduction. It is entirely possible that a man of personality and of force could have saved that strike situation, thereby preventing its costly aftermath and a nationwide demand for regulation.

Even had the industry's premier failed in his efforts to prevent the strike, he could have taken a desk in Secretary Hoover's office and rendered great assistance in voluntary price control. When the operators in western Kentucky refused to agree, he could have jumped on the train and pointed out to them, face to face, that they were insisting on a course which would do much to fasten permanent

THE UNREMUNERATIVE CHARACTER of many coal operations is shown by the statistics just compiled by the Bureau of Internal Revenue covering income tax returns during 1921. Out of 3,656 corporations engaged in the mining of coal, 2,577 had no net income whatever and suffered deficits aggregating \$72,521,815. Of the total, 1,079 corporations had a net income of \$82,654,787 and paid a total tax of \$15,219,444. Of that amount, \$6,922,882 was income tax and \$8,296,562 was war profits or excess profits tax.

regulation on the coal industry. On the other hand, he could have convinced Mr. Hoover, no doubt, that the Kanawha operators should have been allowed to have a higher price, in view of their special difficulties in keeping their mines in operation.

Parker Protests That Trade Commission's Anthracite Reports Are Misleading

The Federal Trade Commission's reports on the anthracite industry are misleading the public, according to E. W. Parker, director of the Anthracite Bureau of Information, Philadelphia, who wrote the following letter of protest to Victor Murdock, chairman of the Commission, Oct. 31:

"On behalf of the anthracite industry as a whole I must earnestly protest against the manner in which the series of reports on anthracite now being issued by the Federal Trade Commission are prepared. Instead of indicating the exact quantities of anthracite, expressed either in cars or tons, which have passed through the hands of one or more wholesale dealers, the information is expressed in percentages, without any reference whatsoever to the relationships such percentages bear to the total production of anthracite.

"It is well known in the industry that the total quantity of anthracite which is sold through wholesalers or jobbers is relatively small. The manner in which the facts are given to the public through the Commission's report is entirely misleading. I am inclosing herewith an editorial taken from the *Evening Bulletin* of Philadelphia, which shows that according to its interpretation of the commission's report, no less than 93.8 per cent of the total production of anthracite passed through the hands of these wholesalers. Expressed in percentages the reports may be based on insignificantly small quantities. They certainly do not apply to the 70,000,000 tons of anthracite production.

"The same objection applies to the portion of your report under the subhead 'High Prices Charged by Mine Operators.' The statement shows that one-third of the tonnage was sold at more than \$12 a ton, but does not indicate what quantity these sales represented nor their relationship to the total anthracite output.

"It is not then, I trust, presuming too much to request of the Federal Trade Commission that in the future reports of this series the quantities of anthracite passing through the hands of wholesalers shall be definitely stated."

Navy Receives 11 Bids for Storage Coal

At the Bureau of Supplies and Accounts, Navy Department, bids were opened Nov. 1 for furnishing 25,000 tons of steaming coal for delivery into storage at the Naval Fuel Depot, Sewalls Point, Va. The proposals received were as follows, all being f.o.b. Sewalls Point, except where otherwise specified:

C. G. Blake & Co., Cincinnati, \$5.02 per ton; W. H. Brown Coal Co., Inc., Norfolk, \$4.42 per ton; Castner, Curran & Bullitt, Inc., New York, \$5.32 per ton; Eastern Coal & Export Corporation, Richmond, \$4.75 and \$5 per ton; Fayette Smokeless Fuel Co., Mt. Hope, W. Va., \$4.87 per ton; Lake & Export Coal Corporation, Huntington, W. Va., \$2.17 per ton, f.o.b. mine; Leckie Coal Co., Inc., Columbus, Ohio, \$5.75 per ton; Low Volatile Consolidated Coal Co., Beckley, W. Va., \$5.32 per ton; Raleigh Smokeless Fuel Co., Beckley, W. Va., \$5.34 per ton; Smokeless Fuel Co., Charleston, W. Va., \$5.52 per ton. An informal bid was received from the Steamship Fuel Corporation, New York.

HEARINGS BY THE FEDERAL TRADE COMMISSION into pyramiding of anthracite prices, which will begin in Washington, D. C., Nov. 19, will be conducted by the full commission. The hearing is expected to last about a week. Conduct of the inquiry by the whole commission is unusual, as heretofore cases heard by the Commission have as a rule been handled by one or two commissioners and an examiner.

Cessation in Hearings of Appeals On Anthracite Tax Valuations

301 Actions Involving Many Millions Enlist
Legal Lights—Commissioners' "Expert" Kites
Values—Numerous Assessments Reduced

After four weeks of taking testimony, the Schuylkill County courts have temporarily discontinued hearings in the appeals of anthracite land owners from the triennial assessment of 1922, the regular civil and criminal terms being due now. These tax cases, comprising 301 separate actions on the court calendar and involving originally the services of more than 30 lawyers from New York, Philadelphia, Scranton, Wilkes-Barre, Reading and Pottsville, are the most important in the history of the anthracite industry.

The issue is this: In 1921 Schuylkill coal lands were assessed for tax purposes at approximately \$63,000,000. In the 1922 triennial assessment the County Commissioners increased this to approximately \$422,000,000. This figure, they said, was only 60 per cent of the market value of the lands, so that the actual market value, according to the County Commissioners, was \$703,000,000. The minority Commissioner, Peter J. Cuff, took the stand and swore that he thought the true market value was \$1,000,000,000 and that he had endeavored to have that figure adopted.

Coal-land owners have maintained that these values were inflated and unjust. They proved, by thousands of instances taken from the public records, that other private properties sold in 1921 had been valued in 1922 at as little as 2.2 per cent of sale price and that the average 1922 valuation of all properties other than coal sold in 1921 was less than one-third. The County Commissioners agreed that they would make their valuation only 45 per cent of market value instead of 60 per cent. This meant that even if the supposed market value of \$703,000,000 were retained, the taxable valuation would be a little over \$316,000,000 instead of \$422,000,000. The cases thereupon went to court upon the issue of determining the actual market value of each tract in the county, to which value, when established by the courts, the ratio of 45 per cent would apply.

SIMPLE PROCEDURE OF AN "EXPERT"

The methods used by the County Commissioners, as testified to in Court, were: County Engineer S. G. Crawford was assisted by one W. C. Monroe, from Scranton, as an "expert." Mr. Monroe has made a business of posing as "expert engineer" for County Commissioners wishing to kite coal-land values, and he has been known to take jobs on a sliding scale basis—a percentage on the final increase in valuation. He had such a contract in Northumberland County last year, and the court there threw it out with considerable tart comment.

Monroe and Crawford took the Geological Survey maps and sections, and from these calculated coal areas and bed thicknesses. It was simple multiplication to get cubic contents on tonnage theoretically in place. In most instances they used 15c. a ton as the value of recoverable coal. Dividing the amount so obtained by the number of acres in the areas under discussion, they arrived at an average value per acre.

As matters now stand, the appeals which are being heard are those of the Philadelphia & Reading Coal & Iron Co. and affiliated interests, comprising 45 separate cases, and 18 of the Lehigh Coal & Navigation Co. and its affiliated concerns.

The procedure in each instance is much the same. The county formally proves assessment and then introduces its "experts," Monroe and Crawford, to sketch the procedure of valuation. The appellants then bring on their witnesses to prove actual market values. In the Reading appeals from the Blythe Township valuations, for example, the actual market value per acre was said by the county to be \$6,132. The Reading offered as witnesses Chief Engineer John F. Bevan, Assistant Engineer W. A. Richards, Division Superintendent Fred C. Caldwell, of Shamokin; W. S. Pugh, former city engineer of Pottsville; George Stevenson,

of Stevenson & Knight, Scranton; Arthur W. Sheaffer, consulting engineer, of Pottsville, and several of the Reading's own division engineers.

These men, after careful analysis of each tract in Blythe Township, placed valuations not to exceed \$1,500 on the best lands and almost nominal sums on lands in the Sharp Mountain basin or under surface set aside for watershed purposes. In every instance these men knew of sales, public and private, of comparable lands, which sales they took into consideration, as the Pennsylvania law directs.

Every man told of the impossibility of calculating the amount of coal in place in a virgin tract. Mr. Bevan showed that it was impossible to determine the amount in a developed tract. He said that any might pinch out unexpectedly, and frequently did, so that within a short space there might be 10 ft. of coal in a gangway and then a thickness of only a few inches. He analyzed the veins in the Blythe Township lands as shown by engineers' maps of the Eagle Hill and Silver Creek collieries. Every vein is there from the Little Diamond down to the Lykens Valley—eleven in all, counting the three splits of the Mammoth as separate.

He testified that the Buck Mountain and Lykens Valley beds there are unworkable. Of the remaining nine, two—the Diamond and the Skidmore—pinch out at places, while the Orchard at one place pinches down to 6 in. of coal.

SAYS ESTIMATES OF TONNAGE IN PLACE IS GUESSWORK

The total thicknesses of the nine workable beds, so far as developed, vary from 30 ft. 6 in. to 93 ft., but the actual coal content in these beds varies from a total of 17 ft. to 59 ft. Mr. Bevan said that in the Schuylkill field nobody could tell what was a hundred yards, or even a hundred feet, ahead, and that any estimate of tonnage was nothing but guesswork.

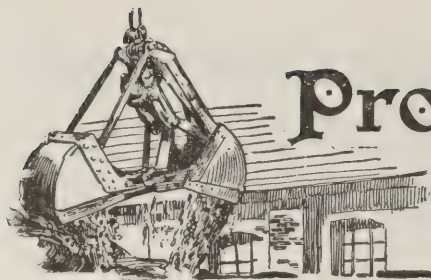
In the same way he testified that it was impossible to fix any percentage of coal in place as recoverable, since nobody could tell what the character of the top rock would be, whether the coal would be crushed, or whether the coal would be friable. The only certain thing, he said, was that the deeper the workings went the less coal was recovered, owing to the overhanging weight which crushed pillars and even unmined coal.

Monroe admitted that he had placed an average valuation of \$6,132 on every acre of land in Blythe Township held by the Reading, and also admitted that they lay in three basins—northern, middle and Sharp Mountain. He admitted that the middle basin was much more valuable than either of the others, but that he had placed a flat valuation on each. He said he had never seen the veins on the property and had never been in the mines there. He also said that he considered that 50 per cent of the original coal content was recoverable, but could give nothing but his "experience" as basis for that estimate.

He said the Reading lands in Blythe were worth, in the market, \$32,507,165. He then said that the total recoverable coal in the lands was 171,813,692 tons, worth 15c. a ton in place. He was told to multiply that out, and seemed nonplussed to find that the total was only \$25,112,053, or more than \$6,000,000 less than his total valuation. He knew nothing of any tract and could not tell what veins specified tracts contained, yet he valued them at \$6,132 per acre just the same.

That the County Commissioners themselves take little stock in their handiwork seems apparent from the peculiar developments since these cases began on Oct. 8. To begin with they lopped off more than \$100,000,000 by the agreement on a 45-per cent ratio. Then the compromisers began to get busy, assisted by one of the judges. The Hudson Coal Co., which was assessed at \$1,739,000 in 1921 and at \$15,970,836 in 1922, settled on a new assessment of approximately \$3,750,000.

The Girard Estate then fell into line. Assessed at \$4,712,279 in 1921 and at \$24,297,110 in 1922, it agreed to a new assessment of approximately \$12,000,000. The Lehigh Valley Coal Co., assessed at approximately \$5,000,000 in 1921 and approximately \$31,000,000 in 1922, settled on a new assessment of about \$12,500,000. Others tumbled into line on settlements involving anywhere from 100 to 150 or 160 per cent over the 1921 valuation.



Production and the Market



Weekly Review

Production of bituminous coal is not suffering any decrease as the season advances. The curve of production is a straight line. During the week ended Oct. 27 10,908,000 tons of soft coal was produced, an increase of 214,000 over the previous week. Preliminary estimates for the week ending Nov. 3 indicate no change in the rate of output. The total production at the end of October is practically equal to that of 1917 and 1920 for the same period, but about 30,000,000 tons below the record year, 1918.

Coal Age Index of spot prices of bituminous coal declined one point last week to 183 on Nov. 5, which corresponds with an average price at the mines of \$2.21.

The tidewater market is flooded with coal.

GOVERNMENT BIDS AS TRADE INDICATORS

Bids opened Nov. 1 for 25,000 tons of Navy standard coal, f.o.b. Sewalls Point, resulted in tenders ranging from \$1.90 to \$3 per gross ton f.o.b. mines.

Bids submitted Oct. 31 to the Government Fuel Yards on 14,700 gross tons of smokeless coal for B. & O. delivery, District of Columbia, from Nov. 15, 1923, to March 31, 1924, ranged from \$2.03 gross ton at the mine by the Valley Camp Coal Co., Salco Mine, upward to \$3.64 as the highest bid by J. B. Haught. The majority of the bids were between \$2.20 and \$2.60.

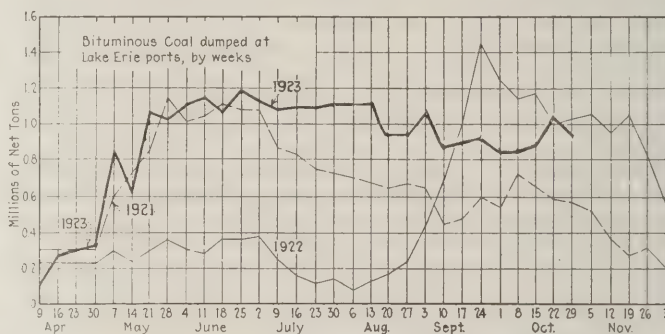
Some inquiries for export coal are being received but there is little actual business placed.

Colder weather slightly improved the domestic-coal market in the Middle West but with no effect on the steam-coal market. There is the usual speculation as to what will happen when the million tons a week now going to the Lakes is thrown on the local markets when navigation closes. The Ohio markets are inactive, prices low and irregular. The Pittsburgh district is saturated with unsold coal and there is no market in New England for spot coal. Dumpings at Hampton Roads during the week ended Nov. 1 amounted to

344,120 net tons, as compared with 259,158 net tons the previous week.

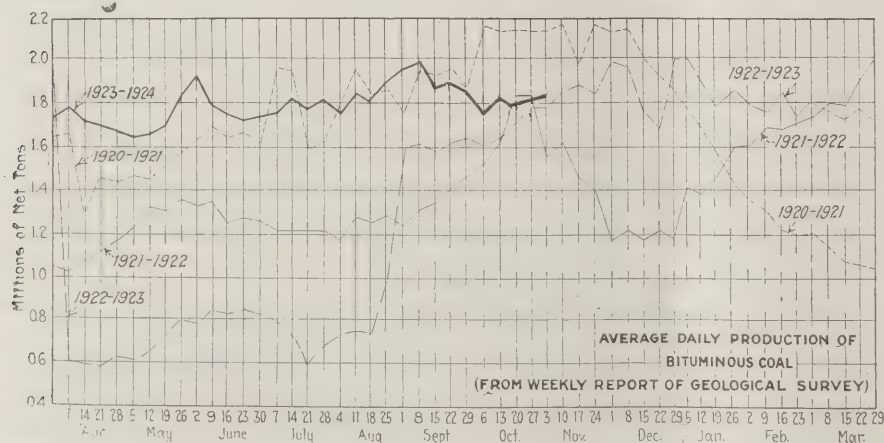
Lake shipments continue close to 1,000,000 net tons weekly, although the season is drawing to a close. Cargo coal shipped during the week ended Oct. 29 amounted to 918,764 net tons.

Although the miners observed Mitchell Day, Oct. 29, by remaining away from the mines and there have



	Week Ended Oct. 29	Season to Oct. 29
Cargo	918,764	25,490,681
Fuel	48,785	1,389,754
Totals	967,549	26,880,435

been idle days for other operations because of local labor troubles, production of hard coal last week is believed to have been between 1,700,000 and 1,800,000 net tons, or between 269,000 and 369,000 net tons below the output for the week ended Oct. 27, which was 24,000 tons ahead of the output for the previous week. Demand for the larger sizes continue active, but pea coal is easier. Difficulty is found to keep down the accumulations of the steam coals and most dealers find it necessary to make concessions in order to move their tonnages. During the week ended Oct. 29 69,771 net tons of hard coal was shipped up the lakes from Buffalo.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Oct. 13	10,110,000	10,953,000
Oct. 20 (a)	10,378,000	10,694,000
Oct. 27 (b)	10,683,000	10,908,000
Daily average	1,781,000	1,818,000
Calendar year	311,922,000	456,728,000
Daily av. cal. year	1,224,000	1,796,000

ANTHRACITE

Oct. 13	2,112,000	2,009,000
Oct. 20	2,039,000	2,045,000
Oct. 27	1,836,000	2,069,000

COKE

Oct. 20 (b)	276,000	286,000
Oct. 27 (a)	237,000	276,000
Calendar year	5,591,000	15,659,000

(a) Subject to revision. (b) Revised from last report.

and Erie, according to the Geological Survey, bringing total shipments for the season to 2,830,590 net tons.

Midwest Coal Moves Better

Slow general improvement of conditions throughout the trade are noted in Chicago and the other Midwest markets. Cooler weather for several days up to the end of last week raised the immediate demand for domestic stuff of various sorts, but of course was not effective enough to start anything resembling a market flurry. No important price advances were possible. Instead, circulars grew a little more firm at the levels operators have been trying in vain to maintain lately. Southern Illinois, for instance, instead of trying to push up the \$4.35 lump quotation, settled down to the business of solidifying the bottom at \$4.

The steam market has not changed noticeably. Buying is sufficient to absorb the running production and no more. Buyers still are of the opinion that they can do better a month from now, when domestic demand is stronger. Franklin County association producers manage to get \$1.40 @ \$1.50 for practically all their screenings with only occasional drops, though there are lots of cheap screenings to

be picked up all around them. Central Illinois sells mainly from \$1 to \$1.25 with the more anxious operators cutting down to 75c. now and then. Not much Standard district fine coal gets into the Chicago region nowadays, but some has been traded there at 50c.@60c.

Trade continues steady in hard coal, now retailing in Chicago for \$17 in the domestic sizes, but there is plenty available for all needs. Pocahontas trade has been light enough to nudge the mine price down from \$3 to \$2.50 on mine-run without any material effect on demand. Demand is fair and that is all.

St. Louis Trade Remains Dormant

Not enough of last week's cold snap got into St. Louis to have any material effect on the coal market. The whole region around that trading center remained in a carefree state of mind regarding fuel. A little movement of the cheaper grades was noted among retailers but the tonnage was too light to be important. Country domestic trade was idle too. Anthracite, smokeless and coke all are in light demand. In the steam trade wagonload is a little active but carload is slow. A movement of egg and nut

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Midwest						
Market Quoted	Nov. 6 1922	Oct. 22 1923	Oct. 29 1923	Nov. 5 1923†	Market Quoted	Nov. 6 1922	Oct. 22 1923	Oct. 29 1923	Nov. 5 1923†		
Smokeless lump.....	Columbus....	\$6.75	\$6.35	\$5.85	\$5.75@ \$6.00	Franklin, Ill. lump.....	Chicago.....	\$5.35	\$4.10	\$4.10	\$3.90@ \$4.35
Smokeless mine run.....	Columbus....	6.00	3.05	2.30	2.00@ 2.65	Franklin, Ill. mine run.....	Chicago.....	4.10	2.60	2.55	2.25@ 3.00
Smokeless screenings.....	Columbus....	5.50	1.35	1.35	1.25@ 1.50	Franklin, Ill. screenings.....	Chicago.....	2.60	1.45	1.45	1.40@ 1.50
Smokeless lump.....	Chicago.....	6.00	6.10	6.10	6.00@ 6.25	Central, Ill. lump.....	Chicago.....	4.70	3.10	3.10	3.00@ 3.25
Smokeless mine run.....	Chicago.....	5.60	2.85	2.85	2.50	Central, Ill. mine run.....	Chicago.....	3.10	2.10	2.10	2.00@ 2.25
Smokeless lump.....	Cincinnati.....	7.00	5.85	5.85	5.50@ 6.00	Central, Ill. screenings.....	Chicago.....	1.85	.90	1.05	.90@ 1.20
Smokeless mine run.....	Cincinnati.....	6.10	2.50	2.50	1.75@ 2.50	Ind. 4th Vein lump.....	Chicago.....	5.10	3.35	3.35	3.25@ 3.50
Smokeless screenings.....	Cincinnati.....	6.25	1.75	1.50	1.25@ 2.00	Ind. 4th Vein mine run.....	Chicago.....	3.85	2.60	2.60	2.50@ 2.75
Smokeless mine run.....	Boston.....	6.85	4.55	4.40	4.30@ 4.50	Ind. 4th Vein screenings.....	Chicago.....	2.35	1.20	1.20	1.15@ 1.30
Clearfield mine run.....	Boston.....	3.50	1.95	2.00	1.70@ 2.40	Ind. 5th Vein lump.....	Chicago.....	4.75	2.50	2.50	2.25@ 2.75
Cambria mine run.....	Boston.....	4.10	2.50	2.55	2.00@ 3.00	Ind. 5th Vein mine run.....	Chicago.....	3.60	2.10	2.10	2.00@ 2.25
Somerset mine run.....	Boston.....	3.60	2.25	2.25	1.90@ 2.65	Ind. 5th Vein screenings.....	Chicago.....	2.10	.80	.80	.75@ .90
Pool 1 (Navy Standard).....	New York.....	4.85	3.05	3.05	2.75@ 3.25	Mt. Olive lump.....	St. Louis.....		3.10	3.10	3.00@ 3.25
Pool 1 (Navy Standard).....	Philadelphia.....		3.15	3.10	2.95@ 3.20	Mt. Olive mine run.....	St. Louis.....		2.25	2.25	2.20@ 2.30
Pool 1 (Navy Standard).....	Baltimore.....	4.50				Mt. Olive screenings.....	St. Louis.....		1.25	1.25	1.00
Pool 9 (Super. Low Vol.).....	New York.....	4.10	2.35	2.30	2.10@ 2.50	Standard lump.....	St. Louis.....	4.00	3.10	3.05	2.90@ 3.25
Pool 9 (Super. Low Vol.).....	Philadelphia.....	4.30	2.45	2.35	2.20@ 2.45	Standard mine run.....	St. Louis.....	2.60	2.05	2.05	1.80@ 2.30
Pool 9 (Super. Low Vol.).....	Baltimore.....	4.00	2.15	2.15	2.15	Standard screenings.....	St. Louis.....	1.40	.50	.45	.50@ .60
Pool 10 (H.Gr. Low Vol.).....	New York.....	3.50	2.05	2.05	1.75@ 2.25	West Ky. lump.....	Louisville.....	4.85	2.40	2.40	2.50@ 2.75
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	3.50	2.00	1.90	1.75@ 2.00	West Ky. mine run.....	Louisville.....	2.50	1.65	1.65	1.50@ 1.85
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	3.60	2.10	2.10	2.10	West Ky. screenings.....	Louisville.....	1.85	.50	.50	.60@ .70
Pool 11 (Low Vol.).....	New York.....	3.00	1.85	1.75	1.50@ 1.85	West Ky. lump.....	Chicago.....	4.10	2.60	2.60	2.50@ 2.75
Pool 11 (Low Vol.).....	Philadelphia.....	3.15	1.70	1.60	1.50@ 1.65	West Ky. mine run.....	Chicago.....	3.10	1.75	1.75	1.50@ 2.00
Pool 11 (Low Vol.).....	Baltimore.....	3.15	1.90	1.90	1.80@ 2.00						
High-Volatile, Eastern					South and Southwest						
Pool 54-64 (Gas and St.).....	New York.....	3.35	1.60	1.60	1.50@ 1.75	Big Seam lump.....	Birmingham.....	3.95	3.75	3.75	3.75@ 4.00
Pool 54-64 (Gas and St.).....	Philadelphia.....	3.50	1.60	1.60	1.50@ 1.75	Big Seam mine run.....	Birmingham.....	2.35	1.95	1.95	1.75@ 2.15
Pool 54-64 (Gas and St.).....	Baltimore.....	3.35	1.75	1.75	1.75	Big Seam (washed).....	Birmingham.....	2.60	2.35	2.35	2.25@ 2.50
Pittsburgh sc'd gas.....	Pittsburgh.....	4.50	2.55	2.55	2.50@ 2.60	S. E. Ky. lump.....	Chicago.....	5.50	3.00	3.00	2.75@ 3.25
Pittsburgh gas mine run.....	Pittsburgh.....		2.25	2.25	2.20@ 2.30	S. E. Ky. mine run.....	Chicago.....	4.25	2.25	2.25	2.00@ 2.50
Pittsburgh mine run (St.).....	Pittsburgh.....	3.35	1.85	1.90	1.85@ 2.00	S. E. Ky. lump.....	Louisville.....	6.75	3.00	3.00	2.75@ 3.25
Pittsburgh slack (Gas).....	Pittsburgh.....	3.60	1.20	1.05	1.00@ 1.15	S. E. Ky. mine run.....	Louisville.....	4.25	1.75	1.75	1.50@ 2.25
Kanawha lump.....	Columbus.....	6.25	3.15	3.15	2.85@ 3.15	S. E. Ky. screenings.....	Louisville.....	4.25	.80	.75	.65@ .85
Kanawha mine run.....	Columbus.....	4.50	1.85	1.85	1.75@ 2.00	S. E. Ky. lump.....	Cincinnati.....	6.25	3.55	3.35	2.75@ 4.00
Kanawha screenings.....	Columbus.....	4.10	.90	.90	.75@ .90	S. E. Ky. mine run.....	Cincinnati.....	4.00	1.55	1.50	1.25@ 1.75
W. Va. lump.....	Cincinnati.....	6.00	3.50	3.35	2.75@ 3.75	S. E. Ky. screenings.....	Cincinnati.....	3.85	.90	.75	.50@ 1.25
W. Va. Gas mine run.....	Cincinnati.....	4.35	1.60	1.50	1.25@ 1.75	Kansas lump.....	Kansas City.....	5.75	5.00	5.00	5.00
W. Va. Steam mine run.....	Cincinnati.....	4.00	1.60	1.50	1.25@ 1.75	Kansas mine run.....	Kansas City.....	3.75	3.50	3.50	3.50
W. Va. screenings.....	Cincinnati.....	4.00	1.00	.75	.50@ 1.25	Kansas screenings.....	Kansas City.....	2.50	2.25	2.25	2.25
Hocking lump.....	Columbus.....	5.50	3.05	3.06	2.85@ 3.10						
Hocking mine run.....	Columbus.....	3.60	1.85	1.85	1.75@ 2.00						
Hocking screenings.....	Columbus.....	3.05	.90	.85	.75@ .90						
Pitts. No. 8 lump.....	Cleveland.....	3.81	2.60	2.55	2.10@ 3.00						
Pitts. No. 8 mine run.....	Cleveland.....	3.56	1.85	1.85	1.80@ 1.90						
Pitts. No. 8 screenings.....	Cleveland.....	3.31	1.00	.90	.80@ .90						

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*

South and Southwest

Big Seam lump.....	Birmingham.....	3.95	3.75	3.75	3.75@ 4.00
Big Seam mine run.....	Birmingham.....	2.35	1.95	1.95	1.75@ 2.15
Big Seam (washed).....	Birmingham.....	2.60	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago.....	5.50	3.00	3.00	2.75@ 3.25
S. E. Ky. mine run.....	Chicago.....	4.25	2.25	2.25	2.00@ 2.50
S. E. Ky. lump.....	Louisville.....	6.75	3.00	3.00	2.75@ 3.25
S. E. Ky. mine run.....	Louisville.....	4.25	1.75	1.75	1.50@ 2.25
S. E. Ky. screenings.....	Louisville.....	4.25	.80	.75	.65@ .85
S. E. Ky. lump.....	Cincinnati.....	6.25	3.55	3.35	2.75@ 4.00
S. E. Ky. mine run.....	Cincinnati.....	4.00	1.55	1.50	1.25@ 1.75
S. E. Ky. screenings.....	Cincinnati.....	3.85	.90	.75	.50@ 1.25
Kansas lump.....	Kansas City.....	5.75	5.00	5.00	5.00
Kansas mine run.....	Kansas City.....	3.75	3.50	3.50	3.50
Kansas screenings.....	Kansas City.....	2.50	2.25	2.25	2.25

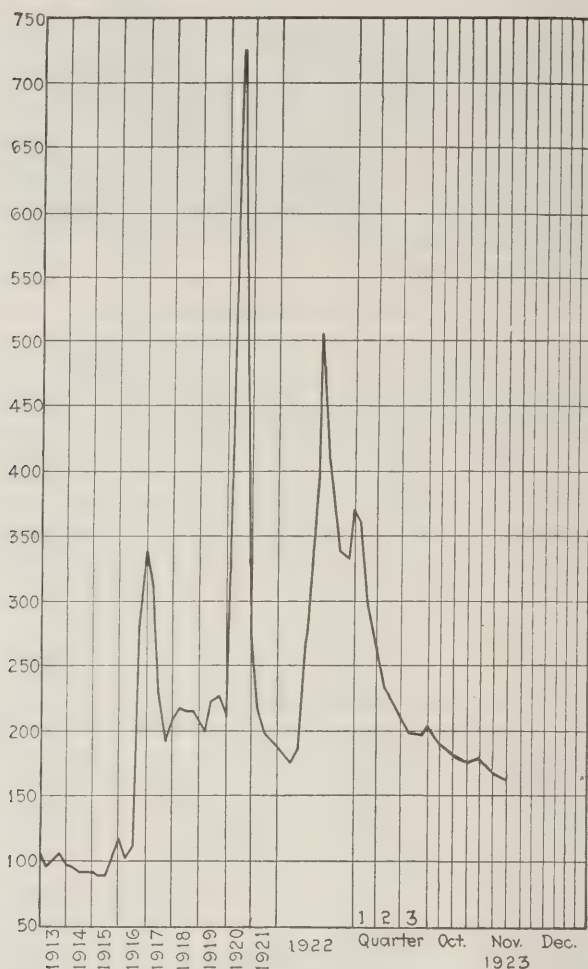
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

Market Quoted		Dec. 26, 1922		Oct. 29, 1923		Nov. 5, 1923†	
		Freight Rates	Independent	Company	Independent	Company	Independent
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25	\$9.60@ 10.50	\$8.00@ \$9.25	\$9.60@ 10.50
Broken.....	Philadelphia.....	2.39		7.90@ 8.10			\$8.00@ \$9.25
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50
Ranges.....	New York.....	2.34		8.25		9.00	
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.75@ 8.25	6.15@ 6.65	6.75@ 8.25
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.75@ 9.00	6.75@ 9.00
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	2.25@ 3.00	3.50	2.00@ 3.00
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	3.00@ 3.50	3.50	3.00@ 3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	1.75@ 2.15	2.50	1.50@ 2.15
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.00@ 1.50	1.50	1.00@ 1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.25@ 1.50	1.50	1.25@ 1.50
Birdseye.....	New York.....	2.22		2.10		1.60	

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

Index	1923		1922	
	Nov. 5	Oct. 29	Oct. 22	Nov. 6
Index	183	184	186	344
Weighted average price	\$2.21	\$2.23	\$2.25	\$4.16

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

to Omaha and Chicago removed some of the coal normally traded in St. Louis. Prices are practically unchanged.

In the southern Illinois field working time continues bad with a good many no bills of various sizes on track. This applies even to independents, who cut prices to get business. Railroad tonnage has fallen off. There is no stint of cars in that region. In the DuQuoin and Jackson County field conditions are similar to those in the territory just mentioned. There the mines with lowest prices appear to be getting the business.

In the Mt. Olive district there has been a little activity, but car supply as well as failure to move egg, nut and screenings is interfering with working time. The demand for domestic is just fair.

In the Standard district the only call for any size seems to be for 6-in. lump. All other sizes are hard to move, and some mines have been idle for many days on account of no bills. Car supply is good. All steam sizes are having a hard time.

Kentucky Feels Better

As a result of decision of the Interstate Commerce Commission granting the western Kentucky operators a rate to Minnesota and the Northwest at 25c. a ton over southern Illinois mines, there is better feeling in the western section of Kentucky this week, in spite of the fact that prices

are still draggy and steam business unsatisfactory. Screenings have bucked up a little. Car supply is reported off in a few sections, although the condition probably will not last more than a day or two.

With the first below freezing temperature coming on the night of Oct. 30, it looks as if the fall season is beginning to run to form, and Louisville trade is feeling much better concerning the general outlook. Retailers are meeting with a much better demand and jobbers report orders more numerous for prepared. Industrial business continues a bit slow, as many industries are well stocked.

However, some industrial buyers realize that when lake movement ceases screenings will be in small production, and a price advance of around 50c. a ton is predicted, or perhaps more. Screenings will stay enough under mine-run to force movement. As the lake shipping season is about over an increased demand for screenings at better prices is beginning already to be felt. Other than advanced prices for screenings in all state fields, and a little firmer holding of mine-run, prices show no material change.

Northwest Market Improves Slightly

A wave of real snappy weather put a little life into the Northwestern coal market during the past week. The effect was largely upon anthracite demand, however, and that was none too marked, for a good deal of hard domestic fuel has already been dumped into cellars. The slacking off of anthracite shipments to the docks is attracting some attention. Of twenty-three cargoes on their way to the Head-of-the-Lakes, only two are of anthracite. Milwaukee stocks of anthracite are not increasing as was expected either, and only a few more cargoes are booked for that port.

Soft coal fills the whole region, however, and is moving in without stint. Milwaukee has received 2,571,753 tons already this season and last week saw six boats at the docks, the largest line-up of the season. Receipts at Duluth-Superior are heavy, too. Prices continue soft and it is the opinion of wise observers that the top heavy market will sag eventually, in spite of the inevitable arrival of winter. Out through the selling field of the Northwest price cutting continues common, for competition is keener than usual at this time of year.

West Feels Cold Snap, Too

A week of cold weather in the Southwestern district brought little relief to the screenings market. The market for lump and nut remains steady, with a few companies advancing the price of these two grades in Kansas coal 25c. to 50c. the first of the month. The increase was not general. Mines are operating from 60 to 70 per cent time.

Utah producers are very long on slack. Dealers have had a good month but business is slowing up a bit. Car shortage continues though it is not bothering the local dealers. Real winter weather for several days would probably embarrass them, however, as the supplies in the local yards are below normal. Prices have not changed.

In Colorado the coal situation has changed slightly during the past week, inasmuch as the mines are working on an average of three to three and a half days a week now, although the majority of the operators still report few orders.

Ohio Markets Are Featureless

There is no outstanding feature in the Ohio trade. At Columbus prices are low and irregular and there is no special strength to the demand. Everybody seems to be playing a waiting game. Producers and distributors are selling only a fair amount of coal and hoping for a better demand when cold weather arrives. Steam-coal business is dull and buying practically only when distress coal can be had cheaply. With the railroads not taking as much tonnage as formerly, the utilities are the best customers. Screenings are extremely dull.

The Cincinnati market is dull. Buying is slow and prices easy. While smokeless lump and egg are quoted around \$6 on the November circular the spot market runs as much as 50c. lower and even under that figure to brokers. Mine run is quoted at \$2.50 but sales of the best Pocahontas No. 3

have been made as low as \$2 and there has been quite a movement of prime New River coal of the best preparation as low as \$1.75. The closing of the lake season is expected to throw considerably more coal into the inland market which it will be asked to absorb.

Reports received at Cleveland indicate that as a result of work in other sections of Ohio there has been a steady influx of miners into eastern Ohio, where continued operations of the mines is attributable in the main to production for railroads and shipments to the Lakes. Retail stocks are moving slowly, while steam demand continues negligible and inquiries are few.

Production in the Pittsburgh district continued downward. Now and then another mine closes, but others vary their output according to circumstances. Prices are not trending downward definitely but can hardly be said to show any stiffening tendency. General quotations do not indicate much because buyers are so discriminating, having things their own way, that there is quite a range according to quality in the open quotable market. Demand for domestic coal is regarded as somewhat poor for this time of the year. Byproduct coal is in poor demand.

Conditions in central Pennsylvania are very unsatisfactory to the operator and miner. There is evidence that some large operators will close down some of their mines and operate others on full time, intending in this way to reduce the cost of production. Many of the mines now working are on short time. Loadings during October were approximately 62,000 cars, a decrease of 6,000 from September loadings. The number of no-bill cars on side track at the end of the month was estimated at 1,800.

There is no activity in the Buffalo market. Buying is practically at a standstill, and some shippers believe it is getting worse. Considerable coal is being offered dealers and low prices prevail.

Bright Spots Lacking in New England

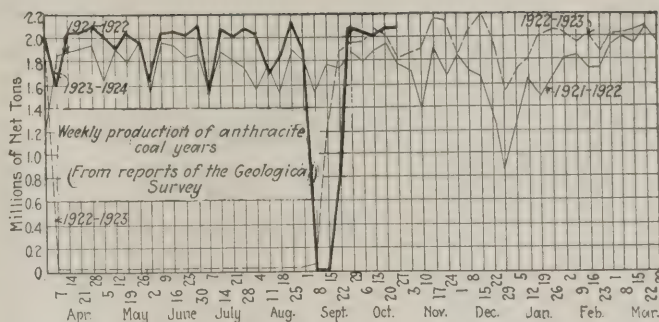
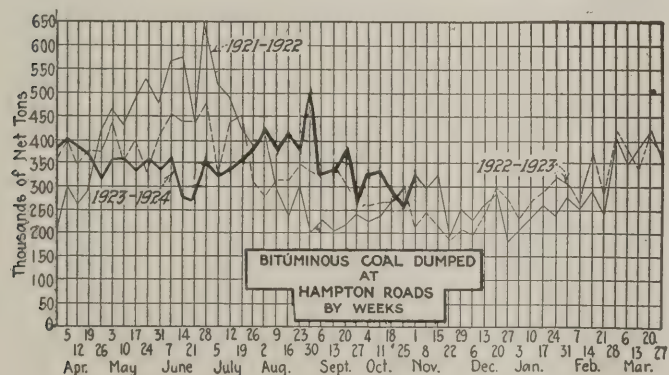
In New England the market drags along without any bright spots whatever. There are accumulations not only at the Virginia terminals but at discharging plants at this end, and in every direction quotations are soft. There is practically no buying except under pressure of special offers and at this writing it is difficulty to see how there can be any improvement during November.

No. 1 Navy standard Pocahontas and New River are to be had at \$4.30@4.50 per gross ton f.o.b. vessel, and on cars Boston and Providence the quotations of last week have been shaded. As low as \$5.35 per gross ton has been rumored f.o.b. Boston, while a few factors are trying hard to raise the price level to \$5.75. Reserves are heavy among all the industries in this territory and there is not enough coal being consumed to warrant any prediction of firmer prices in the near future.

The market for steam coals from central Pennsylvania continues extremely dull. Neither f.o.b. mines nor at the Philadelphia and New York piers is there anything more than scattering demand and prices are correspondingly depressed.

Receipts High, Prices Low, at New York

Heavy receipts at tidewater and low prices rule the New York market. On Nov. 2 there were 2,445 cars of soft coal reported on tracks at four of the largest piers while



the dumpings for that day amounted to but 346 cars, the average dumpings for the first five days of last week were 450 cars. There is little of the cheap coals to be had, most of the demand being for the better grades at low prices. Contract coals continue to move in fair volume, but many original prices have been shaded in order to keep it in transit.

Producers in the Philadelphia market are complaining, and are not able to operate their mines at anything like full time. The cutting of contract prices by some companies has been followed by other concerns, the spot market responding to the reduction.

Conditions at Baltimore are flat. Large consumers continue to buy in the open market and at times are able to pick up bargain lots. The situation appears to be growing worse so far as the prices of West Virginia coals are concerned.

A fairly good domestic market has been maintained in the Birmingham district because of weather conditions, little effort being required to move all of this grade of coal produced. The steam market shows no marked change and inquiry is slow. Production during the week ended Oct. 20 was the lowest for the present year, amounting to 333,000 tons. Labor is plentiful in the coal fields, a decided increase being shown in the number of applications for work.

Anthracite Market Gradually Easing

The hard-coal market is slowly becoming easier. While some retail dealers lack sufficient receipts to take care of their trade most consumers have some coal in their bins or are able to get it within a short while. Some shippers in order to keep down their supply of soft coal or the anthracite steam sizes induce their customers to take a portion of either of these coals with their order for the domestic coals and in many instances the buyer, having no immediate need for the soft coal or the steam sizes returns them to the market for sale. In some instances where a combination order is arranged concessions are made on the quotations for the domestic coals. The market was slightly affected by the lower temperatures that prevailed last week but there was no considerable urgency. Pea coal, next to the buckwheats, is the longest of the anthracite sizes, and shippers are having no difficulty to keep it on the move. The steam-coal situation is becoming serious. The larger operators are storing these coals, particularly buckwheat No. 1, while they are accumulating with the more prominent independent producers. The smaller independents are disposing of their coals at prices much under the company schedule.

Beehive coke production during the week ended Oct. 27 amounted to 276,000 net tons, says the Geological Survey, a decrease of 10,000 tons when compared with the previous week, establishing a new low record for this year.

Car Loadings, Surpluses and Shortages

	Cars Loaded			
	All Cars	Coal Cars	Surplus Cars	Car Shortage
Week ended Oct. 20, 1923	1,072,881	190,451	23,895	5,674
Previous week	1,084,458	194,963	4,409	1,776
Same week in 1922	989,889	193,519	27,062	5,674
Oct. 22, 1923			23,895	5,674
Same date in 1922			4,409	1,776
Oct. 14, 1923			27,062	5,674

Foreign Market And Export News

Slight Increase in British Coal Production; Newcastle Market Improving

An increase of 55,000 tons was made in the coal output of Great Britain's mines during the week ended Oct. 20, when compared with the previous week, the production amounting to 5,680,000 tons, says a cable to *Coal Age*.

The Welsh coal trade is still unsettled though somewhat steadier, owing to a recovery in the demand from Europe. Output of coal is high and mine suspensions, though not so frequent, are serious. The accumulation of stocks is enormous and operators are offering concessions to buyers who will take immediate delivery. Operators decline to see forward on current prices as many mines are not covering their operating expenses.

There is practically no contracting for next year, the large consumers abroad only inquiring with a view to testing the position and holding back the business in the hope of securing further reductions in price by waiting.

The Newcastle market is improving rapidly, both for forward and prompt positions. German inquiries are slow, though those from Italy and Scandinavia are strong. Most of the mines have sold their outputs to the middle of November.

Hampton Roads Market Weak

Conditions at Hampton Roads continued unusually dull last week, with the market weakening and inquiries negligible. The bunker trade alone appeared to be holding its own, although New England trade showed prospects of increasing.

Over production was given by shippers as the cause of the slump which has featured the local market for several weeks. They did not anticipate prices reaching a lower level, because they had already gone well below the low point for several years.

Domestic trade was pronounced dull, also, stocks having been laid in heavily several months ago in anticipation of strike difficulties. The tone of the market was exceedingly weak.

French Miners Want More Pay

Demand for industrial coals are being easily met by the French mines, but users of domestic coals are facing a shortage as soon as the demand increases. While prices are being maintained, a change is expected as a result of the demands of the miners for an increase in pay.

Imports of British coal slightly improved during the last week in October, but were still below the receipts for September. Concessions were made for prompt deliveries and terms for forward contracts remained firm.

Consumers are showing more interest in coals from the United States and inquiries are increasing.

United States September Domestic Coal Exports

(In Gross Tons)

	1922	1923
Anthracite.....	88,688	175,689
Value.....	\$919,037	\$1,855,733
Bituminous.....	1,175,007	1,768,620
Value.....	\$7,875,237	\$9,071,428
Coke.....	35,472	95,479
Value.....	\$448,061	\$930,039

NINE MONTHS ENDED SEPTEMBER

Anthracite.....	1,138,222	3,445,793
Value.....	\$11,752,105	\$37,298,877
Bituminous.....	6,266,733	15,334,621
Value.....	\$35,151,110	\$85,309,428
Coke.....	256,281	932,719
Value.....	\$2,473,348	\$10,233,991

Export Clearances, Week Ended Nov. 3, 1923

FROM BALTIMORE

For Porto Rico:	Tons
Am. SS. Delisle.....	286

FROM HAMPTON ROADS

For Cuba:	
Nor. SS. Bratland, for Havana.....	3,103
For Australia:	
Nor. SS. Barford, for Bathurst.....	1,777
For Italy:	
Ital. SS. Giovanni Florio, for Porto Ferrajo.....	7,100
For Santo Domingo:	
Br. SS. St. Andrew, for Puerto La Plata.....	6,776

Panama Canal Coal Shipments

Shipments of coal and coke through the Panama Canal from the Atlantic to the Pacific Ocean during the fiscal year ended June 30, 1923, amounted to 280,343 gross tons, as compared with 404,389 tons in 1922, says the *Panama Canal Record*. Of this tonnage there were 182,829 tons of coal and 97,514 tons of coke, of which 99,254 tons of coal and 80,364 tons of coke came from the British Isles, and 82,480 tons of coal and 14,762 tons of coke originated in the United States. The west coast of South America received 91,755 tons of coal, the United States 66,174 tons, and 7,676 tons went to Hawaii. Of the coke shipments 54,998 tons was destined for South America, 40,856 tons to the United States and 1,228 tons to Australia.

United States September Coal and Coke Exports

(In Gross Tons)

	1922	1923
Anthracite.....	88,688	175,689
Bituminous.....	1,175,007	1,768,620
Exported to:		
France.....		36,990
Italy.....		37,135
Netherlands.....		29,655
Other Europe.....		10,281
Canada.....	1,110,794	1,513,923
Panama.....	19,163	
Mexico.....	4,756	4,876
Br. West Indies.....	5,113	4,103
Cuba.....	31,709	47,382
Other West Indies.....	1	17,833
Argentina.....		11,630
Brazil.....		38,106
Chile.....		848
French Africa.....		6,384
Other countries.....	3,471	9,474
Coke.....	35,472	95,479

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 25	Nov. 1
Cars on hand.....	1,674	1,899
Tons on hand.....	96,158	114,718
Tons dumped for week.....	69,795	101,618
Tonnage waiting.....	4,500	
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,687	1,684
Tons on hand.....	102,200	99,400
Tons dumped for week.....	85,388	97,702
Tonnage waiting.....	12,314	7,100
C. & O. piers, Newport News:		
Cars on hand.....	1,606	972
Tons on hand.....	83,665	51,750
Tons dumped for week.....	76,208	107,931
Tonnage waiting.....	1,800	1,525

Pier and Bunker Prices, Gross Tons

PIERS		
	Oct. 27	Nov. 3†
Pool 9, New York	\$4.50@ \$5.00	\$4.65@ \$5.00
Pool 10, New York.....	4.00@ 4.75	4.00@ 4.75
Pool 11, New York.....	3.90@ 4.25	3.90@ 4.25
Pool 9, Philadelphia.....	5.25@ 5.40	5.20@ 5.35
Pool 10, Philadelphia.....	4.35@ 4.90	4.30@ 4.85
Pool 11, Philadelphia.....	4.10@ 4.45	4.05@ 4.40
Pool 1, Hamp. Roads.....	4.25	4.20@ 4.40
Pools 5-6-7 Hamp. Rds.	4.25@ 4.40	4.15@ 4.25
Pool 2, Hamp. Roads.....	3.85@ 4.00	3.85@ 4.00

BUNKERS

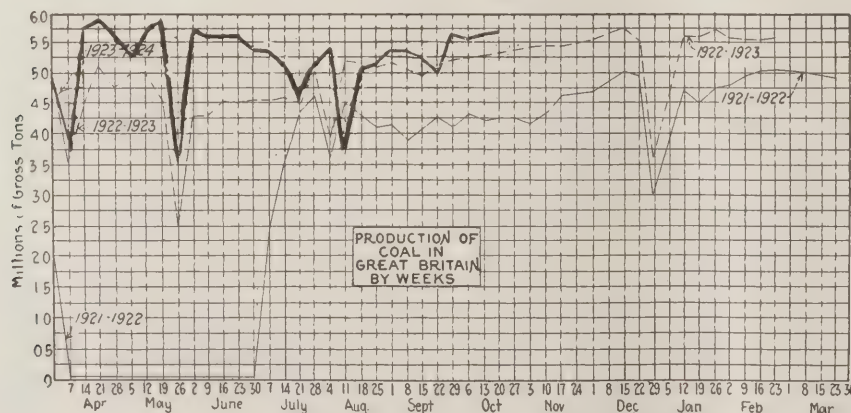
Pool 9, New York.....	4.80@ 5.30	4.95@ 5.3†
Pool 10, New York.....	4.30@ 5.05	4.30@ 5.05
Pool 11, New York.....	4.20@ 4.55	4.20@ 4.55
Pool 9, Philadelphia.....	5.40@ 5.80	5.35@ 5.75
Pool 10, Philadelphia.....	4.85@ 5.20	4.80@ 5.10
Pool 11, Philadelphia.....	4.40@ 4.70	4.35@ 4.65
Pool 1, Hamp. Roads.....	4.25	4.20@ 4.40
Pool 2, Hamp. Roads.....	3.85@ 4.00	3.85@ 4.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Oct. 27	Nov. 3†
Admiralty, large.....	27s. 6d.	27s. @ 27s. 6d.
Steam smalls.....	18s. @ 19s.	15s. 6d. @ 17s. 6d.
Newcastle:		
Best steams.....	24s. 6d. @ 25s.	25s.
Best gas.....	24s.	24s.
Best bunkers.....	23s. 6d. @ 24s.	23s. @ 24s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

COLORADO

The U. S. Land Office at Glenwood Springs has been directed by the Secretary of the Interior to offer for lease a tract of public coal land in Colorado containing approximately 560 acres. The land is in Garfield County in the Grand Hogback coal field. Lease for this tract will be at a government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of \$125,000 during the first three years of the lease, and a minimum production of 120,000 tons of coal a year beginning with the fourth year of the lease.

ILLINOIS

The B-B Coal Co. mine, on the Southern Ry., near Belleville, has suspended operations. More than 100 men have been employed. The B-B is the twentieth mine in the Belleville subdistrict to shut down since April 1.

Two Peabody Coal Co. men of the company's headquarters in Chicago were killed Oct. 27 when the wire of a radio aerial they were erecting made contact with a high-potential line of the Commonwealth Edison Co. They were Albert F. Goepfinger, auditor for the company, and William J. Quinn, an accountant. A third man who tried to drag the writhing pair away from the "hot" wire also died.

J. C. Howell, of the Howell Coal Co., Champaign, has opened an office in the Fisher Building, Chicago. R. L. Dincombe will be in charge of the new office. Mr. Howell will continue to reside in Champaign and will maintain his office there.

Jewel No. 1 of the Jewel Coal & Mining Co. has closed down at Du Quoin. Jewel Nos. 1 and 2 are both comparatively new mines and are under the control of the Sterling-Midland Company, Chicago.

The Rex Coal Co., Davenport, Ia., which operates a mine at Warner, Ill., at its annual meeting of stockholders in the Chamber of Commerce rooms in Davenport elected these directors: Hugh V. Pirt, C. A. Curry, W. A. Carlson, H. E. Bishop, Frank McGugin, C. W. Krueger, A. G. Vogel, James Van Arsdale and G. G. Gatrell.

The Illinois Mining Institute holds its annual meeting in St. Louis, Mo., November 24 at the American hotel, at 10 A.M.

The American Coal Sales Co., 360 North Michigan Ave., Chicago, has been incorporated with capital of \$25,000, as a jobber in coal. The incorporators are Robert W. Kruse, H. E. Larkin and E. L. Verplanck.

After failing to meet two payrolls within three months' time the Jackson Coal Co. resumed operations again the week of Oct. 22 at Hallidayboro. The company, which has main offices in Connellsville, Pa., went into the hands of a receiver Oct. 15, following the second failure to meet the bi-monthly mine payroll and the mine shut-down.

Eureka mine No. 1 at Marissa, which had been closed down since early last April, has resumed operations again. Borders No. 1, in the same district, recently closed indefinitely.

Perry O'Neal, for some time past chief electrician at Mine No. 16 of the Old Ben Coal Corporation at Sesser, has been transferred to Mine No. 14, at Buckner.

The Black Servant Coal Co. recently shipped its first carload of coal from its new strip mine at Elkville. The mine, just completed, is the last word in strip mining and uses the latest machinery on the market, including large electric stripping shovels. The output of the mine is screened and rescreened into various sizes putting the coal on a grade with any other in the district.

The Victory Coal & Mining Co.'s mine at DuQuoin, controlled by the Boehmer Coal Co. of St. Louis, has closed. The Boehmer Coal Co. besides operating several mines in the Belleville district, enjoys a good retail trade in St. Louis. Three years ago the company took over an old property at

DuQuoin, which it remodeled and up to this time has operated steadily.

There has been a shortage of water at several mines in the Southern Illinois field and some mines on the Mobile & Ohio R.R. have had to have water hauled by the railroad to keep their plants going. Recent rains helped the situation some.

The Shed Coal Co. is opening a stripping property near New Denison and soon may be dumping coal into cars on the Illinois Central from a narrow-gage line built from the mine to New Denison. It is expected that the new narrow-gage line will some day serve a number of properties along the right of way.

INDIANA

The Orton & Steinbrenner Co., Chicago, Ill., manufacturers of locomotive cranes, buckets and coal crushers, have just completed a large addition to their works at Huntington, Ind., which will approximately double the output of the Company. All equipment, including a large number of the most modern machine tools, has been purchased and most of it is already in use.

Two carloads of Indiana screenings from the Templeton Coal Co., of Terre Haute, have created considerable interest by starting for Denver, Colo. This is the first shipment known to have gone from Indiana so far west. It is a special coal for foundry use by the Griffin Wheel Co. Although the price of such coal in Indiana is low, the cost delivered in Denver is about \$15, most of which, of course, is freight.

KENTUCKY

The Fordson Coal Co. of Stone has contracted with Roberts & Schaefer of Chicago for screens and loading booms to be installed at these mines: Pansion Junction, Nos. 2 and 1-11 at Hardy, and Nos. 6 and 7 at McVeigh.

The Bertha-Consumers Co., of Pittsburgh, Pa., announces that the post office address of Elsie Mines No. 1, 2 and 3, formerly known as Dalna, has been changed to Elsie coal. The post office address of Elsie No. 4 at Blackey, remains unchanged. Through the courtesy of the Louisville & Nashville R.R., the railroad billing stations have been changed as follows: Dalna, changed to Elsie coal; Smoot, changed to Elsie No. 1; Wevaton, changed to Elsie No. 2, and Woodrock, changed to Elsie No. 4.

The Kentucky Jewell Coal Co., of Lexington, capital \$25,000, has been incorporated by H. E. Bullock, M. O. Bullock, and J. W. Owens, all of Lexington.

Whitesburg reports that the recently formed Sutton Coal Co., in Pike County, will sink a mine and build a new town soon and that it plans to start shipments early next year.

It is reported that the Whitesburg Coal Co. operations at Whiteo have closed down indefinitely on account of low prices and lack of business.

W. F. Bradshaw, coal operator, banker and insurance man of Paducah, was on Oct. 19 appointed a member of the Child Welfare Commission by Governor E. P. Morrow.

A rescreening plant is now being built by Roberts & Schaefer for the W. G. Duncan Coal Co. at its mine in Greenville.

MINNESOTA

George H. Cushing is to talk before an open forum of the St. Paul Association on the coal situation of the Northwest on Nov. 14.

Much interest was shown in the report of the Federal Coal Commission relating to the situation in the Northwest, especially as it indicated that the retail trade has not been getting undue profits. County attorney Olson, of Minneapolis, who has been conducting an investigation into the coal costs, says that the independent coal companies are prospering, despite the handicaps indicated, as they are buying all-rail coal, and their number is increasing.

NEW JERSEY

The Irvington-Hilton Coal Co., of which the late Mayor Edward R. Folsom was president, has been sold by auction to Louis Folsom & Co., recently organized by Louis Folsom, son of the Mayor and vice-president of the bankrupt concern. A telegraphed bid of \$4,000 was received from George H. Woolley of St. Petersburg, Fla., formerly of Irvington. Louis Folsom's bid was \$4,200. The aggregate of bids for separate parcels of the equipment amounted to about \$2,200.

NEW YORK

During the first eight months of 1923 there were 473,657 cars of soft coal loaded at mines located on the New York Central lines, which was an increase of 23½ per cent over the number loaded in the corresponding period of 1919; 1.5 per cent over 1920; 46.7 per cent over 1921, and 153.5 per cent over 1922. Up to the end of August the New York Central lines dumped at Ashtabula and Toledo for lake shipment 64,233 cars of bituminous coal, which was 17.2 per cent of the total dumped by all other railroads at all Lake Erie ports.

H. H. Merrett, managing director of D. R. Llewellyn, Merrett & Price, Ltd., producers and exporters of coal, Cardiff, Wales, who has been in the United States for the past few weeks, sailed on the Aquitania, Oct. 22.

The Virginia Iron, Coal & Coke Co., for the quarter ended Sept. 30, 1923, reports gross income of \$279,842 against \$402,714 in the corresponding period last year. After allowing for interest, taxes and other charges there was reported net income of \$170,414, which, after allowing for preferred dividends, was equal to \$1.07 a share on the \$10,000,000 capital common stock outstanding. In the same quarter last year the net available for the common stock, after preferred dividends, was equal to \$2.11 a share. For the first nine months of the current year the company reports gross income of \$844,425, against \$679,117 in the same period last year. Net income after interest, taxes and other charges was \$528,957. This amount after preferred dividends was equal to \$3.41 a share earned on the common stock, against \$1.01 a share earned on the common stock in the first nine months of 1922.

The Empire Coal Mining Co., of Philadelphia, has opened a branch office in the Marine Trust Building, Buffalo, with K. P. Lewis, formerly sales manager of the Somerset & Cambria Smokeless Coal Mining Co., as resident manager.

Seymour Whitley, several years Buffalo agent of the Pittsburgh Coal Co., announces that he is going into the business on his own account. The Pittsburgh Coal Co. has appointed A. S. Fisher, of the Pittsburgh office, sales manager and P. B. Ballou, from the company's office in Erie, Pa., sales agent to succeed Mr. Whitley.

John Hays Hammond, chairman of the U. S. Coal Commission, was made head of a department of current economic and political movements, organized as a new branch of the National Civic Federation, at a luncheon given in his honor Nov. 1 at the Lawyers Club, New York City, by Judge Alton B. Parker, president of the federation. The department Mr. Hammond is to head will have for its aim the gathering and dissemination to the general public of information on domestic and world affairs. He will be aided in his work by a committee consisting of Louis Wiley, Henry S. Pritchett and Colonel R. M. Thompson. National experts in all fields will be asked to assist in the development of this group program, it was announced.

To his series of lectures on "A One Hundred Per Cent American Program" and "Fundamentals of Social Work," Edward T. Devine, member of the U. S. Coal Commission, has added a new topic "The Coal Industry of America—A Program for Its Stabilization."

The Buffalo Water Works received 21 bids, opened on Nov. 1, on its advertisement asking for 200 cars of slack coal, delivered during several weeks. The lowest was \$1. f.o.b. mine by the American-Canadian Co., Buffalo, and the Miller-Corson Co., Philadelphia. The highest was \$1.65.

OHIO

The new Philo plant of the Ohio Power Co., now being constructed in Muskingum County, will have coal-storage capacity of 400,000 tons. This is the largest amount that can be stored at any electrical plant in the

Ohio valley. A state canal paralleling the Muskingum River is being dredged for a distance of a mile and a quarter and when the work is complete the trough 30 ft. deep will be concreted. The canal will be filled with water and the coal poured into it from the railroad cars. The plant will use 3,800 tons of coal daily.

The Reeves Manufacturing Co., of Dover, is completing an aerial-tramway system that will transport its coal from two mines to galvanized sheet plant, a distance of five miles. An overhead cable slung from towers will carry steel buckets, each containing a ton of coal, and dump them near the furnace.

The Triumph Electric Co. and The Triumph Ice Machine Co., both of Cincinnati, announce that E. C. Morse has joined their organization as vice-president in charge of sales and as a member of the Board of Directors.

OKLAHOMA

A woman has actively entered the operating field in the Southwestern district, and has introduced the first steam-shovel outfit into her home county of Craig, in Oklahoma. She is Miss Pearl Holderman, who owns 1,000 acres of land just across the Kansas line. Miss Holderman's grandmother was a Cherokee Indian. When, back in 1916, Miss Holderman, a graduate of Kansas State Agricultural College, tired of teaching, for which she had prepared, she turned to the 40 acres of land she had received as a head right by reason of her Indian blood. In the seven years since, by her own efforts, she has increased her holdings to the 1,000 acres on which she has put her shovel to work.

PENNSYLVANIA

A new method of giving coal miners instruction to fit them for examinations for jobs as firebosses, mine foremen, assistant mine foremen and mine inspectors has been started in the anthracite districts of the state and Pennsylvania State College is ready to start in the bituminous districts. For several years, Penn State has had Prof. W. G. Duncan located in the bituminous fields supervising night classes for miners. Through a recent co-operative agreement with the college mining school, the State Department of Public Instruction and the State Bureau of Mines, this work has been greatly expanded. The college trains teachers for night classes and supplies the lesson material; the State Department of Mines conducts the examinations and the State Department of Public Instruction, when twenty or more miners of a community ask for the establishment of a class, assists the local school board in the maintenance of the work. Sixty-six lessons constitute the first year's work in anthracite mining; twenty lessons in mining electricity and twenty in mining mechanics. The bituminous-coal mining course consists of sixty short lessons.

F. E. Pratt, paymaster of the Dexcar Coal Co., operating mines at Ashville, Cambria County, was held up and robbed of the company payroll, amounting to \$6,200, on Oct. 26, on a lonely road near the scene of mines where he was going to pay the miners. R. J. Haverty, a private detective, on Oct. 31, arrested Dennis (alias Pawnee Bill) Delozier and Clarence Delaney, at Coupon, Cambria County, and both were held for trial in the Cambria County courts. The Dexcar company offered a reward of \$500 for the arrest and conviction of the bandits.

Auditor General Samuel B. Lewis on Oct. 24 called off the hearing he had set for that day when Rush N. Hosler, superintendent of the coal-mine section of the Pennsylvania Compensation Rating and Inspection Bureau, was to have been brought before him upon subpoena. Mr. Hosler had refused to permit certified accountants employed by the Auditor General to audit the books of the coal-mine section, although the accountants had found that the Insurance Fund had turned over to the section \$250,000 of state money. Superintendent Hosler was directed by the executive committee of the coal mine section to appear and furnish all necessary papers and books in so far as they relate to the State Workmen's Insurance Fund. Accompanied by counsel, Hosler appeared before the Auditor General prior to the time fixed for the hearing and expressed a willingness to co-operate with the accountants. The audit of the Insurance Fund books was made as the result of the passage of a law of 1923 which gave the Auditor General the right to audit the books. The fund in the past had maintained it was not subject to audit by the state.

State Secretary of Mines Walsh completed a series of conferences in Allentown last week with the inspectors of the anthracite region, the purpose of the meeting being to discuss mining methods and practices with a view to providing, if possible, greater safeguards for the work men, the head of the Mines department said. The record of each of the anthracite inspectors, covering a period of several years, has been analyzed in an effort to see why accidents should be greater in number in some districts than in others, the Department of Mines announced. A similar analysis has been made of the casualty record of the various operators and it is the hope of Secretary Walsh, he said, that the number of accidents can be lowered as the result of having presented these facts to the inspectors.

The Carnegie Steel Co. plans to enlarge its coal unloading equipment at the Clairton plant. The plant now has two cranes which unload 13,000 tons of coal per day, each crane having a capacity of six tons per lift. It is planned to install two cranes of similar capacity soon.

The Blacker Engineering Co., Inc., Grand Central Terminal, New York City, manufacturer of Blacker Blacksmithing Hammers, have opened an office in Pittsburgh at 421 Wood Street with George Hesse as district manager.

Edward Manning, colliery superintendent of the Greenwood colliery, of the Hudson Coal Co., Minooka, at a meeting attended by about 350 employees of the mines held recently offered a cash prize of \$250 to the employee who submits before Dec. 1 the best analysis and paper on mining practice at the face. The meeting was a second of a series of educational meetings and was addressed by B. T. Jones, senior assistant inside foreman, Mine Foreman John D. Price and Mr. Manning. The speaking was allowed by an entertainment.

W. L. Buchanan, general manager of the Hudson Coal Co. was the principal speaker at the initial meeting of the Powderly-Coalbrook Safety Institute, at Carbondale, on Oct. 24. Other speakers were W. L. Weickel, colliery superintendent at Powderly; William Davidson, colliery superintendent at Coalbrook; Fred Gilbert, chief clerk at Powderly, and Karl Hughes, colliery engineer. Following the addresses a general discussion among the men was carried on, when several good suggestions on the problem of safety were made. It was decided to offer a number of cash prizes for the writer of the best compositions on the subject, "Work at the Face," the decisions to be given out at a later meeting.

All of the property and assets of the Archbald Coal Co. have been acquired by the Suffolk anthracite collieries. The acquisition will increase the Suffolk's reserves by approximately 3,000,000 tons and increase daily output about 100 per cent.

The Adah mine of the H. C. Frick Coke Co. at Adah, in the sixth pool, Monongahela River, recently established a record in loading 13 standard steel barges with 10,800 tons of coal.

Robert Y. Stuart, Secretary of the Department of Forests and Waters, has sent to each mining company in Pennsylvania a letter offering the department's co-operation in the planting of trees. In this he said that the mining companies in the State during 1923 have planted 1,139,000 trees and that since 1916 they have planted 3,185,000 trees.

The main office of the Keister-MacQuown Fuel Co., of Pittsburgh, will be moved Nov. 1 from the ninth floor to the thirteenth floor, west tower, of the Union Trust Building.

The Candlemas Coal Co., composed of Wilkes-Barre capitalists, is making rapid progress in the development of the old Silver Brook anthracite workings, idle for the last twenty-five years, following expiration of the lease of the Wentz Coal Co.

The Lehigh Coal & Navigation Co. announces that new stripping operations at the "burning mines," at Summit Hill, are to be opened next spring. A location for an incline plane has been established in the effort to extinguish the fire which has consumed millions of tons of high-grade coal. The company plans to open the stripping operation in front of the fire and remove the coal, so that the fire eventually will have to burn itself out when the coal in that particular locality is consumed.

Fire broke out in the Oakdale mine of the Carnegie Coal Co., near Pittsburgh, on Oct. 26, resulting from the ignition by open lights of oil which flowed from a pipe line following a cave-in of shallow cover. A 4-in. pipe line of the Pure Oil Co. passes over that part of the property of the coal company which is pierced by No. 1 butt entry.

The section affected by the fire consists of about 15 acres, which is a tentacle of the main body of coal and is overlaid by a shallow cover. Where the surface break occurred the thickness of the cover is about 15 ft.; rooms were driven but no pillars were taken out. Fortunately, at the time of the cave-in, the oil company was not pumping oil. It is estimated that about 300 gallons of oil standing in the pipe line drained into the mine. Ordinarily the flow is 300 bbl. per hour. Smoke from the fire overcame several miners, but all of them were rescued. Temporary brattices were erected by apparatus men as close as possible to the seat of the fire in order to clear the atmosphere of smoke on the outbye side of the temporary stoppings. Preparations were then made to erect concrete dams. The fire zone will be completely flooded in ten days' time by discharging water into the surface break from a pump with a capacity of 1,000 gallons per minute. It is expected that the fire will be quenched by this method. The main body of the mine is not endangered by the fire.

Governor Pinchot has sent telegrams to the Anthracite Operators Policy Committee suggesting that they come to Harrisburg to confer with him further relative to anthracite prices.

Planning to make a survey of business conditions in the countries of the Far East, Dean K. Chadbourne, manager of the department of the Far East of the Westinghouse Electric International Co., will sail from San Francisco the latter part of the month to visit Japan, China, the Philippine Islands, Java, Australia and New Zealand. Mr. Chadbourne's visit will result in closer relationships between the company and its representatives and agents in the Far East. He will also assist other Westinghouse officials in co-operating with Japanese officials and business men in the reconstruction of the area devastated by the recent earthquake and fire.

TEXAS

The Madison Oil & Coal Co., of which Hall Etter, Houston, is president and manager, will erect a tippie and power plant near Calvert, and will move machinery and some equipment from another location, but will want mine cars, mine rails, mine props and ties.

The Producers' Mining Co. has been organized at Bastrop, with capital stock of \$10,000. Incorporators are: E. S. Orgain, John Belto and Martin Belto. The company will mine lignite from the extensive beds near Bastrop.

UTAH

The Mutual Coal Co. of Salt Lake City has received permission to sell 2,500 shares of its stock at \$12.50 per share. The company has 49,703 shares outstanding.

The Blazon Coal Co. has filed amendment to its articles increasing its board of directors from three to five members.

The F. C. Richmond Machinery Co., representatives for The Conveyors Corporation of America, Chicago, have moved their offices and sales-rooms to 320 West Second South Street, Salt Lake City.

The Pahvant Coal Co. is offering to the public an issue of 500,000 first mortgage, 7 per cent serial gold bonds, due July 1, 1928 to 1938, and priced at 98 and accrued interest to yield about 7½ per cent. The company owns and has under option 840 acres of coal land in Spring Canon, Carbon County, a portion of which for immediate development is estimated to contain 6,000,000 tons.

WASHINGTON

The coal operators of the state are conducting a publicity campaign in defence of the Washington coal industry's right to live. It is repeatedly pointed out that the industry now employs about 30,000 people, directly and indirectly that it is the third largest industry of the state and contributes heavily to the state's welfare and prosperity. However, it is harassed by oil shipped in from southern California at a freight rate less than the average rate on Washington coal to Seattle, and by coal from British Columbia which takes about the same rate as Washington coal but which is mined in large measure by Orientals working for \$2 a day less than Washington union miners. An effort is being made to prevent an increase in coal land taxation in Kittitas County by a new assessment cruise. An offer has been made to voluntarily increase the valuation without a cruise.

WEST VIRGINIA

Logan coal operators are to open their own employment office at Charleston and W. A. Butler, of Lundale, will be placed in Charge. The office will handle only the employment situation for the Logan operators, as there is a constant demand for miners in the Logan field.

The Wheeling-Glenwood Coal Co. has been incorporated at Wheeling with \$500,000 capital by E. L. Peters and associates.

Title to 5,518 acres of coal land in the Boone County field, heretofore owned by the Laurel Coal Land Co., and located on Spruce Fork and Little Coal River has been taken by Pemberton Hurchinson and George McCull, president and vice-president, respectively of the Westmoreland Coal Co., of Philadelphia, which operates coal properties in the Irwin Basin of Westmoreland County, Pa. The large acreage in Boone County was purchased from the Chiltons, of Kanawha County, for a sum said to be in excess of \$600,000.

J. B. Clifton, one of the best-known coal men in southern West Virginia, having acquired the holdings of George Wolfe, president of the Atlantic Smokeless Coal Co., operating at Asco in the McDowell County field, has succeeded Mr. Wolfe as president of the company; Dr. J. Howard Anderson of Marytown, is vice-president; W. M. Black of Lynchburg, Va., is secretary and treasurer, and R. E. Brockman of Asco is general manager. The new president of the company is at the head of several large companies operating in the smokeless fields of southern West Virginia.

Coal loading records for a given week period were again shattered on the Chesapeake & Ohio during the week ending Oct. 13, when the output reached a total of 17,605 cars, equal to 880,250 tons. Of the total loadings it appears that between 60 and 65 per cent are originating in the Logan district. The remaining tonnage comes from the Kentucky, New River, Kanawha, Winding Gulf and Coal River districts, served by the Chesapeake & Ohio.

The Cap Smokeless Fuel Co. has purchased 850 acres of coal and timber land, including all equipment, houses and other buildings, owned by the E. G. Blume heirs of Fayette. The Fayette mine, which will be operated, is one of the oldest in the New River district, but during the past few years has been operated only at intervals. It was last operated by the E. G. Blume Co.

The Jamison Coal & Coke Co., operating in Pennsylvania and northern West Virginia, has liquidated \$150,652.08 of its first mortgage, 5 per cent sinking fund gold bonds.

Many mines in the New River field having no screening facilities are unable to operate. Owing to the fact that about the only grade now marketable is prepared coal several concerns in the New River district are preparing to equip their mines with screening facilities. Slack is going to the market below the cost of production.

The Fordson Coal Co., of Stone, Ky., have contracted with the Roberts & Schaefer Co. for the installation of a completely equipped steel tippie to be installed at its mine at Nuttallburg.

There has been an adjustment of the differences between consumers of power furnished by the Appalachian Power Co. and the company as to rates to be charged for power. About a year and a half ago coal companies using this power sought an adjustment of rates at the hands of the Public Service Commission of West Virginia. The commission, however, refused such a petition after a hearing lasting several weeks. The consumers took their case to the West Virginia Supreme Court. It is understood now, however, that there has been an agreement under the terms of which the case will be dismissed from the courts without prejudice, the power company settling all costs and expenses.

WASHINGTON, D. C.

The Department of Labor reports the adjustment late in October of four strikes of coal miners, with the return of the men to work pending conferences. Two of these strikes were at the Barnum Colliery, Pittston, Pa., and No. 6 Mine of the Pennsylvania Coal Co. of Pittston, both over working conditions and involved respectively 200 and 1,675 men. Another was that at the Central Colliery, Avoca, Pa., the cause being a union dispute and involved 600 men. The fourth strike was that at the Dana Colliery, Dana, Ind., the cause being given as railroad transportation. This dispute was referred to the Public Service Commission. Another such strike is still pending at the

mines of the Canaanville Coal Co. of Ohio, the cause and number of men involved not being given.

The U. S. Civil Service Commission announces open competitive examinations to fill existing vacancies in the positions of mine valuation engineer and assistant valuation engineer in the income tax unit of the Bureau of Internal Revenue, Treasury Department, Washington, D. C. The position of valuation engineer carries a salary of from \$3,600 to \$4,800 a year, and that of associate engineer from \$3,000 to \$3,600 a year. Applications for these examinations will be received by the commission up to and inclusive of Dec. 28.

Explosives sold in the United States during August, totaled 577,098 kegs of black powder, 4,463,830 lb. of permissibles and 19,779,355 lb. of other high explosives. Sales during the eight months ended with August were made up of 4,736,976 kegs of black powder, 37,768,814 lb. of permissibles and 151,694,228 lb. of other high explosives. The coal industry purchased 86.2 per cent of the black powder sold; 94.1 per cent of permissibles and 15.9 per cent of other high explosives.

Commissioner of Internal Revenue Blair has approved the ruling of the Solicitor of the Bureau in the case of a coal company holding that coal used in the manufacture of war materials is an article which contributed to the prosecution of the war and, therefore, buildings erected for the use of miners of such coal were "buildings constructed for the production" of that article. The effect of the decision is to allow the coal company in question its claim for amortization on miners houses built in 1918 to increase coal production as a war measure. The principle involved in this case is said to apply also to other facilities which may have been constructed between April 6, 1917, and Nov. 11, 1918, for the purpose of increasing coal production. Estimates have been made that several hundred coal-mining companies have failed to take a deduction for amortization in the years in which it is properly allowable, because of the fact that they were not aware they were entitled to such a deduction under the law. The National Coal Association calls attention of coal operators to the fact that failure to take a deduction for amortization in the years wherein it is properly allowable does not preclude the filing of a claim for refund or credit, based on a claim for amortization. Claim for refund or credit on any return, however, must be led within five years from the date on which the return was made. That period of limitation will expire on March 2, 1924. It is suggested, therefore, that coal operators who are entitled to amortization and have not made claim therefor must file a claim either for refund or credit on or before that date; otherwise, they will be barred by the Statute of Limitations. The decision of Commissioner Blair has been officially designated as A. R. R. 3920:11-29-1146 and will appear under that designation in the next issue of the Government's Service Bulletin.

CANADA

In the annual mine-rescue and first-aid meet under the joint auspices of the Rocky Mountain Branch of the Canadian Institute of Mining and Metallurgy and the Workmen's Compensation Board of the Province of Alberta, held at Blairmore, Alta., Drumheller took two first prizes, one for mine rescue and one for first aid, though the Crow's Nest Pass Coal Co.'s team from Michel Colliery tied with the Hygrade Coal Co., of Drumheller, in mine-rescue work. In the first-aid events Drumheller made 83.83; Lethbridge Collieries No. 1, 83.50; Bellevue, West Canadian Collieries, 82.83; Lethbridge Collieries, No. 2, 80.83; the International Coal & Coke Co., Coleman mine, 78; and the two Crow's Nest Pass Coal Co.'s teams from Michel and Coal Creek Collieries, 76.50 and 67.83 respectively. Four teams of Boy Scouts had a separate contest, and one ladies' team, obtaining a score of 82.83, was awarded a prize. In the mine-rescue contest the Crow's Nest Pass Coal Co., Michel Colliery, and the Hygrade Coal Co., Drumheller, each obtained 91 per cent; Crow's Nest Pass Coal Co., Fernie No. 2 team, received 90.53; Brazeau Collieries and West Canadian Collieries, Bellevue No. 3 team, each 90. There were in all twelve teams entered in the mine-rescue contest. Medals were given to both the teams making the top score.

The bituminous-coal mining interests of New Brunswick are manifesting keen interest in the Employers' Association, which is being formed to represent the employer in business with the Provincial Workmen's Compensation Board. The chief difficulty

to the organization is the reluctance of the board to countenance the birth of the association, which under the law, must be approved by the board. The efforts to form the association are the fruits of the present and past policy of the personnel of the board which has sought to penalize industry in maintaining the board. C. J. Cell, manager of the Minte Coal Co., represents the coal mining interests on the provisional executive of the Employers' Association.

Michael Dwyer has resigned as mechanical superintendent of all of the Scotia Co. Sydney Mines, N. S., and will devote his time to the Indian Cove Coal Co., of which he is managing director. Mr. Dwyer has been connected with the Scotia Co. for a number of years in various official capacities.

The Seagram-Fawcett Coal Co., Ltd., of Waterloo, Ont. has been incorporated with an authorized capital of \$100,000. The provisional directors are Edward F. Seagram, William J. Fawcett and John Ferguson.

The Dominion Coal Co., of Glace Bay, is installing two Marcus screens in its new steel tippie.

The Milnes Coal Co., Ltd., of Toronto, has increased its capital from \$250,000 to \$500,000.

James B. McLachlan, former secretary of the United Mine Workers district 26, convicted in the Supreme Court on a charge of seditious libel, was sentenced on Oct. 31 at Halifax, N. S., to two years imprisonment. The charge arose out of a letter circulated among the locals of the union accusing the provincial police of atrocities in dealing with the striking coal miners. The charge of conspiracy brought against his colleague, Daniel Livingstone, president of the organization, has not yet been tried and he is out on bail. At Sydney the grand jury has returned a true bill against John Macdonald of Toronto, also charged with seditious utterances.

The commission appointed to inquire into the Cape Breton steel workers' strike has been holding preliminary meetings to consider the scope of the investigations, and began the taking of evidence at Sydney, N. S., on Oct. 31. It has been decided that if it should appear that there is a relationship between the steel workers' strike and that of the Cape Breton coal miners the latter will be included in the inquiry.

A mining company in the union field of Alberta won the right to hire whom it would without union interference under a decision recently handed down by a conciliation board appointed by the federal Minister of Labor. The decision is considered of great importance and is unprecedented in Canada. In July, when the Hygrade mine at Drumheller reopened after a shutdown, the mine manager declined to re-employ James Conroy, a union miner. The managing director of the company also declined. Conroy claimed they should be compelled to give him employment under the "preference of employment" clause of the working agreement which reads: "In case an employee is thrown out of employment, unless discharged, he shall be given preference over new men in other mines in the same camp operated by the same company." The company held that, since it had but one mine, it could decline re-employment to former employees even though they had not been discharged previously. The conciliators supported this position.

British Columbia's coal production for the month of September totalled 181,634 tons, a drop as compared with the previous month of 40,662 tons. Of the total output the Vancouver Island mines were responsible for 121,880 tons, approximately 67.1 per cent, which is 14,067 tons under the production of August. The Nicola-Princeton mines produced 18,978 tons, a decrease of 2,613 tons in comparison with the output for August and about 10.4 per cent of the total production. The mines of the Crow's Nest Pass district produced 40,776 tons, which is 23,982 tons under the August figure and some 22.5 per cent of the total for the province. All the Vancouver Island mines show a decline with the exception of the Canadian Collieries (D) Ltd., Comox mine, which has an increase in comparison with August results of 689 tons and Messrs. King & Foster, Old Wellington mine, which shows an increase of 7 tons.

Output of coal from Canadian mines during July amounted to 986,400 net tons, a decrease of 25 per cent from the tonnage for the previous month and 14 per cent from the average for the month of the three preceding years. The output for the month showed decreases of 435,000 tons in Nova Scotia, and 4,000 tons in New Brunswick. In Alberta there was an increase of 106,000 tons, in British Columbia 6,000 and in Saskatchewan 2,000 tons. The cumulative output from all mines for the seven months

of 1923 amounted to 9,717,000 tons, an increase of 20 per cent over the preceding three-year average for the same period. Comparison of the July and June figures covering the importation of coal from the United States and Great Britain showed a decrease of 5 per cent. July imports amounted to 2,445,000 tons, while in June 2,562,000 tons was brought in. The July importations this year were 58 per cent greater than the preceding three-year average for the month. Importations from Great Britain during the month totaled 60,900 tons. Total importation of all coal for the seven months of 1923 was 12,648,000 tons, an increase of 53 per cent over the three-year average for the period. The imports of anthracite for July totalled 495,800 tons. This was 2 per cent less than in June but 37 per cent higher than the three-year average for the month. Anthracite imported from the United States amounted to 474,200 tons while 21,600 tons came from Great Britain during the month. The total amount imported during the seven months of 1923 was 3,187,600 tons, an increase of 44 per cent over the three-year average for this period. The exports of Canadian coal for the month of July were 28 per cent less than in June. The quantities were: July 73,000 tons, June 101,400 tons. Comparison of the July exports with the preceding three-year average showed a decrease of 67 per cent.

Obituary

Nathaniel Shanklin, 81, one of the men who developed the Grundy County Coal Co., died at his home in Trenton, Mo., Oct. 26, after a lingering illness. He also had been identified with other business enterprises of Trenton, including general merchandising, grocery and feed and fuel, but his greatest success was with the coal company.

James Russell Fitzer, head of the J. R. Fitzer Coal Co., a jobbing concern in the Citizens Savings & Trust Building, Columbus, Ohio, died suddenly Oct. 31 from heart trouble. He came to Columbus six years ago to become salesmanager of the Sunday Creek Coal Co., which position he held up to two years ago. He leaves a widow, two sons and a daughter. One son, John Fitzer, was associated with him in business.

Edwin Ball, age 65, general manager of coal and ore mines for the Tennessee Coal, Iron & Railroad Co., died suddenly at his residence in Birmingham, Ala., Oct. 27. Mr. Ball came to the Birmingham district a number of years ago from the northern ore fields and had been manager of mines for the Tennessee company during his entire residence in the South. He was an able official and had many friends among the employees of the company. He was also prominent in civic affairs and club circles. Mr. Ball was born in England and came to this country at the age of sixteen.

Recent Patents

Coal Jig. George W. Wilmot, Hazleton, Pa., assignor to Wilmot Engineering Co., Hazleton, Pa.; 1,466,866. Sept. 4, 1923. Filed Dec. 23, 1921; serial No. 524,342.

Dumping Mechanism for Dump Cars. Robert H. Starbird, Pittsburgh, Pa.; 1,466,970. Sept. 4, 1923. Filed Feb. 28, 1921; serial No. 448,694. Renewed Feb. 7, 1923.

Hoisting Cage. Vernor T. Barkley, Pittsburgh, Pa.; 1,467,223. Sept. 4, 1923. Filed Sept. 15, 1920; serial No. 410,530.

Apparatus for Washing and Wet Screening. Niels C. Christensen, Salt Lake City, Utah; 1,467,355. Sept. 11, 1923. Filed March 8, 1921, serial No. 450,678.

Mining Machine. George W. Starr and Wm. D. Paynter, Grass Valley, Calif.; 1,467,513. Sept. 11, 1923. Filed Nov. 30, 1921; serial No. 518,789.

System and Apparatus for Conveying Coal. Kenneth Dav's, St. Benedict, Pa., assignor to Rembrandt Peale, St. Benedict, Pa.; 1,467,845. Sept. 11, 1923. Filed Dec. 12, 1918; serial No. 266,595.

Mining Machine. Jacob M. London, Tunneton, Pa., assignor to Jeffrey Mfg. Co., Columbus, Ohio; 1,467,864. Sept. 1, 1923. Filed Dec. 7, 1916; serial No. 135,664. Renewed Jan. 15, 1921; serial No. 437,631.

Coal Chute. John S. Erskine, Freeport, Ill., assignor to Stover Mfg. Co., Freeport,

Ill.; 1,468,012. Sept. 18, 1923. Filed March 14, 1922; serial No. 543,558.

Combined Coal and Cinder Hoist. Clyde P. Ross, Chicago, Ill.; 1,468,606. Sept. 18, 1923. Filed June 26, 1922; serial No. 570,765.

Mining Machine. Joseph Rechichar, Plymouth, Pa., assignor of 45 per cent to Wm. B. Cleary, Plymouth, Pa.; 1,468,326. Sept. 18, 1923. Filed Sept. 21, 1922; serial No. 589,622.

Coal-Tar Support. W. G. Jamrog, Saginaw, Mich.; 1,468,266. Sept. 18, 1923. Filed Oct. 5, 1922; serial No. 592,640.

Chain Cutter for Mining Machines. Edmund C. Morgan, New York, N. Y.; Olive Eugene C. Morgan, executrix of Edmund C. Morgan, deceased; 1,468,914. Sept. 25, 1923. Filed March 25, 1920; serial No. 368,802.

Coke Wharf. Elliott J. Mason, Pittsburgh, Pa., assignor to Heyl & Patterson, Inc., Pittsburgh, Pa.; 1,468,971. Sept. 25, 1923. Filed July 14, 1921; serial No. 484,626.

Pulverized Fuel-Feeding and Distributing Apparatus. C. F. Herington, Pittsburgh, Pa., assignor to Heyl & Patterson, Inc., Pittsburgh, Pa.; 1,468,966. Sept. 25, 1923. Filed Sept. 14, 1922; serial No. 588,217.

Loading Machine. Patrick J. McDonald, New Cumberland, Pa.; 1,469,046. Sept. 25, 1923. Filed June 22, 1922; serial No. 570,212.

Cutting Apparatus for Mining Machines. Walter J. Wilson, Sewickley, Pa.; 1,469,132. Sept. 25, 1923. Filed Nov. 18, 1918; serial No. 263,059.

Briquetting Machine. Wm. F. McDevitt, South Dorset, Vt.; 1,466,405. Aug. 28, 1923. Filed Dec. 30, 1921; serial No. 525,952.

Drill Bit. Edward W. Shimin, Thermopolis, Wyo.; 1,463,848. Aug. 7, 1923. Filed Jan. 17, 1923; serial No. 613,289.

Apparatus for Washing and Sorting Coal and Other Minerals. Antoine France, Liège, Belgium; 1,464,035. Aug. 7, 1923. Filed Aug. 17, 1921; serial No. 493,117.

Cooling and Stabilizing Charcoal. Orin F. Stafford, Eugene, Ore.; 1,464,732. Aug. 14, 1923. Filed Aug. 19, 1920; serial No. 404,500.

Mining Machine. George W. Starr and Wm. D. Paynter, Grass Valley, Calif.; 1,465,372. Aug. 14, 1923. Filed July 25, 1921; serial No. 487,348.

Scraper. G. W. Packer, Chicago, Ill., assignor to the Goodman Mfg. Co., Chicago, Ill.; 1,465,456. Aug. 21, 1923. Filed May 19, 1921; serial No. 470,711.

Association Activities

The question of ore equitable freight rates on smokeless coals produced in the Pocahontas, Tug River, New River and Winding gulf fields, as discussed in a recent meeting of the **Smokeless Coal Operators Association of West Virginia** at New York is being brought to the attention of consumers in New England and other states along the Atlantic. It is being pointed out to the consumers that an adjustment of rates is important if consumers are to obtain soft coal when it is needed and particularly during periods of hard-coal shortage. If all-rail rates to the Atlantic markets were more equitable, it is pointed out, it would be possible to establish a large and steady market and thus supply the demand. As stated at the recent meeting at New York coal can be shipped from the smokeless fields to Chicago for \$3.27 a ton and yet the same amount of coal shipped to New York, which is twenty miles nearer takes a rate \$2.75 per ton higher. Not only is that true but the freight rate to Baltimore and Philadelphia is higher than the rate to Chicago, although the distance is much shorter.

Trade Literature

Boiler Trimmings. Wright-Austin Co., Detroit, Mich. Bulletin No. 500. Pp. 24; 6x9 in.; illustrated. Describes safety alarm water columns and trimmings. This bulletin supersedes No. 1240.

Separators and Exhaust Heads. Wright-Austin Co., Detroit, Mich. Booklet 300. Pp. 56; 3x6 in.; illustrated. The different

types of steam and oil separators, flanges and exhaust heads are covered.

Type T Heavy Duty Reliance Motors for Direct Current. Reliance Electric & Engineering Co., Cleveland, Ohio. Bulletin No. 2014. Pp. 31; 8x10 in.; illustrated. All parts that are included in the make-up of these motors are minutely described. Table of ratings with adjustable and constant speeds and general outline dimensions are given.

The Van Dorn Electric Tool Co., Cleveland, Ohio has issued a page folder illustrating and describing its **Electric Glue Pot**.

The Reliance Electric & Engineering Co., Cleveland, Ohio, has available for free distribution a 51-page paper by its chief engineer, A. M. MacCutcheon, entitled "**Anti-Friction Bearings in the Steel Mill**." This was presented at the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers and is written from such a standpoint that it is of general interest to users and designers of machinery and power equipment in other industries.

Publications Received

Timbering of Metal Mines, by E. A. Holbrook, Richard V. Ageton and Harry E. Tufft, Bureau of Mines, Washington, D. C. Bulletin 215. Pp. 72; 6x9 in.; illustrated. This manual is intended chiefly for the practical miner or small operator.

Traffic News

A complaint has been filed by the Hannibal Shippers' Association against the A. T. & S. F. Ry. attacking rates charged on coal from Illinois mines to Hannibal, Mo. The complaint stated that preferential rates had been allowed by the defendant carrier to St. Louis and other points which are in direct competition to the members of its association, pointing out that these preferential rates are in violation of Section 3 of the Interstate Commerce Act.

Railroads of the United States on Oct. 15 had 10,509 locomotives in need of repair, 16.4 per cent of the total number on line, according to a report by the Car Service Division of the American Railway Association. This was an increase of 686 over the number in need of repair on Oct. 1, at which time there were 9,823, or 15.3 per cent. The railroads on Oct. 15 had 2,487 serviceable locomotives in storage where they are being held until traffic conditions necessitate putting them in service. During the first 15 days in October 19,323 locomotives were repaired and turned out of the shops.

Freight cars in need of repair on Oct. 15 totaled 155,637, or 6.9 per cent of the total number on line, according to reports filed by the Car Service Division of the American Railway Association. This was an increase of 4,305 over the number in need of repair on Oct. 1, at which time there were 151,332, or 6.7 per cent.

The Interstate Commerce Commission has refused to suspend the new tariff increasing freight rates on Utah coal. The petition for rehearing is still before the commission. The commission order was effective Oct. 15, and it was explained the request for suspension had been filed too late, as at least ten days' notice and preferably twenty, before the tariff becomes effective was required. The order increases rates on Utah coal to points west of Mountain Home.

Coming Meetings

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Illinois Mining Institute. Annual meeting Nov. 24, Springfield, Ill. Secretary, Martin Bolt, Springfield, Ill.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8: Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, NOVEMBER 15, 1923

Number 20

The Anthracite Rate Hearings

WHAT implicit faith the public has in its public agencies! Here is the Interstate Commerce Commission, acting on the demand of the Coal Commission, making diligent inquiry into freight rates on anthracite. The Commerce Commission has gone to the ends of and nary a consumer at hand to protest these rates. the hard-coal consuming earth, Pittsburgh on the west and Vermont on the north, holding hearings and finding it necessary veritably to drag the witnesses in who would say a word on the supposedly liveliest topic in the East.

But if the affair has dragged so far, the broadening of the scope of the investigation to include rates on bituminous coal, substitutes for domestic sizes of anthracite, as was done last week by the Commerce Commission, will liven things up. If the hard-coal consumers are passive as to the possibilities of the situation, the soft-coal producers are not, and it is certain that an effort will be made to get all-rail rates into New England and New York on such recognized substitutes as smokeless coal that will boom that business.

Central Pennsylvania, also a producer of high-grade low-volatile coal, has, as a whole, neglected in the past the domestic trade on the theory that to seek to compete with anthracite were hopeless. These producers are now given incentive to enter the lists thus opened by the commission. There will also be opportunity for the commission to apply its general theory of favoring short hauls and frowning on the long haul as wasteful of transportation. Smokeless coal, heretofore confined to water haul to New England, is knocking at the door for an all-rail rate that will permit it to enter this rich market for household coal with a product that has not been degraded by many handlings over docks.

No Wage Cuts

IT IS time for some gloomy pessimist to step right out in front and put a great big broad chalk mark on the wall for the non-union coal operators. One after another the strong associations are lining up definitely and firmly on a policy of holding wages to the present level. Hazard took that stand some time ago. The entire Smokeless field has put itself on record against wage reductions. Logan put it to a vote of the men, as it were, and came to the same conclusion. Some of the others are as yet a trifle uncertain. Now is the time to make it unanimous.

The unanswerable argument dictating this policy is that no reduction of wages that could reasonably be made will put the cost down to a point that will sell more coal in the markets of today. Spot-coal prices have descended well below the contract-price levels and even below average cost. Any individual advantage arising from a sharp drop in price is certain to be tem-

porary. The exception is proving the rule, for some local wage reductions are proving embarrassing to the operator, who is now looking for an excuse to put them back up.

From a broad standpoint of policy in industrial relations as well as of selling, this action of the non-union operators is well advised. It serves to point out to union men—operators as well as mine workers—that the non-union men are not black, as so often painted. There is a proper time to raise or to lower wages, when you are free to do so. The non-union fields have well judged that this is not such a moment. Conditions are far different now than in the fall of 1921, even though a union wage contract expires the following April.

Furthermore a policy of no wage reductions answers the gloomy critics who have imagined that the sole interest animating the non-union operator is to drive a wedge in between the operators and men in the organized fields, to foment strikes and to profiteer while the union fields are prostrate, whether by reason of strike or because of high and ungovernable costs.

Recapturing the Usufruct

THERE is nothing novel or new in the proposal of the Coal Commission to impose a graded tax on the anthracite producing industry as the one corrective measure to give the hard-coal consuming public "a share in the good fortune of the low-cost, high-profit operator." The excess profits tax of war days was that kind of a measure with the essential difference that it applied to all business alike, and was not assessed against a single industry or class. This plan was suggested by the commission in its summary report of September and repeated in that on investments and profits in the anthracite industry, issued last week.

As a plan it must, first of all, be viewed as a compromise measure. The painstaking and thorough investigation of the commission into this aspect of the hard-coal business disclosed wide variations among producers in the margin between cost of production and the selling price of anthracite. Whereas, in 1921, thirty-nine producers having about seven per cent of the total output lost money, thirty-three per cent of the tonnage was sold with margins ranging from 1c. to 50c. per ton; 52 per cent from 50c. to \$1 per ton; and nearly eight per cent between \$1.50 and \$1.75 per ton. The differences were even more pronounced in the first quarter of 1923, when three-quarters of the total anthracite was sold at margins from 80c. per ton upward to \$3 and over. No one would think, however, of that as a feature characteristic of anthracite, for it is inherent in all business.

It is plain enough the commission considered that some of the companies garnered too much profit. See-

ing that 278,000 tons out of more than 18,000,000, or 1.5 per cent, brought the producer and seller \$3 or more per ton in the first three months of this year the layman, the general public, will quickly come to the same conclusion. It might have the same opinion of the average margin for all in that three-months' period, namely \$1.19 per ton, as compared with 54c. per ton in the year 1921.

It is pointed out in this report that margin is not profit, for against it are to be charged federal taxes and interest on borrowed money before the amount available for the owners of the property is known. Nevertheless the margin is an index of profits, and since the commission was not able to name the profits in terms of percentage on investment, the public must look to the figures of margins as a basis for judgment, tempered of course by individual opinion as to whether the industry is entitled to a return on investment measured by present value of the properties and the unmined coal, as measured by original cost, or by some method that gives a figure between these extremes.

But by whatever process of reasoning, before one comes to the conclusion that some of the anthracite producers are taking too great a profit, as the Coal Commission has judged, and following that with the conclusion that the "low-cost, high-profit" producer must be forced to forgo a portion of his gains, one is forced to accept the philosophy that the production of anthracite is a public utility, charged with public interest in a legal as well as economic sense, before that industry can be singled out for a graded income tax on differential profits.

There are other questions as to the legality of such a scheme. The production of anthracite is an intrastate business, hence how can there be a federal tax on income? There is some doubt also whether the present laws of Pennsylvania would permit a state income tax of the nature proposed. But why compromise? If the production of anthracite is a public utility, with some operators making too much profit, why not go the full distance and give the consumer directly the benefit by price regulation or even nationalization of the mines? The public, as did the Coal Commission, balks at this extreme. Price regulation and federal operation, both promise to increase rather than lower costs and prices.

The Coal Commission notes that a graded tax on income would not lower price, but it did not comment on the possibility that it would raise the average cost to the consumer. There are two price levels for hard coal, the conservative one of the "railroad" companies, representing 70 per cent of the whole, that keeps the average down, and the free market price of the independents that reaches higher levels at times of peak demand. What incentive to the large producers to restrain their prices in such a market as that of this fall, if the public is satisfied to pay the price and take a rebate in general taxes?

There is much more to the commission's report on Investments and Profits in Anthracite Mining than its recommendation for a graded tax, though that is its remedy. The report recommends current publicity of all data on costs, prices and profits, and urges the consumer to turn to substitutes if he would lower the price of anthracite. In its assembly of facts, presentation and summarization this report is well above the average of what the Coal Commission has produced. A very difficult subject has been well handled.

Pinchot's Sixty Cents

GETTING a 10-per cent increase in wages through for the anthracite miners was child's play for Governor Pinchot compared with the task of making good on his boast to force the distribution machinery of the industry to absorb that increase in cost. The Governor's latest drive in this direction has the elements of simplicity in every meaning of the word. In short he called the operators to Harrisburg and asked them to agree among themselves and with him to refuse to sell or ship anthracite to any dealer, or to any wholesaler who would ship to any dealer, who charged the public *more per ton than for the same coal a year ago*.

Aside from the fact that the dealer might righteously resent being made the goat for the whole cost of the Pinchot excursion into labor politics, there is the very practical fact of liability for conspiring on the part of any operators who engaged in such an undertaking. Governor Pinchot promised that his Attorney General would give the operators an opinion that would demonstrate that no law could or would be violated by such an agreement, but his Attorney General has not had time during the past month to write it out. Meanwhile the operators are proceeding on the advice of their own legal counsel.

It is hard to believe that Governor Pinchot is really serious in making such a proposal. He may be a practical politician, but he cannot be a practical business man to ask the coal producers to engage in such a doubtful enterprise—to further his political future. The publicity given out passes the buck to the operators, so the Governor may be satisfied.

The Railroads Deliver

THERE may be those who regret the absence this autumn of the usual and normal coal-car shortage and seasonal coal-price flurries. If so they are an insignificant minority. The country is rejoicing in the achievements of the railroads in the year 1923. When early in the year the railroad executives announced that every indication pointed to an unprecedented demand for transportation in the period to follow and that they were going to meet that demand, the popular thought was: Interesting if true.

It was and is true and as pictured to the railroad presidents assembled in New York last week, it was little short of dramatic. The achievements in rehabilitation and in handling traffic the past year have set new records. Emerging from the strike of 1922 and facing a huge demand with an undue proportion of equipment in poor repair and with weakened credit, the railroads have come forth victorious in all save one respect—their earnings are yet below the minimum named by the Interstate Commerce Commission as representing an adequate return.

The railroads are now asking that they be given yet another year in which to demonstrate what private ownership can do. They want the Transportation Act to have a longer life before it is tinkered with. They are asking, in other words, that Congress leave them alone this winter. The railroads have concluded that this Transportation Act that looked so heinous to them three years ago is after all pretty good. Every encouragement should be given the railroads to work out their own destiny under this law, in view of the splendid performance of this year. None can but agree that 1923 promises well for 1924.



No. 14 Colliery, Pennsylvania Coal Co.

Destruction of Anthracite Breakers Proves Need of Fire-Prevention and Fire-Fighting Equipment

Recent Conflagrations Entail Heavy Losses—Use of Steel and Concrete in Construction Materially Reduces Fire Hazard—Prohibit Smoking and Use of Naked Lamps—Description of Spray System in Coal Breaker

BY HAYDN HAMMOND

Mechanical Department, Lehigh Valley Coal Co., Wilkes-Barre, Pa.

DUE to a number of large financial losses experienced by several coal companies in the anthracite field within the past year or two, fire protection in anthracite breakers of timber construction is absorbing more thought and study than in the past. The Susquehanna Coal Co. probably suffered greatest, three breakers having burned to the ground within a few months, namely: the William Penn, at Shenandoah, Pa., and Nanticoke Nos. 5 and 7, at Nanticoke, Pa. The Hudson Coal Co. lost the Laffin breaker, at Laffin, Pa., and the George F. Lee Co. lost the Chauncey breaker, at Avondale, Pa. The latter was completely destroyed within three or four hours after the fire was discovered.

These recent heavy losses give conclusive evidence of urgent need for more consideration of the fire hazard and the adoption of efficient fire prevention and fighting methods and apparatus. Coal breakers are an easy prey to flames because of the very nature of their construction as well as because of the fine particles of coal dust that are continually floating in the air, the oil- and grease-soaked timbers and floors.

A prime essential is protection against the possibilities of fire. This involves due consideration of the location, layout, construction, and operation of the

breaker as well as the enforcement of certain fire-prevention rules and regulations.

First of all the breaker should be erected far from other buildings that are inherently susceptible to fire or that may even cause fire to be carried in their normal operation. Conversely, it may be said that all other structures should be located sufficiently far from the breaker so as not to set it on fire. Obviously the powder house should be located in some remote place on the property, as is usually the case. However, too little consideration sometimes is given to the location of the boiler house, blacksmith shop, oil house and warehouse.

ELECTRIC PLANTS SHOULD NOT BE NEAR BREAKER

Where electric power is used it is foolhardy to mount the outside lightning arresters and switches on or near the breaker structure, as is frequently done. Transformer substations, switching towers and direct-current converting equipment should be located at some distance from the coal breaker. More attention would no doubt be given to the location of this equipment if the designing engineers were to be called upon to operate the apparatus and not only be impressed with the difficulties experienced in keeping the equipment free from dust but also with the fireworks that are set into action on heavy overloads or during lightning storms. Then again, fire practice and fire fighting is always more dangerous and difficult when

NOTE—Headpiece shows one of the most recent collieries. Many of the older plants, which it does not pay to rebuild, being made of timber and not concrete, glass and steel, need protection such as this article describes.

hampered by treacherous power lines and switching equipment being nearby.

The layout of the breaker structure should be such as to prevent the spread of fire. Steam-locomotive tracks should be laid out only through those sections of the breaker which are concreted or similarly protected from fire from the sparks thrown by the locomotives.

Construction materials such as steel and concrete greatly reduce the fire hazard. Sheet-steel or asbestos-covered rooms should enclose all apparatus which is susceptible to fire but which must be located in the breaker structure. Oil switches and in fact all power switches should preferably be located in fireproof buildings remote from the breaker and controlled by automatic start and stop pushbuttons located at the motors and other convenient locations. All wiring should be enclosed in conduit, motors should be provided with conduit connection boxes and all electrical equipment should be thoroughly painted with a waterproof insulating varnish to prevent, as far as possible, deterioration of the insulation, which may cause flashes from grounds and short-circuits. Steam lines, wherever used, should be covered with pipe covering for the double purpose of preventing heat losses and fire.

EQUIPMENT SHOULD BE TESTED FREQUENTLY

Fire-spray systems, augmented by fire buckets, and fire-alarm systems should be installed and tested frequently. Rules against smoking and the use of naked lamps should be rigidly enforced. Fire-alarm boxes should be marked with red lights and when the breaker is idle all other lights should be extinguished so as

to make any fire more easily visible to the watchman while on his rounds. Workmen doing repair work should be provided with extension electric lamps and battery lamps of suitable candle power and capacity to give sufficient illumination for working in the darkest corners. The batteries of these lamps may be readily strapped to the workman's belt and the lamp carried on his cap or in his hand, enabling him to move from one location to another over and around screens, chutes, jigs, etc., without dragging along an extension cord.

The fire-spray system installed in the Prospect breaker, located in Wilkes-Barre, Pa., was originally put in service in 1915. A reservoir of 200,000 gallons capacity furnished the fresh water supply under an entrance head to a steam-operated 28x16½x32 duplex pump. The suction pipe was 12 in. in diameter. The pump discharged into a 12-in. cast-iron line connected to a 12-in. main riser pipe in the breaker. At the various floors and platforms and under the roof, laterals were run to approximately seventy spray heads, so located that the entire breaker could be wet down. The amount of water was limited to the safe pump speed, which gave a capacity of approximately 1,600 gallons per minute. On account of some breaker changes it was found necessary recently to add additional laterals and spray heads requiring increased pump capacity up to 2,500 gallons per minute, which the original pump could not deliver at a safe speed. It was therefore decided to replace the duplex pump by an 8-in. single volute centrifugal pump manufactured by Barrett, Haentjens & Co. and driven by a type C. I. Terry steam turbine.

The pump has a capacity of about 2,500 gallons per minute against a total head of 125 ft. at 1,800 r.p.m. The driving unit is equipped with a throttling governor, an emergency governor and water-cooled bearings. The wheel is made from a single forging of special composition steel, and the semi-

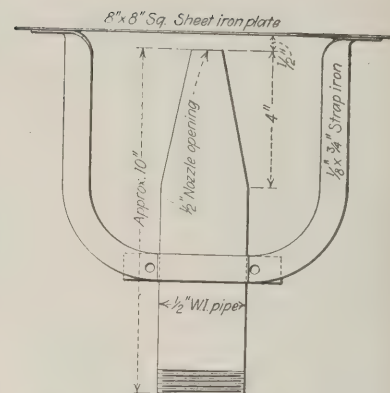


FIG. 2—SPRAY HEAD USED IN PROSPECT BREAKER

Some of these spray heads are installed in an inverted position, depending upon the conditions and direction in which the water is to be thrown.

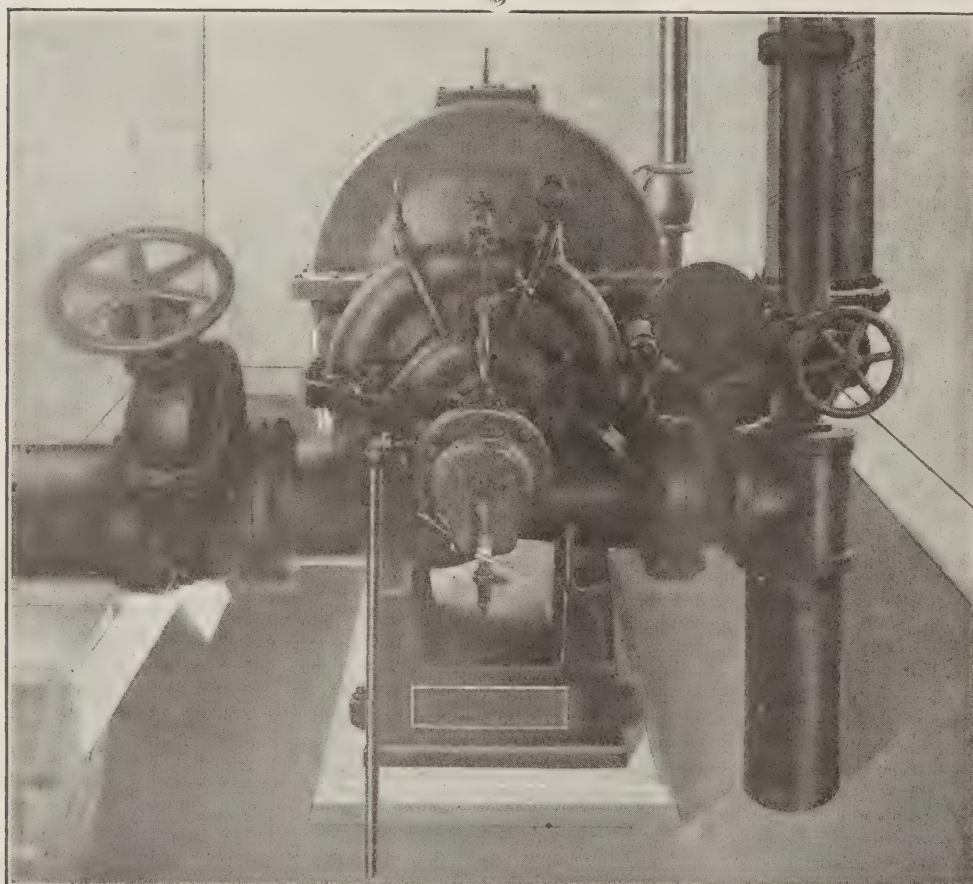


FIG. 1—PUMP AND TURBINE UNIT FOR FIRE SPRAY SYSTEM

The pump has an entrance head of 10 ft. and in 77 seconds can discharge the equivalent of ten fire-hose lines from ninety-eight sprays.

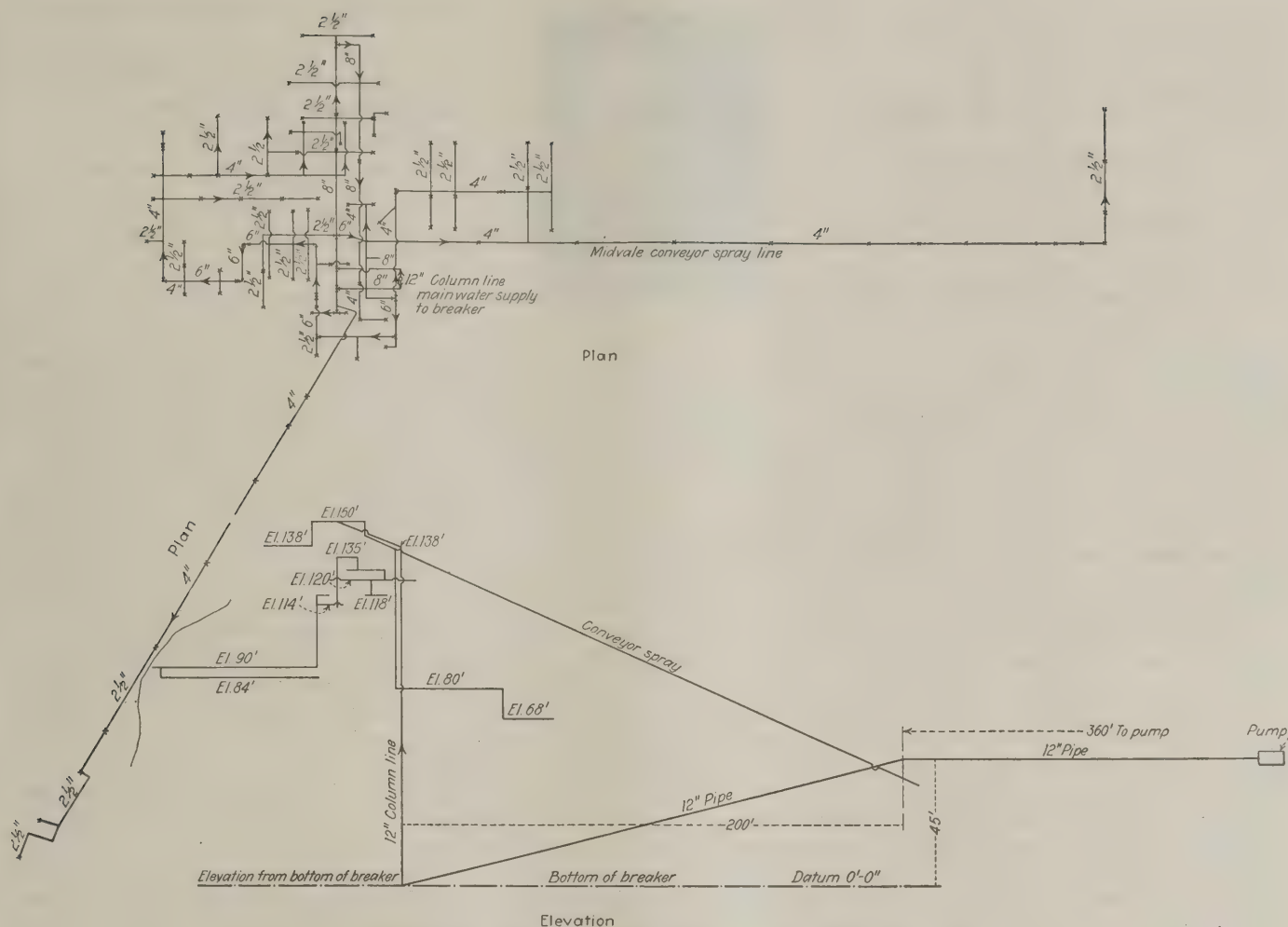


FIG. 3—PIPE LAYOUT SHOWING LOCATION OF FIRE SPRAYS

These views show how the sprays are scattered throughout the breaker and on the conveyor lines. Note that many of the sprays are located in the upper part of the breaker, the open structure inside the breaker readily permits the water discharged at the higher elevations to wet down the lower sections quickly.

circular buckets or pockets are milled from the solid metal. The blades have large clearance and are further protected by the projecting rims at the sides of the wheel, which would take without damage any rubbing that might occur if clearance became reduced. The turbine is of the radial-flow type and is run non-condensing. The steam conditions at the colliery average 110 lb. gage pressure.

The pump is located so as to have a 10-ft. entrance head from the same reservoir through 10-in. suction pipe and discharges through an 8-in. opening to the old spray system. The 12-in. main is 360 ft. to the foot of the breaker and the riser in the breaker is 138 ft. There are approximately ninety-eight spray heads in the building, of which some are upright, as illustrated, and others the reverse, depending upon the location and conditions for which they serve.

SYSTEM EQUALS TEN LINES OF FIRE HOSE

The system will throw a quantity equal to ten lines of fire hose throwing 250 gallons per minute each. The regular standard fire equipment, such as lines of hose, fire pails, water barrels, etc., serve as additional protection.

A bypass on the pump discharge line permits running the pump daily, without flooding the breaker, to assure its being in operating condition at all times. In a recent test from starting until water was discharging through all sprays took 77 seconds. The

centrifugal pump was selected in preference to a straight-line duplex pump as it has less moving parts requiring attention and it also eliminates valve and packing troubles.

STEEL DISPLACES TIMBER IN EUROPE.—Owing to the scarcity of timber, various substitutes are being employed in European countries for mine props, says George S. Rice in his report to the Director of the Bureau of Mines relative to his recent trip to Europe. Steel props and steel arches are being extensively used to uphold mine roofs. In Belgium, mine shafts, in wet, "running," ground, are being largely constructed by the freezing process, in which, through the medium of refrigerated brine forced through pipes surrounding the area to be excavated, the ground is frozen and made easier of excavation. Shafts more than 600 ft. deep have been sunk by this method.

PROFESSOR VLADIMIR KARAPETOFF, of the School of Electrical Engineering, Cornell University, has been awarded a prize of four thousand francs by the Montefiore Foundation of the University of Liège, Belgium. The award was made for his kinematic computing devices of electrical machinery, described in the technical press during the last three years. A committee of five Belgian and five foreign members, which makes these awards, has characterized this work as an expression of a "new idea which may lead to important developments in the domain of electricity."

British Coal Industry Opens Doors to American Observer



Letters from Officials and Industrial Leaders Prove Open-Sesame—Reassuring Credentials Elicit Frank Thoughts on Pressing Problems

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

KNOWING that the British have been mining coal for five centuries and that they have developed a highly stable industry, the editor of *Coal Age* suggested to me that there should be a few leaves, at least, that the bituminous-coal industry in this country could take from the book of British experience.

Mr. Leshar gave me the assignment in the hope that I could learn something that might be helpful to the industry here to get on a better basis. He did not choose me for that undertaking because of technical knowledge of coal production or distribution. I have dug no coal. My name never has appeared on the payroll of a coal-mining company.

The real truth of the matter is that Mr. Leshar did not want the British mines examined. He did not want statistics compiled nor costing systems analyzed. He wanted someone to go abroad who would search out the men in the coal trade there having the rather rare faculty of being able to survey and appraise the industry as a whole. He wanted someone who could see scores and scores of such men so that we could obtain a good cross-section of opinion. He knew that the men who have spent their lives in the British industry have at their tongues' ends more accurate information about it than could be compiled in a year by twenty American experts making their own first-hand examinations. All that he wanted to do was to send a news gatherer who had some conception of the troubles which afflict the American industry to talk with British coal men and to ascertain how they have met those problems or have prevented them from becoming acute.

I had the advantage of long experience in Washington, where one man is expected to keep an eye on 435 Congressmen and 96 Senators, as well as to keep abreast with the doings of some 300 executive and other establishments and agencies. Such experience tends to develop an ability to flit quickly from flower to flower in the search for news and opinion. Experience in Washington has educational value in that the news gatherer here must learn to separate wheat from chaff in opinion. For these reasons the articles which I expect to write will contain no opinion of my own. I will attempt to reflect as accurately as it is within my power the many interesting things which were told me and shown me by those engaged in the production and distribution of coal from British mines.

I set out with some important assets in the form of letters. One was from the Secretary of State. Then I had a letter from Commerce Secretary Hoover, which I displayed at the slightest excuse, as I found it was particularly effective in paving the way into confidence of those on whom I called. John Hays Hammond, at that time chairman of the Harding Coal Commission, took the risk of giving me a blanket endorsement. In addition he gave me a letter to Post

Wheeler, counsellor of the American Embassy in London, who reacted by authorizing me to refer to the Embassy anyone suspecting me of muckraking proclivities. This proved to be an important anchor to the windward, as in London they are inclined to credit any American newspaper man of an uncanny ability in the twisting of prosaic facts into sensational articles. Dr. George Otis Smith gave me a letter to his intimate friend Sir Richard Redmayne, chairman of the Imperial Minerals Resources Bureau, who proved to be a wonderful source of information and worth-while opinion. F. R. Wadleigh, then Federal Fuel Distributor, gave me a sheaf of letters. He once was the London representative of an American coal company. He knows the men there who have ideas and who have the faculty of concise expression.

Julius Klein, director of the Bureau of Foreign and Domestic Commerce, gave me letters to the department's commercial attachés. They were more than perfunctory letters of introduction, but I doubt if they obtained any special favors for me. From what I saw at the foreign offices of the Department of Commerce, the members of their staffs go to any amount of trouble to be helpful to all comers. In addition, I had various letters from several of the American coal companies who have representatives in London or Paris.

BRITISH COAL INDUSTRY WIDELY DISTRIBUTED

These credentials had the effect of opening any door that I could reach. Unfortunately, my time was so limited that I could not make all of the calls I desired. Not only is the production of coal well scattered over England, Scotland and Wales but the men connected with the industry in London are well distributed over the 600 square miles which the city occupies.

Both at Cardiff and at Newcastle I was given the privilege of the floor at the exchanges. This made it possible for me to question a much larger number of men than would have been the case otherwise. I found no tendency among all those with whom I talked to be reticent. My greatest trouble was in keeping them from interviewing me. They were so anxious to learn just how we do things that it was difficult to keep them talking on the things I wanted to learn about. They are more insistent, however, than the average American in satisfying themselves whether or not an interviewer is likely to make constructive use of the information which they furnish. Reassured by my credentials and by my local sponsors, I believe they acquainted me frankly with their real thought on the problems of their industry, but in nearly every instance they would exact the promise that they were not to be quoted.

[Next week Mr. Wooton will begin the recital of his experiences abroad.]

Commission Proves That

Machine Loading Reduces Mine Cost 30 Per Cent*

U. S. Coal Commission Investigator Finds Machines Loading
45 Tons an Hour, Even Though Idle 40 Per Cent of Time—
He Compares Machine and Hand Loading in Same Mine

THE statement already made that the cost of coal at the mines may be reduced in many cases by 30 per cent is not theory but is based on a thorough analysis involving detailed time studies of the operation of loading machines in several mines with access to the confidential records of the operating companies. The figure is conservative because it takes but small account of the supplementary savings that will accrue from extended development of the machine.

I and my associate industrial and mining engineers expended several days studying loading machines at work in two mines and made time studies of the work in a third. The general plan of operation with the large loaders is as in Fig. 1, which shows in outline the general type of several designs of loading machines. The head of the machine, which in some types is on a truck running on the track and in others on a caterpillar tractor, and in some cases has on the floor line a cutting machine, is run ahead, thus assisting the lower conveyor to collect fine coal and lumps. This conveyor, which consists essentially of a chain with suitable flights running on an inclined trough, is fed in some machines by separate clawlike arms.

The upper or discharge conveyor of the machine running on a vertical plane, with the emptied flights below the full ones, receives the coal from the lower one and discharges it into mine cars. As the pile of coal is taken away, the head is moved sidewise, or forward, into fresh coal, either by the aid of jack posts as mining machines are moved, or else by the mechanism of the loader itself. One man operates the machine and another may be required to assist the haulage motorman in adjusting the discharge conveyor to the car.

FILLS A FOUR-TON CAR IN THREE MINUTES

For the large-capacity loader, which fills a 4-ton car in two or three minutes, the locomotive stays with the car and hauls it out to the empty track as soon as it is filled, whence it is taken in trips of a few cars each, by another locomotive. As soon as the room is cleaned up, the loader, under its own power or hauled by a locomotive, is taken to the next room. The room which is vacated is then ready for the machine cutter. This is followed by the electric drill and shot-firing, and by the cleaning up of any slate that may have fallen. Under good conditions a loader may load the same room twice in a single shift.

A typical day's work of a large and a small loader is shown in Fig. 2. Only the delays due to shifting the machine from one working place to the next are shown by the breaks in the line, the time waiting for cars between individual loads being included in the general

line of the curve. Nevertheless the length of these waits is shown in detail for a typical period in Fig. 3.

In our discussion 400 tons is assumed as a conservative output for the large loader, although this is slightly higher than is shown in the table or diagram, because as such work becomes more nearly a routine and the haulage becomes still better adapted to rapid loading less time will be lost. Besides this, in the days observed, delays occurred due to cars leaving the track or to lack of adequate power, for which in operation there should be no excuse. Furthermore, records of the company show average loading for a period of two weeks at a rate as high as selected, with occasional days in which it was greatly exceeded.

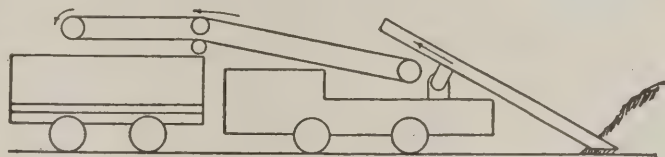


FIG. 1—DIAGRAM ILLUSTRATING LOADING METHOD
By the use of two conveyors the desired flexibility between points of loading and of discharging is attained. Most machines are modifications of this principle.

Reference has been made to large recovery with a large loading machine. The machine works so fast that it is possible quickly to clean up pillars and stumps clear up to the breaking line, giving the roof far less time or opportunity to fall than in hand loading.

A Day's Work of a Loading Machine.—The records of a day's work of a loader in Tables I and II are from actual detailed job analysis covering in each case an entire day of continuous observation with a stop watch. The results of one of these days of a loading cycle for a large and small machine also are shown in graphic form in Figs. 2 and 3, previously described.

ALL THREE LOADING MACHINES DO EQUAL WORK

Studies of the large machine were made by our engineers in two different mines of the same company, one loading machine in the first mine and two loading machines in the second. All these machines were of the same type, one of them, however, having been in operation for five years, at first experimentally and intermittently. Note particularly in the table the uniformity of operation of the three machines. As will appear in subsequent discussions, the operation is normal and representative of regular, continuous daily production.

Examining further the tables for the large machine we note that the time of loading a four-ton car averages 3.2 minutes. Fig. 3 shows a minimum loading time of less than 2 minutes. In one of the mines a number of four-ton cars were loaded in a little over one minute each. Including delays waiting for cars, etc., the total gross loading time per car averages 5.6 minutes. The average tonnage per machine in eight

*Second installment of Report on "Underground Management in Bituminous Mines," made by Stanford E. Thompson and associates to the U. S. Coal Commission. The first section appeared in *Coal Age*, Nov. 8, page 691, and was entitled "Coal Commission Suggests Ways of Operating Mines That Would Lower Cost." Other installments will follow later.

hours for the day's observation is 352 tons (of 2,000 lb.), but out of the 480 minutes in eight hours the machine was loading coal 270 minutes, or 56 per cent of the time, and the rest was taken up in changing cars, moving loader, and incidental delays as indicated.

It is evident that with more continuous operation there will be a large increase in the production. If the idle time were reduced to, say, 20 per cent, which is certainly a fair possibility with well-designed transportation, the output would be increased to 550 tons in eight hours.

Instead, therefore, of the 400 tons taken as a conservative average, we may expect a working rate eventually for the large machine of at least 500 tons per eight hours. From the relation of working to waiting time it is evident that attendance upon the loader and the planning of the mine development to meet the needs of the loader, need for maximum production and economy more careful treatment than they are receiving at present. As the loading machine has outdistanced hand shoveling so must control of the operations, the apparatus, and equipment go beyond present methods by which hand loading is planned, controlled and aided mechanically.

TABLE I—ANALYSIS OF DAY'S WORK OF LARGE LOADERS
Loading Rates and Tonnages

Machine	Cars Per 8 Hours	Cars Per Hour	Car Yield Tons	Tons Per 8 Hour	Tons Per Hour
I.....	86	10.7	4.12	354	44
II.....	87	10.9	4.12	360	45
III.....	83	10.4	4.12	344	43
Average.....	85.3	10.7	4.12	353	44

Total Work and Delays per Loader in Eight Hours, Minutes

Machine	Net Loading Time Min.	Net Time Moving Loader	Net Time Moving Cars	Miscel- laneous Delays	Total Idle Time
I.....	250	51	125	54	230
II.....	284	71	117	8	196
III.....	275	74	121	10	205
Average.....	270	85	121	24	210

Percentages

Machine	Net Loading Time	Net Time Moving Loader	Net Time Moving Cars	Miscel- laneous Delays	Time All Delays
I.....	52.1	10.6	25.9	11.4	47.9
II.....	59.1	14.6	24.5	1.7	40.8
III.....	57.3	15.5	25	2.2	42.7
Average.....	56.2	13.6	25.1	5.1	43.8

Average Time per Carload, Minutes

Machine	Net Time Loading	Gross Time Loading	Net Time Moving Loader	Time Moving Loader Per Carload	Time Awaiting Cars	Miscel- laneous Delay	Total Lost Time
I.....	2.9	5.6	5.7	0.7	1.4	0.6	2.7
II.....	3.3	5.5	7.7	0.8	1.3	0.1	2.2
III.....	3.3	5.8	8.2	0.9	1.5	0.1	2.5
Average.....	3.2	5.6	7.2	0.8	1.4	0.3	2.5

The time lost in waiting for cars must be reduced by improvements in haulage methods. That lost in moving the loader can be lowered by modifying the manner in which the mine is developed. Nor is that time now lost through miscellaneous delays incapable of being saved, for better standardization and maintenance of equipment will ultimately reduce it.

The data on the small machine given in the Table II are taken from an experimental run of fourteen days conducted by the mining company and from observations made by company officials and representatives of the manufacturers of the loading machine. The important values were checked approximately by our engineers on their visit to the mine. From the observations we selected three of the best days' runs, as it is evident, with machine loaders as with all machinery, that continuous operation smooths out defects and tends to increase the average production to or beyond the maximum in the first experimental runs.

With the small machine the percentage of delays is lower—an average of 35 instead of 44 per cent—but with it more time is lost waiting for cars—an average of 1.9 minutes between loadings instead of 1.4 minutes—showing less efficient haulage in the mine with the small machines. Assuming 20 per cent for delays, the same figure as selected as fair idle time with the large machine, the average capacity of the small unit would become 150 tons in each eight-hour shift.

INTRODUCTION OF LOADING MACHINE INEVITABLE

It is evident from the tables and data presented that the loading machine has established such a degree of efficient operation and such a magnitude of tonnage production as to assure its inevitable ultimate adoption in the coal industry. When contributory changes have been made such as will afford rapid transportation of coal to the tippie, speedy handling of cutting and drilling, efficiency in company work and maintenance and such a modification of the system of development as will favor the mechanical loader, the loading machine will introduce a new epoch in the history of coal production.

Haulage for Machine Loader.—In machine loading the haulage problem, as indicated by the percentages of lost time, is even more important than in hand loading. The movement of the coal while the loader is in operation is practically continuous. The movement of the coal in the mine cars is sadly interrupted.

In one of the mines where observations were taken, for example, two locomotives alternately took groups of cars into a room to the loader, replacing the cars as fast as they were filled, remaining with the loading machine until the trip was loaded. The cars were hauled to the main parting in short trips, and in order to avoid the still more expensive idleness of the loader, two other locomotives were employed for this work, these two locomotives spending more than half their total time in waiting.

For example, the average time for the round trip to the parting required 23 minutes, of which 10 minutes was actual running time and 13 minutes waiting. The need here for definite control of transportation, to which reference will be made hereafter, is evident.

TABLE II—ANALYSIS OF DAY'S WORK OF SMALL LOADERS
Loading Rates and Tonnages

Machine	Cars Per 8 Hours	Cars Per Hour	Car Yield Tons	Tons Per 8 Hours	Tons Per Hour
IV.....	40	5	2.5	100	12
V.....	50	6.3	2.5	125	16
VI.....	60	7.5	2.5	150	10
Average.....	50	6.2	2.5	125	15

Total Work and Delays per Loader in Eight Hours, Minutes

Machine	Net Loading Time Minutes	Net Time Moving Loader	Net Time Moving Cars	Miscel- laneous Delays	Total Idle Time
IV.....	292	74	92	22	188
V.....	312	47	98	23	168
VI.....	326	39	84	31	154
Average.....	310	53	82	25	170

Percentages

Machine	Net Loading Time	Net Time Moving Loader	Net Time Moving Cars	Miscel- laneous Delays	Time All Delays
IV.....	60.8	15.4	19.2	4.6	39.2
V.....	65.0	9.8	20.4	4.8	35.0
VI.....	67.9	8.1	17.5	6.5	32.1
Average.....	64.6	11.1	19.0	5.3	35.4

Average Time per Carload, Minutes

Machine	Net Time Loading	Gross Time Loading	Net Time Moving Loader	Time Moving Loader Per Carload	Time Awaiting Cars	Miscel- laneous Delays	Total Lost Time
IV.....	7.3	12.0	12.2	1.8	2.3	0.5	2.8
V.....	6.2	9.6	9.4	0.9	2.0	0.5	2.5
VI.....	5.4	8.0	4.9	0.7	1.4	0.5	1.9

Machine Cutting and Drilling in Conjunction with Mechanical Loading.—With the development of machine loading, a prime essential is to plan the management of all the operations, including the cutting and drilling, so as to keep pace with the loading. With this in view the arcell machine, which remains permanently on its truck and which is said to require less labor to operate per ton of cutting than any other cutting machine, has been used. It swings around a semicircle 18 to 21 ft. in diameter, cutting a semicircular kerf in the coal seam. This gives a convenient shape of face for loading. With this plan it has been found possible with one machine and two operators to cut 350 to 400 tons per day.

With machine loading the drilling must be done by a separate gang of men. For this an electric drill was found to be cheaper and quicker than the ordinary hand auger and to be an essential adjunct in preparing coal for the loading machine. A comparison of studies made to ascertain the net times of drilling in various mines indicates that in similar coal the net drilling speed is some five times greater when the electric drill is used instead of the hand auger.

This division of labor also is economical in specializing the work and inducing greater skill, and, therefore, more efficient work. Furthermore, the work can more readily be placed on an incentive basis.

Comparison of Hand- and Machine-Loading Mine.—In order to obtain a true comparison of production and cost of hand vs. machine loading it is necessary to compare conditions where the machine loader is the only variable. Fortunately, for this purpose we were able with the co-operation of the operators and men in the mine to make arrangements for studying machine loading in a mine recently changed over from all hand loading to all machine loading. The physical conditions in the two cases, therefore, were alike and the differences in number of men and in production per man were due simply to the change from hand to machine loading.

The table of comparison of hand and machine loading which follows gives the distribution of the men underground and complete information with reference to the coal loaded and the output per day. Five columns are given in the table. The first column gives the results from a single complete day's observation of the machine; the second column similar data from the records of the company for a six days' performance with three loading machines (this was during a period of two weeks in June, 1923, the mine working intermittently) while columns 3 and 4 give similar information of another mine, column 3 for one day's observation on a single machine and column 4, six days' actual running of the mine with two loading machines.

NUMBER OF MEN IN MINE ALMOST HALVED

Records from the same mine outlined in columns 3 and 4 are shown in column 5 with all hand loaders during the period of two weeks or eight working days in October, 1922. On account of the like conditions a comparison of hand vs. machine loading can be clearly drawn by comparing the various values in columns 4 and 5. It is interesting also to check these machine data with the other mine shown in columns 1 and 2.

It will be seen that the total number of men in the mine in column 5 is cut nearly in two for equivalent production; that is, 118 men underground for 733 tons per day against 73 men underground for a production of 814 tons, the average daily tons per man under-

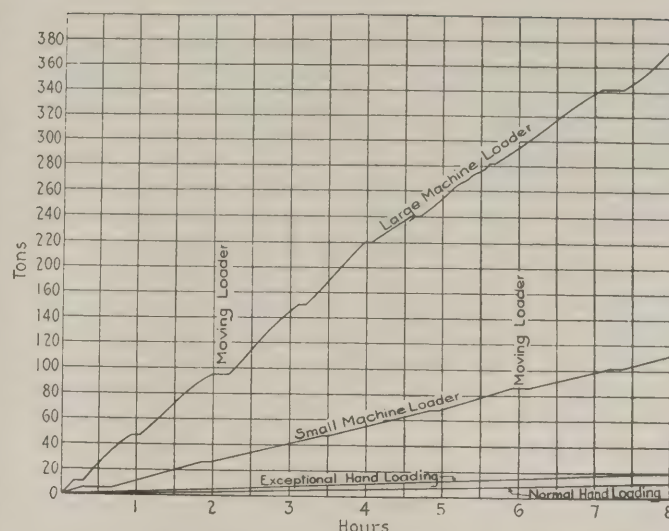


FIG. 2—OPERATION CHART, LARGE AND SMALL LOADER

Horizontal lines in the graph show the time when the machine is being moved from one working place to another, not the time waiting for cars, which latter has been merged into the total time of loading at any given working place. Sloping line shows gross rate of loading, including waiting for cars.

ground, all men counted, being increased with the machine loader from 6.2 tons to 11.2 tons. Note further that the hand loading in this mine in the previous period was much above the average, or 13.8 tons per hand loader per day.

The average output per loader per day in Table III is slightly higher than the average of the tabulation in the previous table, because the men, who were only getting about three days' work a week on account of railroad car shortage, were working a little over eight hours per day.

The use of machines in mines with thick partings which cannot be picked out of the coal fast enough to avoid delaying the machine loader, may necessitate changes in the methods of cleaning. It may be necessary to supersede entirely hand sorting at the face by installing more and better cleaning devices at the tippie. The cost of such extra cleaning, even if appreciably large, will be overbalanced in most mines by the saving in the cost of loading.

A handicap in some sections, which, however, cannot be permanent, is the tendency of the union, on the introduction of any labor-saving device, to seize nearly the whole of the advantage by demanding piece rates high enough to make the cost of the coal practically the same as before. It is inevitable that eventually all savings of this kind, except that portion needed to pay a fair return on the development, must inure chiefly to the consumer.

Advantages of Machine Loading.—The saving in cost of mining by the coal loader is only one of its merits. Its value to the miner himself is of great moment because it eliminates the hardest and most lonesome work in the mine—shoveling coal—and also, because—this is of even greater importance—it increases safety by concentrating and speeding up the work. The latter advantage becomes important as the capacity of the loading machine increases.

Picture the difference in the operation of a hand and a machine loading mine. In the hand-loading mine in 7-ft. coal we get an output of 400 tons from a given section. We have some 30 to 50 hand loaders working in as many rooms in a territory of, say, 25 acres. These men advance in their rooms perhaps for four months until the maximum length of about 300 ft. is reached.

With machine loading, using a large loader in 7-ft. coal, even with the room-and-pillar method of development, which probably can be improved, the area operating at one time for a section of a mine yielding a 400-ton output can be reduced to some three acres, or less than one-eighth of the area of the hand-loading mine producing the same output. With a small loading machine the ratio is much greater. The necessary acreage in all cases varies with the thickness of the coal.

What does this mean to the miner and the operator? It means that the foreman, instead of making an occasional visit to the miner—say once or twice a day—is in constant touch with all the men. He can inspect the timbering. He can insist on the most economical methods of shooting. He can regulate and follow up the company daymen. He can supervise the track and maintenance work, and especially he can be in such close touch with all the men that accidents must inevitably be reduced to a minimum, yet at the same time all the work progresses more rapidly and at less cost. Further than this, because the room is excavated in, say, one month or maybe a half, instead of four months, and pillars can be recovered with similar rapidity, the danger of falls is lessened to a remarkable degree and timbering may be reduced in quantity and less coal be wasted.

Of paramount importance from the standpoint of observation is this larger recovery. It is estimated by operators using the large loading machines that the introduction of these labor-saving devices has increased the recovery by as much as 5 to 10 per cent.

Development Plans With Machine Loader.—Though our observations show conclusively that room-and-pillar methods can be used with machine loading, it is evident from the facts just given that some other system which will reduce the time lost in changing cars and moving the loader will be of further and correspondingly larger benefit. In mines already in operation, the plan of development is difficult to change, but for new workings, operators most interested in mechanical loading have considered modifications of the longwall system.

In one of the modified longwall systems the use of belt conveyors has been considered, in another a steel portable conveyor has been successfully used, and even with the room-and-pillar method there is a possibility of developments of this kind.

Work of Company Men with Machine Loader.—With the use of a machine loader many duties which now fall to the hand loader pass over to company men. Such work as timbering, laying track in rooms, cleaning up after the loader and removing rock or slate are necessarily done entirely by men who can be specially trained for this work. Furthermore, these men work in a small area and under constant supervision of foremen, which is impracticable where individuals are scattered in work places widely apart. Consequently they can be more effectively employed and at correspondingly lower unit costs.

The last three columns of Table III, which give the actual number of inside men employed in a mine operating entirely with machine loaders and the same mine before any loaders were introduced, show the distribution of the gang—except the loaders and men on machine shooting—to be substantially alike in the two cases, notwithstanding that all the timbering and trackwork in the machine mine is being done by company men. Longer operations (the loading machines have

been working only about six months in this mine) and further standardization, which is possible with men under such definite control, is bound to effect still greater reduction in the working force.

TABLE III—COMPARISON OF HAND AND MACHINE LOADING

Column Number	(1)	(2)	(3)	(4)	(5)
Mine	Machine	Machine	Machine	Machine	Men
Number of days' run....	1	6	1	6	8
Miners mining by the car			4	4	53
Miners mining by the day	2	2			
Loading machines.....	3	3	2	2	
Loading-machine men....	12	12	8	8	
Machine runners.....	3	3	3	2	2
Shooting after machine..	8	8	8	8	
Trappers.....	2	2	1	1	2
Motormen.....	11	11	6	6	6
Brakemen.....	11	11	6	6	6
Phone boys.....			2	2	
Wiremen.....	3	3	1		1
Motor repairsmen.....	2	2		1	2
Timbermen.....	6	6	7	7	8
Trackmen.....	10	10	13	12	20
Slatemen.....	20	20	10	10	10
Ditching.....					1
Bratticemen.....	4	4	1	1	2
Sprinklers.....	2	2	2	2	2
Foremen.....	5	5	2	3	3
Number of days.....	1	6	1	6	8
Total men underground..	101	101	73	73	118
Man days.....	101	606	73	438	944
Total cars loaded.....	298	1,704	200	1,186	1,428.5
Average car yield.....	4.12	4.12	4.12	4.12	4.11
Total tons loaded.....	1,228	7,020	824	4,886	5,868
Total tons per day.....	1,228	1,170	824	814	733
Tons per man loader per day.....					13.8
Tons per machine per day	400	380	385	380	
Tons per man per day....	12.1	11.6	11.3	11.2	6.2

MACHINE-LOADER MINE 40 PER CENT MORE EFFICIENT

Mining Costs Reduced with Large Machines.—At the beginning of the report the statement is made that in many cases the total cost of coal at the mine, that is, f.o.b. railroad cars, may be reduced as much as 30 per cent. This statement is based on careful estimates covering various physical and operating conditions. The reduction in the number of men underground has already been noted, and, as there indicated, with a longer period of operation this number will be reduced still further because of more systematic supervision and distribution.

Including the outside men so as to include all mining labor (exclusive of camp operation and maintenance) the output per man shift for all the men employed at and in the mine becomes 4.7 tons for the hand-loading mine to 7.7 tons per man for the large machine-loading mine. This is a reduction in total mining labor underground and outside of nearly 40 per cent. Taking into account differences in rates of pay, interest, depreciation and repairs to loading machine, different quantities of supplies, overhead in both cases and indirect labor maintaining mining town, the reduction in cost per ton in the mine under observation is somewhat larger than the 30 per cent presented as our estimate.

Increased Output from the Mine.—The introduction of loading machinery, instead of making so large a reduction in the number of miners, may be utilized in increasing output. Certain operators have estimated from their cost records that by running a mine full time, instead of on half production due to lack of railroad cars, that their reduced overhead and non-productive labor per ton (which items as a total are nearly independent of production) lowered their costs nearly 50c. per ton. Similarly, increase in production with the same overhead and equipment will produce large savings.

In some cases the ultimate increase in production is limited by the capacity of the shaft or tippie, but our observations show that by more uniform operation, by

utilizing the time lost through the day, and by the adoption of the best methods of operation, there usually is a remarkable opportunity to increase production without increasing either the inside or outside equipment. Furthermore, through the reduction in cost due to increased output combined with other savings directly due to loading machines and their accessories, the mine is placed in the class of low-cost production with naturally more uniform operation throughout the year because of readier sales.

Limitation of Loading Machines.—The loading machines thus far developed are limited to coal beds having a thickness of about 48 in. or over. This, however, includes most of the coal mines now being operated. For thinner beds satisfactory machines undoubtedly can be designed when needed although naturally the thinner-bed mines will fall in the class of higher cost, which, unless the coal is of exceptional quality, would operate only on a market with large demand.

Though best adapted to a sound roof, loading machines are being satisfactorily used even where the roof is weak. As a matter of fact—and this is of great importance—the speed of loading of the larger machines is so great that danger of falls is appreciably reduced.

It is not the purpose of this report, however, to consider such details, no matter how important, except to indicate the probable trend of progress in management. We may say, however, that one of the chief dangers of longwall mining with thick seams, that of falls which injure miners or tie up traffic, is minimized with large machine loaders because the speed of excavating makes it more possible to get out of the way before the roof falls.

LOADER HAS TRAILED BEHIND OTHER MACHINES

Present Accomplishments in Mining Machinery and Equipment.—Let us see what has been accomplished in underground machinery up to the present time. Electric locomotives with overhead trolleys are universally used for the haulage of trips on main lines and cross entries. The bottoms and partings and first-aid and office rooms underground, and sometimes (although in fewer cases than might be desired) the workings themselves are lighted by electric lamps. Storage-battery and reel locomotives and electric room hoists are widely superseding the mule for gathering from the working places.

Undercutting of the coal by hand has been largely eliminated by the cutting machine. Drilling is still usually done by hand augers, but in machine-equipped mines the electric drill is coming into use. Ventilation has become a science giving sufficient fresh air in every room and passageway. Drainage is handled by pumps of plunger, piston and centrifugal type—tandem for higher lifts—of the latest design. Outside machinery at tipples and power plants is sometimes highly developed. Watering with a specially designed sprinkler is employed underground in the best equipped mines.

The big possibilities of machinery in coal mining now are in the underground loading and in the adaptation of other underground operations to this method of operation. Experiments have been made with loading machines of various types for some ten or fifteen years. In metal mines their use is quite extensive, but in coal mines they are only just now arriving at a stage where they can be called an operating success.

Machines combining cutting and loading have not yet

been proved successful. "A cutting and loading machine however, has just been completed which is designed particularly for longwall operation. The machine advances steadily but slowly into the face of the coal, undercutting it, and the coal so undercut—by the arrangement of the mining method—falls with little or no drilling and blasting on to a conveyor with which the machine is equipped. This conveyor carries the coal to a haulage road where it is loaded into mine cars and so conveyed to the tipple."

A handicap in the development of loading machines has been not merely the overcoming of mechanical and physical difficulties but also the opposition of the Union,

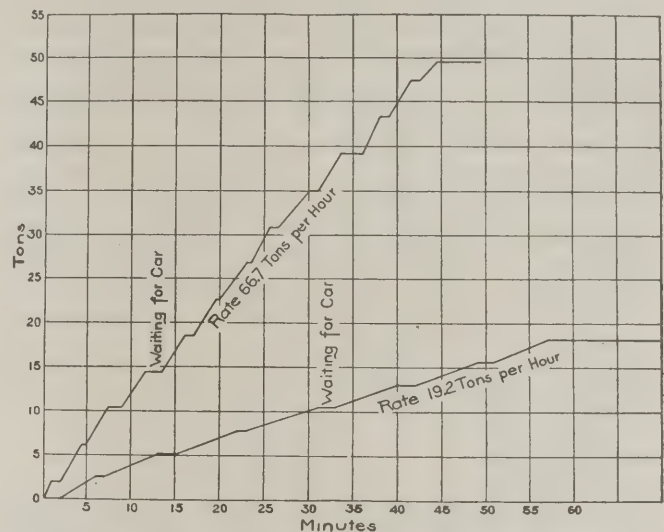


FIG. 3—OPERATION CHART IN SINGLE PLACE
Horizontal lines in this graph show times when loader waits for cars and sloping lines show the net rates of loading.

which has opposed their introduction, or has attempted to attain so high a rate of pay for operating the machine as to deprive them of a large part of their economic value.

Many types of loading machines have been tried. In the West with the softer coal and thick seams electric power shovels of the steam-shovel type have been adopted although regarding these we have no records showing any such large output as we have observed with the type having two conveyors. A modification of this type that is being developed for coal mining in thinner seams is a bucket that is forced into the pile of coal and then lifted backwards and discharged onto a conveyor.

In connection with the loading machines and also in hand loading, experiments are being made at the present time with mine conveyors of various types. For outside operation belt conveyors, often in more than one section, are frequently used for distances of several thousand feet for delivering material for shipment, as for instance, to barges. In one mine visited a belt 400 ft. long carried coal on an incline from the mine to the tipple.

In anthracite mining, belt conveyors have been used at the working place, arranged so that a gang of shovelers distributed along the face shovel onto the belt. For bituminous mines extensive conveyor installations have been proposed and designed. In metal mining, conveyors 6,000 ft. long have been used. Eventually development in loading and transportation may result not only in revolutionary changes from the present "room-and-pillar" method but in the elimination of

the hauling of coal by cars and locomotives and its replacement by some other form of transport with changes also in the methods of cleaning and preparing coal for market.

Summary of Gains from Machine Loading.—Loading is performed at a fraction of the time and cost of hand loading; undercutting can be performed more systematically and efficiently; drilling is done by electric drills; hauling is simplified and trips can be scheduled more definitely and haulage costs reduced; less timber is used; roof falls less readily because of speed of progress and, in longwall work, less working room is required; concentration of workings produces large tonnage in small areas, inspection and supervision being more effective because of the smaller area kept active; cost of track equipment and maintenance is reduced by having fewer rooms or if longwall is provided by having no rooms whatever; cost of drainage is reduced by the smaller active area; cost of ventilation is lowered for similar reasons; cost of plant construction per ton and maintenance is reduced by reason of the larger production per man; waste of coal is lessened by larger recovery; safety—the most important factor in mining—is increased. This is due to concentration of area worked, and closer supervision.

Use Elevating Graders and a Steam Shovel In Large North Dakota Strip Pits*

RARELY does one find elevating graders in use for the removal of overburden in strip pits, but in the valley of the Missouri River, near Garrison, McLean County, at a point almost in the center of the State of North Dakota, Stevens Bros., contractors, of St. Paul, Minn., are using six machines of this type to uncover the lignite over an area of 140 acres.

The deposit is situated one and a half miles south of Garrison, a town of somewhat over 700 inhabitants, on the Soo Line. The property is exceptionally well situated for the method of operation adopted. The coal bed, which is 7 ft. thick, is covered with overburden to a depth of 20 to 30 ft. This consists of 6 to 8 ft. of surface gravel, followed by 3 to 5 ft. of yellow clay, below which is a 1 ft. bed of slack lignite, 3 to 4 ft. of yellow shale, 2 ft. of hard coal and 6 to 10 ft. of blue shale.

The property is cut through by the Garrison Creek

*Abstract from an article in *The Excavating Engineer*.



ROAD GRADER ADAPTED TO COAL STRIPPING

Two elevating graders which dig and convey surface material to wagons driven alongside make a speedy way of loading up overburden, it being sufficiently soft for such a manner of operation.

Valley, which offers a convenient pit for depositing the overburden. The coal to be mined is an excellent, exceptionally hard, smooth and lustrous lignite, similar to cannel coal in texture and appearance. The method of stripping the three pits is, in general, similar. In No. 1 mine the first "swipe" was taken with a tower drag scraper, and the rest of the cover by the methods followed in No. 2 and No. 3 mines. This is about to be described in reference to the last-mentioned of the three pits.

In that mine six elevating graders are used to do the main part of the stripping over the entire surface of the pit, removing, in the course of one series of operations, 1 ft. of overburden. The graders are hauled by six 10-ton tractors and deliver the material which they plow and elevate to from sixty to one-hundred dump wagons, ten or more wagons being allotted to a single grader. The haul averages about 1,000 ft.

The shovel has a 1-yd. dipper and is mounted on caterpillars. It is used for taking the heavy cuts and for removing the sloping banks which are necessarily left by the grader operations. It delivers on an average about 800 cu.yd. per day, loading the material into dump wagons. It also is used for mining the uncovered lignite, although about 50 per cent of this, up to the present, has been mined by hand. Some of the strip material is being dumped back into other parts of the excavated pit.



STRIP PIT OF STEVENS BROS. AT GARRISON, N. D., OPERATED BY SIX ELEVATING LOADERS AND A SHOVEL.

The coal is taken to the tipple, a distance of about 1,000 ft. There it passes over shaker screens and is loaded into box cars by a box car loader. The capacity of the plant is between 500 and 600 cars per month, the coal being sold in North and South Dakota and Minnesota.

Engineers Society of Western Pennsylvania Discusses Thick Freeport Coal

AGAIN the oft discussed question of the identity and peculiarities of the Thick Freeport coal was the cause of disagreement at the bi-monthly meeting of the Mining Section of the Engineers Society of Western Pennsylvania, held in Pittsburgh, Pa., on Oct. 30, after a paper, "Thick Freeport Coal," had been read by John M. Rayburn, in which he characterized the coal as the "double thick Freeport coal." This terminology was attacked by Dr. Thiessen, of the U. S. Bureau of Mines, who first discounted the redundancy in the combining of the words "double" and "thick," and then declared that the coal dealt with in the paper is none other than the Upper Freeport measure.

Dr. Thiessen said his petrographic studies of thin sections of coals from various seams have proved that the composition and structure of coal from every seam changes gradually from bottom to top. Studies of the Thick Freeport seam, he said, bring to light the same gradation which convinces him that this much-debated measure is only an occurrence of the Upper Freeport bed which attained unusual thickness over limited areas in Allegheny County, Pennsylvania. According to Dr. Thiessen, one would expect to find a halt in the gradual change of composition and structure at the contact between the upper and lower branches of the Thick Freeport seam, if the Upper and Lower Freeport seams really came together. In his studies he has found no such break, nor can the fossils found in the Thick Freeport seam be associated with those of the Lower Freeport seam.

Many speculative thoughts were advanced as to the cause of sandstone wants which are so prevalent in areas where the Freeport coal is thick. Mr. Rayburn believes these were laid down following a quiet period because a shell of talc-like clay separates the rock from the coal. Cross-sections of the wants are unlike those of old stream beds and do not grade in the direction of drainage. Their shapes are irregular and their long axes

point in all directions proving that streams were not responsible for the wants.

The Thick Freeport seam has an average thickness of 86 in. and underlies an area of about 73,600 acres. It is estimated that the resources in this seam total 470,000,000 tons. Most of the coal is owned by industrial interests outside of Allegheny County. Coal men in the county failed to appreciate the value of this coal when the field was opened up, and stood aside while people from afar bought up tracts of this coal. It is now being used mainly for byproduct coking.

Prize for Best Battery Locomotive

LIEUTENANT-COLONEL G. R. Lane-Fox, M.P., Secretary for Mines of Great Britain, announces that, in order to encourage the production of a safe and efficient type of electrical storage-battery locomotive for use underground in coal mines and with a view to displacing pit ponies in deep and hot mines, Charles Markham, colliery director, of Ringwood Hall, Chesterfield, has placed at his disposal the sum of £1,000 to be offered as a prize for the best vehicle which fulfills certain specified conditions.

Much discussion has arisen in England relative to the treatment of horses and ponies underground, and the persons interested in legislating animals out of the mines are trying first to find substitutes adapted to British methods of haulage.

J. A. B. Horsley, Electrical Inspector of Mines; Sidney Bates, Institution of Mining Engineers; Roslyn Holiday, Mining Association of Great Britain; Roger Smith, Institution of Electrical Engineers, and Herbert Smith, president of the Miners' Federation of Great Britain, have consented to act as judges and with the co-operation of the Chief Inspector of Mines have drawn up the conditions of the competition.

This will be open to manufacturers of any nationality, Oct. 1, 1923, and will be closed on such date, not less than six calendar months thereafter, as the judges may determine. Working trials in England will subsequently be arranged of any vehicles which are selected for test.

Copies of the conditions of the competition can be obtained on application from A. M. Clegg, Secretary Electrical Storage-Battery Locomotive Competition, Mines Department, Dean Stanley Street, Millbank, Westminster, London, S. W. 1.



LOADERS ARE HAULED BY SIX 10-TON TRACTORS. LIGNITE IN BANK ON RIGHT IS NOT THE SEAM BEING MINED.

New Equipment

Viking Coal-Mine Gathering Pump

A NEW coal-mine pump for gathering purposes now on the market recommends itself by reason of its simplicity, as it has only two moving parts, a large annular gear or rotor and a small internal gear or idler. This pump, known as the Viking, is an application of a design hitherto applied successfully to pumping duties in several industries for handling liquids of high and low viscosity. As is evident from an inspection of Fig. 1, the rotor fits closely inside the casing, through which projects the shaft driven by means of a spur gear and bakelite pinion. The idler revolves upon a hardened

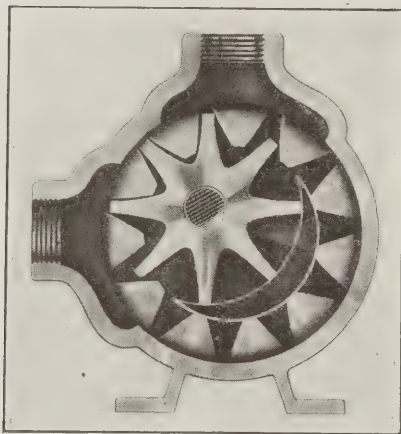


FIG. 1—MINE-PUMP PARTS

Simplicity of construction and ease of repair are very evident. The principle of operation depends upon the trapping of water between the external and internal gear teeth.

ground steel pin on the head of the pump by engaging with the rotor. Aided by the stationary crescent which is integral with the head of the pump, these two gears mesh at a point in the casing midway between the ports to form an absolute barrier. Water sucked in and trapped in the spaces between the teeth of both gears is forced out through the discharge port and there is no churning of the water inside the pump chamber. By reversing the direction of rotation of the gears the suction and discharge ports may be interchanged.

Because it has only two moving parts and is provided with a casing-liner which takes the wear instead of the casing, the efficiency of the pump can be easily

restored to a maximum by replacing one or more of these parts. Where the water is not acid, the casing and the casing-liner may be made of cast iron, but for general water conditions in coal mines bronze is used.

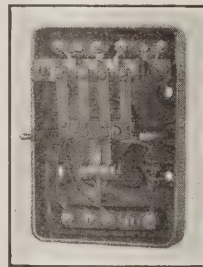
The characteristics of this pump are unlike those of a centrifugal pump; high efficiency is maintained under varying heads. In actual test conducted at the University of Iowa a 2-in. Viking pump at 440 r.p.m. discharged 101 gallons of water per minute against heads varying from 0 to 150 ft. at an average efficiency of 63 per cent.

The Viking pump will pump water and air, though the efficiency, of course, will be diminished depending upon the amount of air taken in with the water. For this reason it requires no attendance aside from that necessitated for starting or stopping, and for periodic replenishment of lubricating oil in the reservoir. Owing to the fact that the pump will pump water and air it needs no priming, which means that it will pick up again though it has lost its water.

The Viking pump is manufactured by the Viking Pump Co., of Cedar Falls, Iowa, which has placed the sole sale rights with Charles A. Saints, of the Power Equipment Co., Oliver Building, Pittsburgh, Pa.

Multiple-Contact Auxiliary Relays for A.-C. and D.-C. Service

AUXILIARY relays for use where it is desired to trip several circuit breakers from one protective relay are manufactured by the Westinghouse Electric & Manufacturing Co. The relays are made in two types, type M for intermittent duty on d.-c. circuits, and type MC for continuous duty on both a.-c. and d.-c.



TYPE M RELAY, COVER REMOVED. Automatic control of tripping circuits is protection of a high degree, as it reduces delays and maintenance costs.

circuits. These relays can be used, for instance, in the differential protection of a generator for tripping at one time the circuit breakers connecting the generator to two busbars and at the same time for opening the field switch. One of the contacts also can be used for energizing a bell alarm circuit. Each contact will make and break 10 amp.

The type M relay is provided with a direct-current electro-magnet suitable for various voltages and is furnished with either four or six contacts. Each contact is mounted on an individual phosphor bronze spring. The internal connections are so arranged that the current for the contacts comes in through one lead to a conducting bar on which all the contact springs are mounted. The four or six contacts are all insulated from each other.

The type MC relay is provided with an electro-magnet suitable for continuous duty on either a.-c. or d.-c. circuits of various voltages and can be furnished with either three or six insulated contacts. When energized the three-contact relay makes two independent circuits and breaks one, and the six-contact relay makes five circuits and breaks one. In the case of the six-contact relay, these circuits are not independent but have a common point. The construction of the contacts is similar to that of those on the type M relay, except that the breaking contacts are silver so as to insure a good contact without an excessive amount of initial tension in the helical spring holding the armature open.

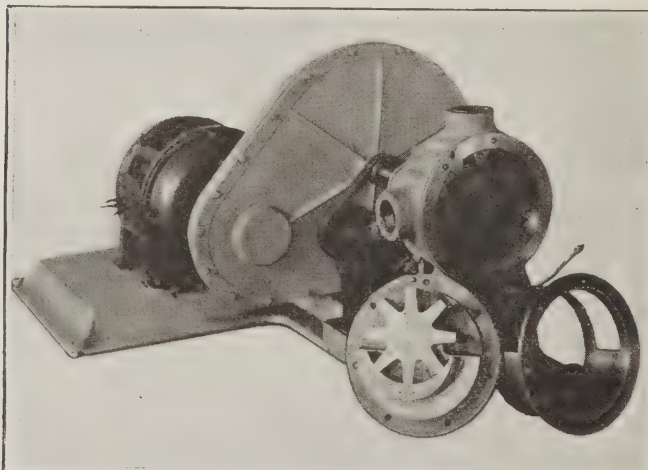
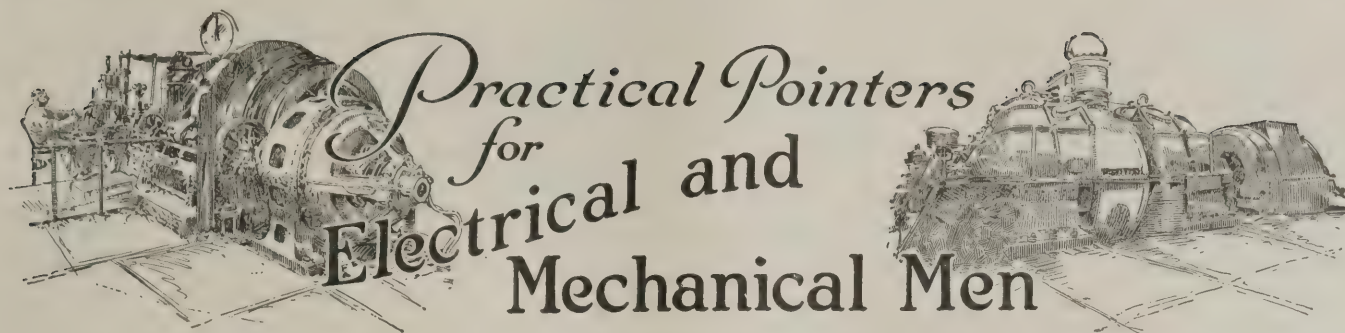


FIG. 2—MOTOR-DRIVEN UNIT

This arrangement gives a simple, compact pumping outfit suitable for easy transportation about the mines.

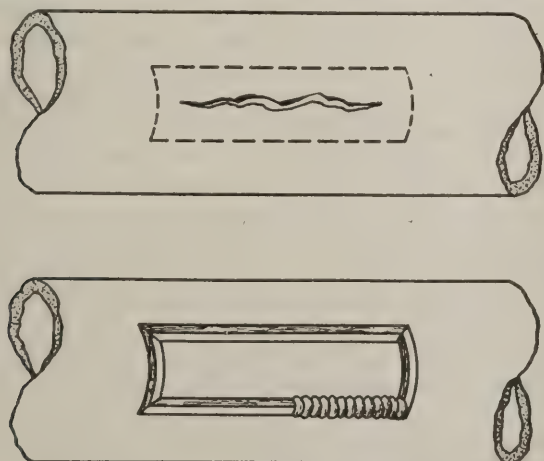


Repairing Ruptured Pipe by Oxyacetylene Welding

A RUPTURED or broken pipe is often the cause of a shutdown and concurrent serious production delays. Hence it is advisable to be prepared for such emergencies by understanding how to handle such a job and having the equipment necessary to its execution at hand when it does happen.

Forces, like so many other things, always follow the lines of least resistance, so that when a break occurs at a certain point in a pipe it usually is feasible to assume that the pipe was weakest at that particular point. In repairing the break by oxyacetylene welding it is well to keep in mind that the metal immediately in the vicinity of the break probably is weak also and for this reason it is best to remove it for a short distance back from the break.

If the break is a longitudinal rupture, as usually is the case, it may be repaired as follows: With an oxyacetylene cutting blowpipe cut away the ruptured and weakened metal, leaving a rectangular hole in the pipe as indicated by the dotted lines in the illustration. Then a rectangular patch of the same thickness and form may be obtained by cutting it from a stock or scrap length of the same size and class of pipe or it may be readily formed from a piece of sheet steel of the same thickness as the pipe wall. If this thickness is $\frac{1}{8}$ in. or more the edges of both the hole and the patch should be beveled to a 45-deg. angle with the cutting blowpipe, so that when the piece is inserted a 90-deg. V-shaped groove will be formed, thus permitting the welder to obtain full penetration of the joint when he butt welds the patch in place. A piece of rod welded to the patch will serve as a handle by which it



WELDING A PATCH ON A PIPE

The upper figure shows the section cut out and the lower figure shows how a patch has been put in position for welding. Chamfered edges permit the weld being made to the full thickness of the metal.

can be held in place during welding and can be readily cut off with the blowpipe after the welding is completed. This type of repair can be fully completed in an hour or two at very small expense and has the important advantage of being permanent.

Protecting Transformers and Motors from Damage Resulting from Single-Phasing

EVERYONE using three-phase alternating current has no doubt on some occasion experienced delays, burnouts and various other troubles due to equipment operating or tending to operate on single phase when something has gone wrong with the power supply, wiring of the control apparatus or the equipment itself.

Aside from being troublesome, single-phasing of a three-phase line may result in considerable damage to transformers and motors. Many types of phase-failure

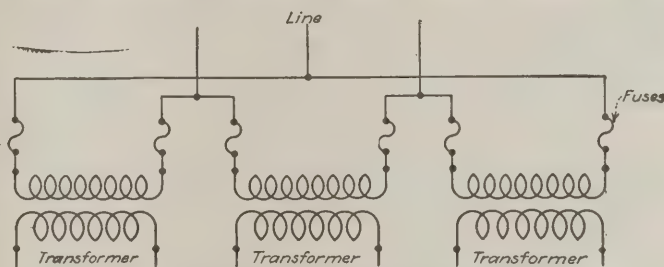


FIG. 1—FUSING A TRANSFORMER BANK

Fuses in the transformer lead wires blow whenever the line wires single-phase.

devices have been placed on the market, but few if any appear to be entirely reliable and give 100 per cent protection. Perhaps these devices are not perfect in functioning because most of them depend for their operation upon voltage coils which under single-phase conditions have enough induced voltage applied upon them from the single operating phase to prevent them from properly functioning.

In the coal industry where many three-phase motors are used to drive fans and pumps, damage to these motors becomes a serious problem. If the fan shuts down for any considerable length of time, serious consequences may result, necessitating the men leaving the mine and the removal of mules. When important pumps shut down the whole pumping station and equipment may be drowned.

Single-phasing of lines feeding transformer banks also is a serious problem because many important motor drives may be connected to a single bank of transformers and single-phasing of the transformer bank immediately places a large amount of equipment in danger of being burned out.

A three-phase induction motor will not start on

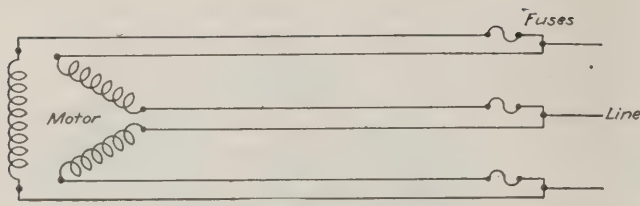


FIG. 2—PROTECTING THE THREE-PHASE MOTOR
This connection gives the best protection against single-phasing.

single-phase but if once started on three phases it will continue to operate if single-phased. This single-phase operation is not always apparent to the operating man and as a consequence one phase winding of the motor carries the total load with greatly increased current and heating until finally it burns out.

For some time our company has been very successful in avoiding damage to equipment by fusing its transformers as shown in Fig. 1. It will be noticed that the fuses are placed in the transformer lead wires, the idea being that these fuses are of much less capacity than those required in fusing the live wires for a given load. The result is that when single-phasing occurs the fuses being placed in the transformer leads and being very nearly the proper current capacity of the transformers they quickly blow out when the additional load resulting from single-phasing comes upon any transformer.

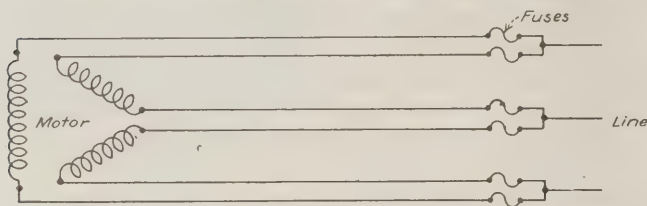


FIG. 3—ANOTHER CONNECTION FOR THE THREE-PHASE INDUCTION MOTOR

The scheme of connection here is not so good as that shown in Fig. 2 because a ground in the motor frame may blow the fuse on one end of the phase winding and still leave the connection intact on the other. Thus the motor would have a circuit to ground and be dangerous.

Obviously the same method of protection may be applied to induction motors, but in order to do this it is necessary to bring out the end wires of each phase. If this is done it is possible to use several different methods of protection by the use of either fuses or relays. Fig. 2 shows how an induction motor might best be protected. Fig. 3 shows another connection for the protection of an induction motor. Fig. 4 shows how this protection may be applied to a motor starter.

Some manufacturers design their induction motors so that they may be connected to operate on two or more different voltages. Such motors may have the

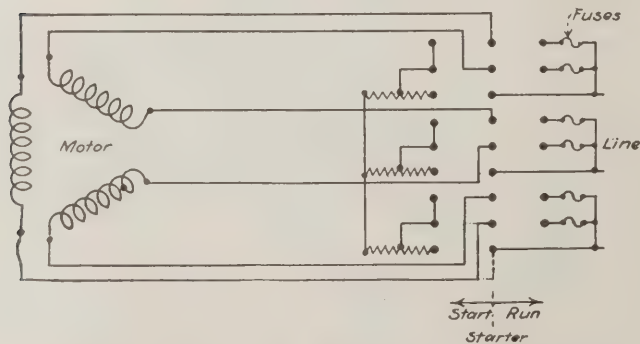


FIG. 4—FUSING AND PROTECTING THE MOTOR AND STARTER

Note that this connection is similar to that in Fig. 2 and that it protects against single-phasing in the motor and starter.

proper phase wires brought out to a terminal board for the connections shown in the figures and thus lend themselves readily to the above method of protection; but there are many other motors on which this is not possible. Therefore it would seem that the manufacturer should be required to bring out the necessary phase wires so as to permit the adoption of the above scheme of protection.

J. F. MCWILLIAMS,
Cresson, Pa.
Electrical Engineer,
Pennsylvania Coal & Coke Corporation.

Asks Suggestions for Recovering Timber In Anthracite Mines

WHILE making an inspection tour of one colliery of a large coal mining company in the anthracite region I was much impressed by the large amount of timber used, especially in robbing areas where the final recovery of coal is taking place. In many areas in this mine the roof is supported upon a forest of props and cogs which often constitute a menace to the further reclaiming of pillars left for roof support. When the roof is supported upon timbers, no cave takes place, but much of the resulting roof pressure is thrown upon the coal pillars, making the work of pillar mining difficult and oftentimes very dangerous.

I believe that by digging around the butts of the props, much timber could be profitably and safely recovered by means of a prop puller. There also are other cases where with a miner taking back top coal, the props could be economically and safely reclaimed. Let me illustrate. Some of our beds of coal lie on a pitch of about 25 deg. As the chamber advances we take the mining bench, which on an average runs about 7 ft. thick. Above this mining bench we have a parting rock, which is locally known as big slate. This slate oftentimes is found to be about 3 ft. thick, and usually is propped up as the chamber advances.

When the chamber has reached its limit we bring back the remainder of the vein as top coal, blasting down first of all the 3 ft. of big slate. This big slate and débris gather around the props, leaving only about 3 ft. of the upper end of the prop exposed. The top coal left is sound and solid and forms a splendid roof. To recover the props the miner would have to clean about 4 ft. of rock from about the foot of the props. It seems to me that under such conditions a prop puller would be ideal as a means of saving much valuable timber. This practice of reclaiming timber is extensively used in mining in Europe and in many well-managed mines in the bituminous regions of the United States. The Anthracite Mine Law, Rule 55, states, "No person or persons working in a coal mine or colliery shall cut out any props or timbers while the same are in position to support the roof or sides. When it becomes necessary to remove any of the said props or timbers for the purpose of mining coal that may be supported by the same, to dislodge any of the said props or timbers it must be done by blasting."

In view of the fact that the Governor of this state is so keen on forest conservation and timber preservation, would it not be well to have the mining laws amended so that they will meet the conditions of modern mining?

Perhaps many readers of *Coal Age* would be good enough to give us the benefit of their experience along the lines suggested above.

ANTHRACITE MINING ENGINEER.



Problems of Operating Men

Edited by
James T. Beard



Harmony and Co-operation Needed Among Mine Officials

Safety-First Type of Men Needed—Strict Discipline Required to Avoid Accidents—Miners Will Follow Foremen They Learn to Trust

SPEAKING of reducing the number of accidents in mines to which so many writers in *Coal Age* have referred and which is of the greatest interest to the coal industry, kindly permit me to offer a few suggestions that I believe are essential to the accomplishment of this purpose. No great aim or purpose can be attained, in any undertaking, without there is team work on the part of every one concerned.

Coal mining, above all other industries, needs men of the safety-first type placed in control of its operations. By this I mean, first, that the superintendent should be a man of good practical experience and judgment. In no way will his ability be manifested more strongly than in the selection of his assistant foremen. Without exception, they should be men who always put safety-first before everything else.

A superintendent should never be satisfied, unless the strictest discipline is maintained in every branch of the work and particularly underground. Prompt obedience to orders should be demanded of every one and violation of the rules should always be punished by a suitable penalty.

MANY SAFETY RULES SOON BECOME DEAD LETTERS

A penalty attached to a rule commands respect for its observance. Otherwise, many safety rules become dead letters to be followed or disregarded according to the whim of the worker. The result is a laxity of discipline that, sooner or later, will bring accidents.

Where it appears that the superintendent, mine foremen and assistants all work in harmony and have the same desire to make safety the first consideration, one is sure to find good results. The mine will have fewer accidents, because the same spirit pervades throughout the entire organization. Almost without exception coal miners will follow a good example set by a foreman whom they have learned to trust.

One of the most frequent causes of accidents in mines is the attempt to get cheap coal, which generally means a flagrant disregard of safety rules. Too often the mining laws are violated by both foremen and men, who take their own chances in not living up to the requirements of the law. In most cases, our mining laws are good and were enacted to safeguard both lives and property.

When a foreman neglects doing things that he knows require attention and puts aside such work for a few days, in order to keep down the showing on the cost-sheet, he takes chances knowingly and assumes a grave

risk. Should he succeed and no accident happen as a result, he will be more careless a second time. This will go on, until he finally meets disaster and an accident will occur that may cost many times the amount he managed to save by his departure from the rules.

It is at such times that a foreman will try to shift the responsibility for his own acts by attempting to fix the blame for the accident on one or more workers, who were simply carrying out his orders. It is my belief that if everybody, from the state mine inspector down to the trapperboy in the mine, would do his duty faithfully, and strive, in every possible way, to make the mine safe there would be fewer accidents and many lives would be saved.

MINER.

Duquoin, Ill.

Dewatering a Wet Hole in Blasting

Water accumulated in a hole drilled for blasting removed by simple device—Its use saves the miner both time and labor.

AMONG the many good things I have found in *Coal Age*, explaining ways and means of overcoming difficulties and saving time and labor, I have seen no mention of a simple device that came to my notice not long since.

In working for a large anthracite coal company and when visiting the various collieries on the property it has frequently been my good fortune to observe different methods of doing the same thing. Some ingenious mind often invents a contrivance that permits the mine worker to perform his duties in a more efficient and safe manner.

On one of my recent trips, I came upon a miner using an ingenious device of his own invention, designed for the purpose of dewatering a wet hole before charging the same for blasting the coal. It was in a place where the coal was being worked toward the outcrop and, naturally, there was much trouble caused by the seepage of water into the hole. Unless this water was removed immediately before charging, the shot would not do effective work and often a misfire would result.

SOAP AND OIL FAIL TO KEEP CARTRIDGE DRY

Different schemes had been used by the miners to overcome this difficulty. Some would soap their cartridges and others would oil them to prevent the water from coming in contact with the powder. These attempts would often prove fruitless and the cartridge would be drowned in the wet hole before it could be fired. It is unnecessary to say that such a condition entailed extra work and expense for the miner. Holes drilled to the dip, of course, proved the most troublesome.

In the instance I mention, the miner had taken a pipe of a somewhat smaller diameter than that of the hole drilled in the coal. In the end of this pipe, which

was a little longer than the hole, he had arranged a check valve, consisting of a disk of leather reinforced with an iron washer of a little less diameter. By drilling two small holes close to the end of the pipe and inserting a nail, he had succeeded in holding this valve in place so that the pipe formed a hand-pump.

HOLE QUICKLY CHARGED AND FIRED

Having drilled and cleaned the hole with his scraper, the miner would soap his cartridge and prepare his tamping in paper bags, or cartridges similar to that holding the powder. He did this to hasten the charging and tamping of the hole after pumping out the water. Then, by working the pipe with the valve in the bottom and plunging it quickly back and forth in the hole, he was able to extract practically all the water that had accumulated therein.

This being done, the charge was quickly inserted, the powder cartridge being followed by the tamping, which was rammed into the hole and the fuse ignited and the shot fired. There are doubtless different ways of fixing the check valve in the end of the pipe so that it will work effectively. One way would be to form a valve seat, by inserting an iron ring in the end of the pipe and placing the leather washer above it, confining its action by the nail inserted through the holes drilled in the pipe.

E. P. THOMAS.

Kingston, Pa.

Working Three Contiguous Seams of Coal

Large amount of waste material to be handled makes the economic working of the coal a difficult proposition—Room-and-pillar system of working preferred.

WITH much interest, I have followed the question of working three seams of coal separated by thick partings of slate and shale, as discussed by writers in recent issues of *Coal Age*. My interest was much increased by reason of the fact that the conditions described correspond very closely to what I encountered some years ago in my own experience.

In that case the rooms were driven up in the lower seam, the 4 ft. of top slate dropped and the 36 in. of coal above it allowed to fall. It was surprising to see the good results obtained. A large quantity of nice coal was mined in this way with scarcely any expense except for loading, which was easily done.

By arranging a chute of common boards placed at the top of the fallen slate and extending into the mine car, we were able to load practically all of the top coal with little effort. The coal was loosened with picks and handled mostly with our hands, scarcely ever requiring the use of a shovel.

In the question under discussion, it is desired to obtain the largest percentage of coal at a minimum cost per ton. Speaking generally, it is my belief that no longwall method of mining can be successfully applied to the working of these three seams as there is too much waste material to be handled. I doubt very much if the coal can be loaded into the mine cars, today, for less than \$10 per ton by employing the longwall method.

On the other hand, the three seams mentioned form a good proposition, if care is taken to adopt a suitable method of working out the coal. Like many other undertakings, however, the mistake can be easily made of choosing a wrong method, which will eventually cause much trouble and increase the cost of production. The result is a "gouging system" of mining.

It is my earnest hope that these remarks will not be taken as personally criticizing what has been said. My aim and desire is only that we may come to a better understanding of ways and means of mining coal, and be able to secure a little profit, while paying a living wage to the miner and marketing the coal at a fair price to the consumer.

In line with my own experience and assuming this to be a drift mine, I would suggest developing the property by driving the main headings two, three or four abreast, as desired, in the two lower seams. From these main headings I would drive double-entry butt headings to the right and left, on 400-ft. centers, turning rooms or chambers off these, on 24-ft. centers.

DETAILED PLAN OF WORKING

Judging from the description given, my plan would be to drive all entries and chambers 12 ft. wide, which would leave 12-ft.-pillars between the chambers. Probably the best plan of mining would be to shoot out the bottom coal a distance of 4 or 5 ft., first, and then shoot down the slate parting and the middle seam of coal. The coal should be loaded out first, after which the slate should be sent out of the mine to the slate dump.

If timbering is found necessary to support the upper parting, I would cut hitches in the coal seam and use short posts to carry the crossbars. It is my opinion, however, that little timbering will be necessary in this case, as the parting is a hard sandy shale varying from 4 to 6 ft. in thickness.

Now, drive four chambers to the limit and cut through the 12-ft. pillars, at that point, taking out the middle seam only and leaving the lower parting and the 12 in. of bottom coal in place. In the same manner, continue to draw back the pillars in these four chambers, say a distance of from 20 to 30 ft. Then, start a fall of the top parting, at the head of the chambers. It may be found necessary to load out a car or two of slate, in order to reach and mine the top seam.

My belief is that this top seam will fall easily and the miner will have the advantage of being able to load the coal of that seam directly into the car. The bottom coal and lower parting left in the pillars will now form a platform, or hogback, from which the top coal can be readily shoveled or handled into the car standing at the side of the pillar.

I would suggest using cars holding at least 3 tons. In case the top sandstone should break, it may be advisable to use plenty of timbers and leave a barrier pillar, between these four chambers and the next set, to control the break. The next four chambers are to be mined in the same manner as the first. In my opinion, this plan will afford a maximum extraction of coal, in these three seams, at a minimum cost of production.

Parnassus, Pa.

C. W. ATKINS.

Formula for Calculating Limit of Fall in Siphoning Practice

Calling attention to error apparent in development of formula giving limit of fall in a siphon line—Siphon could not operate—Discharge end higher than intake.

KINDLY permit me, as one of the interested readers of *Coal Age*, to draw attention to an evident error in the development of the formula for finding the limit of fall h_1 in a siphon line having a given rise or lift h , the lengths of the suction and discharge pipes being l and l_1 , respectively, and the diameter of pipe uniform.

The formula expressing the equal effective heads in the two branches of the pipe, as given in *Coal Age*, Oct. 4, p. 521, is correct.

$$\frac{34 - h}{l} = \frac{h_1 - 34}{l_1}$$

Transposed, however, this gives for the limit of fall,

$$h_1 = \frac{l_1(34 - h)}{l} + 34$$

From this last equation it appears the atmospheric head, 34 ft. at sea level, must be added to the other term, instead of being subtracted, as appears on page 521 of that issue. In the application of this formula to the concrete case given on page 522, we find for the limit of fall in a siphon having a lift $h = 24$ ft. and

the lengths of the two respective branches of the pipe being $l = 100$ ft. and $l_1 = 500$ ft.

$$h_1 = \frac{500}{100} (34 - 24) + 34 = 84 \text{ ft.}$$

The result found by making the last term minus instead of plus gave the limit of fall as only 16 ft., which would make the discharge at a higher elevation than the supply basin to be drained.

MANAGING DIRECTOR,

Coal Valley, Alta., Canada. Coal Valley Mining Co.

[We are glad to have attention called to this error in the development of the siphon formula on page 521 of the Oct. 4 issue. The limit of fall in the case assumed is 84 ft. as shown by correspondent.—EDITOR.]

Inquiries Of General Interest

Classification of Mine Having Two Openings

Increased Development Calls for Second Opening—New Shaft Operated as Separate Mine—Old Slope Reopened How Legally Classified?

AN ANSWER to the following questions through the columns of *Coal Age* will be greatly appreciated by a subscriber and constant reader:

A certain mine has been developed to a point where it became advisable to sink a shaft. At first, the purpose in view was merely to secure the better ventilation of the extended workings. Later, however, on going carefully over the situation it was decided to equip this opening as a hoisting shaft, as its location favored the shipment of coal on another railroad. The old fan proving inadequate for the ventilation of the entire workings, a new fan was installed at the shaft opening and the old fan shut down for the time. The slope was virtually abandoned, at least as far as hoisting operations were concerned, being used only to haul supplies and refuse in and out of the mine and as a manway for men going to and from their work. An additional shaft has since been sunk and provided with an extra hoist to handle slate and men.

REOPENING THE OLD SLOPE AS A NEW MINE

In the course of time, however, the old slope was again put into operation and coal is now hoisted and dumped over a tippie of its own, the coal being shipped on a different railroad from the one previously mentioned. The new shaft and the old slope are $3\frac{1}{2}$ miles apart. All entries leading from the slope to the shaft have been closed and sealed, except one that has been kept open for use as a manway and supply road. The old fan has again been put in operation to ventilate the workings on the slope side of the mine.

The question I want to ask is, Would this operation be legally classed as a single mine, the two openings being operated under the one management; or would the classification be two separate mines and require two foremen? As much interest has been attracted to

the matter in this district, I want to ask for a full explanation stating the reasons for the answer given.

_____, Pa.

INQUIRER.

In regard to the question of the two operations being considered as one or whether they would be classified as two separate mines, the fact that they are under the same management and control is of no particular consequence. As long as operations underground were confined to the new shaft, and the old slope was merely used for hauling supplies and refuse in and out of the mine, the entire development comprised but a single mine, ventilated by the new fan and hoisting coal at the new shaft. The situation would naturally call for but a single foreman, who would have charge of the entire mine.

On the other hand, when it was decided to reopen the old slope, start the old fan and begin hoisting operations at the slope, the management was virtually starting a second operation, which would naturally be classified as a separate mine. As is well known, the same company will frequently operate a number of mines, either adjoining each other, or in widely separate localities or districts. But each operation is then known and classified as a separate mine.

In the instance cited by the inquirer, the fact that the two openings are ventilated by separate fans, producing two independent circulations, and hoisting and loading coal at separate tipples, would seem to justify the employment of two mine foremen, each having jurisdiction over his own workings and held responsible for the output of coal, the safety of the men and the safe and healthful ventilation of the mine. The fact that there is maintained a manway or opening connecting the two workings would, in most cases, be considered as fulfilling the requirements of the law in regard to second openings, as furnishing a means of escape for the men in case of accident.

Capacity of Pipe to Hold Water

Approximate rule for estimating the capacity of pipes of different diameters—Exact method of calculation explained.

LOOKING through an old textbook a few days ago, I came upon a problem asking for the capacity of a 6-in. pipe, 12 ft. long, to hold water. The solution of the problem, as given in the textbook was based on the statement that a pipe 6 in. in diameter would hold a quart of water in each inch of its length. The rule seemed very simple and I was not long in estimating that for a length of 12 ft. (144 in.), the pipe would

hold 144 qt., or $144 \div 4 = 36$ gal. This seemed to me a very large quantity of water and I am wondering if the rule was correct. From one of the problems given in *Coal Age*, I attempted to figure the capacity of this pipe, but could not get the same result. As problems of this kind occur frequently in coal mining, I would much appreciate having the calculation explained.

Nokomis, Ill.

STUDENT.

The statement of the textbook, as quoted by this inquirer, should read a pint of water to each inch of length of a 6-in. pipe, which would be approximately correct and would make the capacity of a 12-ft. length of pipe, 6 in. in diameter, 144 pt., or $144 \div 8 = 18$ gal.

To find the exact number of gallons a pipe of any given diameter will hold, multiply the square of the diameter, expressed in inches, by 0.7854. Then multiply this product by the length of the pipe, in inches, and divide the result by 231, the cubic inches in a gallon.

Examination Questions Answered

Anthracite Foremen's Examination Districts 1 and 2, 1923

(Selected Questions)

QUESTION—What is meant by the terms "mixture" and "explosive mixture"? Explain fully.

ANSWER—A common mixture is one where two substances of different kinds are mingled intimately in any proportion. In other words, the mixture is simply mechanical, in distinction from a chemical mixture, in which the atoms of the two substances unite in definite proportions and heat is either evolved or absorbed, in the action that takes place. In a mechanical mixture there is no change of heat.

An explosive mixture is one capable of developing an explosion when heat is applied or other means used to produce that result. Methane and air mixed in certain proportions form an explosive mixture known as "fire-damp."

QUESTION—What great mine disaster was responsible for the Act of 1870, increasing safety and protecting the lives and health of those employed in mines?

ANSWER—The Avondale disaster of Sept. 6, 1869, resulting in the loss of 137 lives, so aroused public opinion regarding the need of adequate mining laws that the Legislature, the following year, enacted what was then known as the "Ventilation Act," which was the embodiment of the present mining law in Pennsylvania.

QUESTION—What three natural laws govern the flow of air in a mine?

ANSWER—The three laws that establish the relation between the pressure, velocity, quantity and power of a circulation, are the following: (1) Pressure, in mine ventilation, varies as the square of the velocity of the air current. (2) The power producing a circulation varies as the cube of the velocity of the air current. (3) For a constant power on the air, the quantity of air in circulation varies inversely as the pressure.

QUESTION—What effect has a regulator on the mine resistance?

ANSWER—The placing of a regulator in a mine airway has practically the same effect as lengthening the airway. The regulator forms an obstruction to the flow of air, which increases the resistance of that airway. The result is an increased mine resistance and a consequent decrease in the quantity of air circulated by the same power.

QUESTION—State the conditions in a mine where it is necessary to provide a separate travelingway.

ANSWER—The anthracite mine law (Art. 4, Sec. 4) requires a separate travelingway to be provided in a slope mine where the inclination is 15 deg. or less. Separate travelingways should also be provided whenever men are compelled to use a main haulage road when going to or from their work.

QUESTION—How are air measurements made and by whom? How are they to be recorded?

ANSWER—The anthracite law (Art. 10, Sec. 15) requires the inside foreman, or his assistant, to measure the air with an anemometer or other efficient instrument, at the inlet and outlet airways and at or near the face of each gangway and at the nearest cross-heading to the faces of the inside and the outside chambers or breasts where men are employed. These measurements must be made once every week and entered in the colliery report book.

QUESTION—How many cubic feet of air are passing in a gangway 10 ft. high on one side, 6 ft. high on the other side and 12 ft. wide at the bottom, the velocity being 300 ft. per min.?

ANSWER—Taking the average height of the airway as $\frac{1}{2}(10 + 6) = 8$ ft., the sectional area is $8 \times 12 = 96$ sq.ft. Then, assuming an average velocity of 300 ft. per min., the quantity of air in circulation is $300 \times 96 = 28,800$ cu.ft. per min.

QUESTION—What is meant by the term "diffusion of gases"? Explain fully.

ANSWER—The term relates to that property of air and gases having different densities and in contact with each other, by which their molecules intermingle. The molecules being in a constant state of vibration and the amplitude of vibration depending largely on the density of the gas, the result is a migration of the molecules causing the gases to intermix, which action is termed "diffusion."

QUESTION—How does the strength of props vary as to their lengths and diameters?

ANSWER—The strength of a mine prop, aside from the quality and kind of wood, depends on the ratio of the diameter to length of post being such that the timber will present equal resistance to crushing and bending. For average mine timber, this ratio is 1:12. In other words, the diameter of the post, in inches, should be equal to its length in feet. When the length of a post exceeds 12 times its diameter, the post will fail by bending if the load is excessive. Again, when the length is less than 12 times the diameter the post will crush before it will bend. For two posts of the same quality and kind of timber, their relative strength, in respect to bending, varies as the ratio of the fourth power of the diameters to the square of the lengths. Or, the relative strength, in respect to crushing varies as the square of the diameters. It is always a question of whether the post will fail by bending or by crushing, which depends on the length being greater or less than 12 times the diameter.

Coal Commission's Report On Anthracite Profits

Recommends Differential Taxation, Publicity of Accounts and Use of Hard-Coal Substitutes

Marked Variation in Costs Makes It Difficult to Supply Definite Information on Question of Profits—Average Would Be Misleading Because of Extreme Spread—Carrying Charges on Excess Coal-Land Reserves a Burden

Recommending that anthracite operators who have the good fortune to produce coal at a low price and realize a profit above the average should be subject to a special tax; that the federal government should be given power to require complete publicity of accounts, and that consumers of anthracite turn to substitutes for self-protection, the U. S. Coal Commission released on Nov. 10 its report on Investments and Profits in Anthracite Mining.

The Commission says that the man on the street wants a simple answer to the questions, "How much do anthracite operators make?" and adds that it would no doubt satisfy him to be told that the profit is so much per ton and yields the operator such and such a per cent return on his investment. "But such a simple answer cannot be truthfully given, however much it may be demanded by the consumer. It cannot be given because the business of mining anthracite is one of markedly varying cost and because therefore some operators pay very large dividends and others very small dividends, or sometimes no dividends at all."

Averages are misleading under such conditions and there is no single figure that represents either the profit per ton or the per cent return on the investment, and those who wish to find out the profits of anthracite mining must, according to the Commission, be prepared to consider extremes as well as the average and to weigh the evidence as derived from one method of valuation against the evidence from another, for the Commission has found no shorter way.

"Some light on profits is thrown by the margin per ton. The margin is the difference between the cost of production and the average sales realization f.o.b. mine on all coal sold. The margin is not the same as profit. From it must first be deducted federal taxes and interest on borrowed money before the amount available for the owners of the business is known. Even then it cannot be translated into terms of per cent return on the investment until the investment per ton is known, and as the investment of different operators varies, so the margin necessary to profitable operation varies from operator to operator.

"The margins of anthracite operators vary within the widest limits. In the year 1921 there were three operators who reported to the Commission a margin in excess of \$1.50 a ton. One of these three operators was a railroad coal company and two were small independent producers. To-

TABLE II—RANGE IN MARGIN PER TON, JANUARY TO MARCH, 1923
(Fresh-mined coal, all companies reporting)

	Number of Companies	Production (Gross Tons)	Per Cent of Output	Cumulative Per Cent
Companies reporting cost in excess of sales realization	1	64,000	0.4	0.4
Companies reporting a margin of:				
\$0.01—0.04.....	1			0.4
0.05—0.09.....	1			0.4
0.10—0.14.....	1			0.4
0.15—0.19.....	1			0.4
0.20—0.29.....	3	2,716,000	15.1	15.5
0.30—0.39.....	1			15.5
0.40—0.49.....	1	29,000	0.2	15.7
0.50—0.59.....	1	15,000	0.1	15.8
0.60—0.69.....	2	43,000	0.2	16.0
0.70—0.79.....	5	1,220,000	6.8	22.8
0.80—0.89.....	1	263,000	1.5	24.3
0.90—0.99.....	4	4,228,000	23.4	47.7
1.00—1.24.....	4	2,012,000	11.2	58.9
1.25—1.49.....	8	4,141,000	22.8	81.7
1.50—1.74.....	4	358,000	2.0	83.7
1.75—1.99.....	8	602,000	3.3	87.0
2.00—2.49.....	10	1,733,000	9.6	96.6
2.50—2.99.....	8	347,000	1.9	98.5
3.00 and over.....	6	278,000	1.5	100.0
Total.....	66	18,049,000	100.0	

gether they mined 7.6 per cent of the total output. But in the same year there were eight other operators who reported to the Commission a loss of over \$1.50 per ton. These eight operators were all very small producers, and together they contributed but 1 per cent of the total output. They were independents who had high costs and who could not get satisfactory prices under the market conditions of that year.

"In between these extremes were ranged the remainder of the 74 companies reporting, as shown in Table I.

"It is pointed out that the size of margin necessary to profitable operation varies with the investment of the operator. One company may have heavy investments in machinery and equipment and thus show a relatively low labor cost, while another may have a small investment and a high labor cost. In the case of the first company the margin must be larger in order to give an equal rate of remuneration for the larger amount of invested capital per ton of product. Again, there are anthracite-mining properties affiliated with the railroads that are habitually run at a virtual loss in order to furnish traffic to the carrier and there are other companies subsidiary to a larger interest in which the cost of production is burdened with carrying charges on a large reserve of coal lands which is really held for the benefit of the parent company. But with due allowance for these other factors, it is still true that anthracite mining is characteristically a business of differential advantage and widely varying profits."

This fact has an important bearing on any proposal to reduce the cost to the consumer by reducing the profits of the operator. The margins of the high-profit companies, says the Commission, are clearly larger than is necessary to return an adequate income on the average investment, but the effect of any cut in the margin must be gaged not only with respect to the average operator or the high-profit operator but also with respect to the low-profit operator.

Lay Costly Mining Methods to Lack of Competition.—The Commission is aware that the costs of many operators are burdened with carrying charges on coal lands that will not be developed for generations and that the absence of competition in the anthracite region has encouraged the opening

TABLE I—RANGE IN MARGIN PER TON, 1921

Fresh-mined coal, all companies reporting representing 99 per cent of the commercial tonnage)

	Number of Companies	Production (Gross Tons)	Per Cent of Output	Cumulative Per Cent
Companies reporting cost in excess of sales realization	39	4,933,000	7.2	7.2
Companies reporting a margin of:				
\$0.01—0.04.....	2	3,460,000	5.1	12.3
0.05—0.09.....	1	190,000	0.3	12.6
0.10—0.14.....	1	67,000	0.1	12.7
0.15—0.19.....	2	239,000	0.4	13.1
0.20—0.29.....	6	1,918,000	2.8	15.9
0.30—0.39.....	2	2,453,000	3.6	19.5
0.40—0.49.....	5	14,529,000	21.3	40.8
0.50—0.59.....	4	16,272,000	23.9	64.7
0.60—0.69.....	1	98,000	0.1	64.8
0.70—0.79.....	3	6,954,000	10.2	75.0
0.80—0.89.....	3	11,032,000	16.2	91.2
0.90—0.99.....	2	839,000	1.2	92.4
1.00—1.24.....	1			92.4
1.25—1.49.....	1			92.4
1.50—1.74.....	3	5,136,000	7.6	100.0
Total.....	74	68,120,000	100.0	

TABLE III—CHANGE IN MARGIN PER TON OF TEN RAILROAD COAL COMPANIES, 1913-1923

(Margin for 1919 to 1923 adjusted so as to be comparable throughout period)

Period	Margin (Adjusted)	Period	Margin (Adjusted)
1913.....	\$0.33	1920.....	\$0.56
1914.....	0.39	1921.....	0.85
1915.....	0.33	1922 year.....	Loss 0.10
1916.....	0.41	1922 first quarter.....	0.59
1917.....	0.63	1922 4th quarter.....	1.15
1918.....	0.41	1923 1st quarter.....	1.18
1919.....	0.61		

of properties which could not be operated under more active competition, and has further made it to the interest of the producer to extract a larger percentage of the coal in the ground than was formerly the practice. It is conceivable, if not probable, that if faced by the absolute necessity of reducing costs, the industry would find means to mine coal more cheaply, but this result could not be accomplished quickly and would almost certainly entail waste of the resources.

This report of the Commission presents a summary of its investigations on margins as well as on profits, the signed report being accompanied by special staff reports on each of these subjects, both prepared under the general direction of David L. Wing. In its discussion of margins the Commission points out that the average margin is not in itself a safe measure of profit, although changes in margins show whether profits are increasing or decreasing.

"Compared to the margins before the war, present-day margins show a large increase. In the four years before the United States entered the war the average margin for the railroad coal companies was 37c. a ton. In 1919 the average margin (adjusted—see table III) was 61c. In 1920 and 1921 for these 10 companies it was 56c. and 85c., respectively, the variations in these years representing in part changes in price, in part the movement of steam sizes in and out of storage to the market. The average for 1921 was thus more than twice as great as the pre-war average.

"During the five-months' strike of 1922 the companies lost money heavily and operations for the year as a whole showed a loss. After the resumption of mining, however, margins rose to the highest point of record in the ten years. For the last quarter of 1922 the average of the railroad coal companies was \$1.15, and in the first quarter of 1923 it was \$1.18, or more than three times the pre-war average. The large margins of late 1922 and early 1923 were due in part to the active demand for steam sizes and in part to the fact that the railroad coal companies advanced the price of domestic coal slightly.

"The increase in margin over the pre-war years is in part attributable to federal income and excess-profit taxes, which are included in the margin and which before 1917 were negligible in amount. The average amount of federal taxes per ton of all coal produced by the railroad coal companies was found to be approximately 11c. Even after deducting federal taxes therefore the margin shows a large increase over pre-war years."

The evidence of the margin as to profits of anthracite operators is summed up by the Commission as follows:

"There is normally a wide variation in margins between the low-cost and the high-cost operators. Some operators make very large margins and others very small margins. Still others frequently have to sell below cost.

"Present margins are much larger than pre-war, even allowing for federal taxes. The margin in the six months

following the strike was the highest on record, partly because of market conditions which are not expected to be permanent, partly because of an advance in the circular price.

"Labor costs and other costs also show a large increase over pre-war figures, but the increase in price has been such that the operators' margin since the war has been about the same percentage of the sales realization as before."

Per Cent Return on Investment.—The Commission found itself confronted with conflicting claims as to the basis upon which the rate of income should be reckoned, and it outlines the theories, without, however, committing itself to any one. One claim is that the current market value is the proper measure of value. Another that the income should be reckoned upon original cost; another that it should be determined with reference to cost of reproduction.

The Commission "has deemed itself justified in finding" as a fact that the mining and transportation of coal in interstate commerce impresses that commodity with a public use. The problem of valuing anthracite therefore while not strictly analogous, bears some resemblance to the problem of valuing a public utility for the purpose of regulating rates. It will be found that the courts have laid down a single formula for ascertaining value. Each case seems to rest upon its own merits and the courts have considered original cost, stock and bond issues, and the cost of reproduction and have been governed in their decisions sometimes by one element and sometimes by another. As the Commission is not called upon to determine judicially the valuation of these properties, it does not deem it prudent to lay down a rule for making such valuation. The Commission has rather deemed it to be its duty to set forth for the use of Congress and the public all the information on these subjects which it has been able to obtain."

In order to arrive at an estimate of market values, the Commission secured without compensation the services of a committee of engineers who, it says, "through technical training and many years of experience as experts in the appraisal of coal-mining properties, were especially qualified.

"The method employed is that adopted by engineering experts in valuation of mining properties; that is, the basis being the present and the estimated future earnings. The objection to the valuation of properties in the anthracite field is that this basis is that of earnings derived from inherent monopolistic conditions, the uncertainty as to future mining costs and future realization margins—two factors highly speculative. Nevertheless, this method of valuation is that which is employed by the experts representing capitalists desirous of investing in anthracite mining properties, and is the accepted practice in such transactions involving value of particular tracts.

"The committee's estimate, including both physical property and working capital, also covers the value of lands not owned by operating companies. The committee's valuation is as follows:

Present valuation of lands now operated, including development, plant and equipment, and working capital.....	\$843,500,000
Present valuation of reserve tonnage.....	146,400,000
Total present valuation.....	\$989,900,000

"The Commission says 'that the current market value determined on this basis is not a satisfactory base against which to determine whether or not the anthracite companies have been using their monopoly powers to extract unreasonable profits,' and points out that 'if the estimate of the engineers correctly appraises the present market value of this industry it also measures the increment in value to the owners of the land.'"

Book values of the companies examined by the Commission's field accountants "after deducting outside investments, amount to \$520,000,000 with working capital included (counting the memorandum accounts of the Pennsylvania Coal Co., and Hillside Coal & Iron Co. as a part of the book value). The companies examined produced 85 per cent of the output and own in fee 81 per cent of the coal. If they represent a like percentage of the total investment in anthracite mining, the book value would be in the neigh-

TABLE IV—DIVISION OF PURCHASER'S DOLLAR F.O.B. MINE BETWEEN MARGIN AND COST
(Thirteen companies, adjusted margins)

Period	Cents of net sales realization dollar—			
	Labor Cost	Supplies	General Expense	Margin
1913-16 (average).....	61.3	12.3	13.4	13.0
1919.....	64.4	14.6	9.7	11.3
1920.....	65.2	14.5	11.0	9.3
1921.....	63.0	13.7	10.8	12.5
1922 year.....	71.1	14.0	17.0	2.1 loss
1922 1st quarter.....	66.2	12.6	12.6	8.6
1922 4th quarter.....	59.9	10.8	11.2	18.1
1923 January to March.....	59.5	10.8	11.5	18.2

TABLE V—BOOK FIGURES OF COAL INVESTMENT AND COAL INCOME, AND IDENTIFIED REVALUATIONS, 1921

	Pennsylvania & Hillside	Lehigh Valley & Coxe Bros.	Philadelphia & Reading	Scranton Coal	Lehigh & Wilkes-Barre	Lehigh Coal & Navigation	Hudson Coal Co. Interests
Total assets as per books.....	\$26,367,000	\$80,656,000	\$114,862,000	\$5,079,000	\$39,266,000	\$77,151,000	\$85,326,000
Net income as per books.....	6,126,000	4,012,000	3,482,000	291,000	5,836,000	3,034,000	4,098,000
Total investment in coal operations, adjusted <i>a</i>	13,026,000	46,301,000	97,198,000	4,126,000	28,974,000	31,966,000	51,298,000
Total income from coal operations, adjusted before deducting federal tax.....	5,950,000	5,831,000	4,119,000	465,000	8,707,000	678,000	4,496,000
Per cent of return on investment in coal operations.....	45.7	12.6	4.2	11.3	30.0	2.1	8.8
Revaluations of assets, 1913-1921.....		38,550,000	12,000		969,000	11,244,000	27,538,000
Revaluations identified prior to 1913.....		3,500,000	67,000,000		5,200,000	4,970,000	65,500,000

a Average of investment as figured from the companies' balance sheets at the beginning and end of the year.

b Approximate.

c Minimum.

borhood of \$600,000,000 or \$640,000,000 working capital included. In other words, the estimate of the committee indicates a market value some hundreds of millions in excess of the values now on the books of the companies, representing therefore a capitalization of monopoly profits."

The cost of reproduction is not a figure that can be obtained with respect to the anthracite industry because the largest values are in land and unmined reserves, "to which, of course, reproduction cost cannot apply." The values carried on the books of the anthracite companies, as found by the field accountants of the Commission, represent in most instances a figure below present market value, as estimated by the engineers, but above original cost. Like original costs and market values, the book figures are to be accepted as throwing light on the rate of profit although not conclusive evidence thereof.

What the books show is summarized in table V.

Commission Investigates Original Cost.—The report reviews at length the Commission's investigations into the original cost of the anthracite properties. It points out that all but two of the railroad coal companies other than the Pennsylvania and Hillside wrote up the values of their land for tax purposes some time between 1913 and 1921. The amount of these revaluations of property assets identified by the accountants in the books of each are shown on the last two lines of table V.

"The revaluations made between 1913 and 1921 by the railroad coal companies in the table totaled \$78,000,000, not including the \$40,000,000 in the memorandum account of the Pennsylvania and Hillside companies. In addition to the companies here shown, revaluations to the amount of \$15,500,000 were found on the books of the independent companies examined. To this should be added the appreciation of values which took place when the Delaware, Lackawanna & Western R.R. sold its property to the Glen Alden Coal Co. in 1921. Assets which at the time of sale showed a value of \$6,240,000 on the railroad company's books were entered on the Glen Alden Coal Co.'s books at \$72,240,000, an increase of \$66,000,000.

"The total increase in the book values of the companies examined arising from appreciation of values has thus amounted, since 1913, to approximately \$159,800,000 exclusive of \$40,000,000 in the memorandum account of the Pennsylvania and Hillside companies.

"The Commission was unable to obtain figures of the original investment; neither the records of the present operating companies nor the resources of the Commission were adequate for this purpose. As has been found by the Interstate Commerce Commission in the valuation of the railroads, accurate records of original cost in many instances do not exist. The most that the present Commission has been able to do is to set down the items of appreciated value which could be identified on the books, and it is probable that other appreciations of value not identified by the accountants have been placed on the books even during the life of the present operating companies.

"The total amount of appreciation of values identified both before and since 1913 was approximately \$186,000,000 exclusive of \$40,000,000 in the memorandum account of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co.

"Those who hold to the theory of original investment as the basis for reckoning profit may, if so disposed, deduct these revaluation items from the book values in order to derive a figure closer to the original cost than the book values themselves. The Commission itself does not feel

justified in making the deduction, for several reasons. In the first place, it is not sure that all the appreciations in value were discovered. Again, the depletion allowances which have occasioned many of these write-ups have not yet been finally settled with the Treasury Department and are, therefore, subject to change.

"Again, the Commission cannot guarantee in all instances that the assets revalued are exclusively concerned with the production and sale of coal, though most of them relate to coal lands. Finally, some of these entries are explained by the companies as restoration to capital accounts of amounts previously charged off through excessive depletion and depreciation, or of improvements charged directly to operating expenses. In view of the accounting practice of some of the companies it is likely that the book values of plant and equipment are in some instances less than the original cost and subsequent improvements.

With these uncertainties still attaching to the entries it would be a departure from the Commission's procedure of strict conformity with the written records of the companies to make the deductions and to calculate the per cent of return on the resulting investment. The figures are, however, here presented for the use of those who desire to approximate original cost as closely as may be from the facts now at hand."

Increase in Net Income 1913-1922.—The figures of net income confirm the evidence of the margin per ton that the operators have been receiving larger returns since the war than before, says the report. In table VI is shown the combined net income from coal operations of all the railroad coal companies except the Glen Alden. From an average of \$13,000,000 in the three years 1913 to 1915 the income rose to \$33,000,000 in 1920. In other words it increased two and a half fold. In the following year, 1922 as a whole, the income was by far the smallest of the ten-year period but it is to be expected from the evidence of margin per ton that 1923 will show a relatively high income. Out of the increased income, it should be noted, federal taxes must be paid.

Table VII shows the dividends paid (exclusive of stock dividends) by the railroad coal companies for the years 1913 to date. The dividends are shown in two ways: first, in per cent of par value of capital stock; and second, in dollars and cents per ton of coal produced. The very high rates of dividends paid by certain of the companies should be considered in the light of their small capital stock, and in the first two lines of the table the figures of total assets and capital are given for each company for purposes of reference.

In table VIII are given the earned surpluses of the railroad coal companies as distinct from surplus arising through revaluation of assets. The first column of the table shows the surplus of the six railroad coal companies that have been paying dividends in recent years and that are engaged exclusively in the mining and selling of coal. The surplus

TABLE VI—NET INCOME FROM COAL OPERATIONS BEFORE DEDUCTING FEDERAL TAXES, 1913-1922—RAILROAD COAL COMPANIES

Period		Period	
1913.....	<i>a</i> \$16,039,000	1918.....	22,369,000
1914.....	<i>a</i> 11,814,000	1919.....	25,220,000
1915.....	<i>a</i> 11,264,000	1920.....	33,466,000
1916.....	<i>a</i> 14,832,000	1921.....	30,246,000
1917.....	29,997,000	1922 (strike year).....	6,249,000

a Total of certain companies' reports for fiscal year and others for calendar year.

TABLE VII—DIVIDENDS PAID BY NINE RAILROAD COAL COMPANIES, 1913-1922, EXCLUDING STOCK DIVIDENDS

		Pennsylvania Coal Co.	Hillside Coal & Iron Co.	Lehigh Valley Coal Co.	Coxe Bros. & Co., Inc.	Phila. & Reading Coal & Iron Co.	Scranton Coal Co. Interest	Lehigh & Wilkes-Barre Coal Co.	Lehigh Coal & Navigation Co.	Hudson Coal Co.
Total assets, Dec. 31, 1922		\$16,316,864	\$3,283,875	\$68,245,151	\$8,154,085	\$115,064,815	\$4,697,333	\$39,127,208	\$77,018,864	\$42,100,782
Capital stock, Dec. 31, 1922		5,000,000	1,000,000	9,465,000	2,910,150	8,000,000	260,000	9,210,000	29,243,400	16,134,250
Dividends Paid	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton
1913	49	\$0.44								
1914	10	.09								
1915	10	.09								
1916	31	.29	25	0.18						
1917	110	.92	105	.69	25	0.32	25	.46		
1918	83	.72	45	.29	21	.26	10	.18		
1919	54	.52	80	.56	8	.13	9	.16		
1920	59	.66	70	.57	134	1.93	92	1.74		
1921	137	1.30	205	1.51	72	1.03	83	1.52		
1922	168	2.76	190	6.69	21	.53	20	.72		

a Memorandum accounts for depletion and depreciation purposes indicate value of \$40,000,000 in addition to these amounts.

b Since the larger part of this company's net income is derived from transportation facilities, rate of dividend per ton is omitted.

c On account of operating agreements between Hudson Coal Co., Delaware & Hudson Co. Coal Department, and Northern Coal & Iron Co. rate of dividend per ton for the Hudson Coal Co. is omitted.

d Eighteen months.

of these six companies rose from \$9,700,000 in 1912 to \$53,000,000 in 1919. In other words it increased more than five-fold in seven years. In 1920 it decreased slightly, chiefly because of the payment by the Lehigh Valley out of its surplus of a dividend of 134 per cent. In 1921 the combined surplus fell to \$37,000,000, chiefly because of the payment out of surplus of another dividend of 227 per cent, this time by the Lehigh & Wilkes-Barre. Other large dividends were paid during the year, notably \$2,050,000 by the Hillside, equivalent to 205 per cent on its small capital stock, and \$6,850,000 by the Pennsylvania Coal Co., on its capital of \$5,000,000.

The Glen Alden Co., which took over the coal properties of the Delaware, Lackawanna & Western Railroad Co., in August, 1921, was omitted from the preceding tables by the Commission because the change of ownership makes it impossible to set up the accounts on a comparable basis. Were the company included the profits of the industry would appear larger. Its mine had the lowest average cost of any large operator in the region during the four-year period, 1919-1922. Its margins are, therefore, large and its earnings correspondingly so. For example, in the first quarter of 1923, the average margin of the other railroad coal companies was \$0.93 per ton. The margin of the Glen Alden was \$1.48. Including the Glen Alden the margin for all the railroad coal companies was \$1.04. In other words the average with the Glen Alden included was 11 per cent higher than with it excluded.

The Commission was unable to obtain a separation of the coal accounts and the railroad accounts of the Delaware, Lackawanna & Western Railroad Co. that would permit a statement of income from coal applied to investment from coal. It is a matter of common knowledge, however, that the business was highly profitable, and that the coal-mining department contributed largely to the prosperity of the combined enterprise. The dividends paid by the Delaware, Lackawanna & Western Railroad Co. have been as shown in Table IX.

Carrying Charges of Coal-Land Reserves.—"The greater part of the investment of the anthracite operators consists of coal-bearing land. Where, as is the case with a number

of companies, lands are held which cannot be developed at the present rate of output for some generations to come, the carrying charges become a serious burden. The taxes upon the undeveloped lands are charged to operating costs. The interest is not properly chargeable against cost, but it must come out of the margin. Carrying charges on excessive reserves are one reason why some of the substantial companies pay small dividends or no dividends at all.

"To ascertain the effect of such charges upon the profits of the companies examined, the Commission obtained the

TABLE IX—DIVIDENDS PAID BY DELAWARE, LACKAWANNA & WESTERN RAILROAD CO.

	Per Cent		Per Cent
1909	70—cash a	1916	20
	15—stock	1917	22½
1910	20	1918	20
1911	55b	1919	20
1912	20	1920	20
1913	20	1921	18—cash
1914	20	1922	100—stock
1915	20		12

a Extra dividend to enable stockholders to purchase stock of the newly organized Delaware, Lackawanna & Western Coal Co.

b Including 35 per cent in securities of the Lackawanna Railroad Co. of New Jersey.

services of D. C. Ashmead, formerly of the Commission's engineering staff and later of the Bureau of Mines, to estimate the probable life in years at the present rate of output of each of the companies whose accounts were examined. From the information furnished by the companies to the Commission Mr. Ashmead has estimated the total tonnage of recoverable coal in the lands controlled by each company, and has divided this by the company's present rate of annual output.

"The Commission does not itemize the individual estimates. In order, however, to show the wide range in the amount of reserves carried by the several companies, table X has been prepared, in which each operating interest is shown by a code number only. The table gives for each interest the life of the property in years at the present rate of output, including all coal, whether owned or leased, now controlled by the interest. The table also gives the per cent of the tonnage controlled by the corporation that is in fee and the per cent in leasehold. To illustrate, company No. 3, has coal enough in the ground to keep on operating for 123 years at the present rate of output, and all of this coal is owned by the operating company. Companies No. 7 and 8 have coal enough for 98 years of operation of which 59.5 per cent is owned in fee and 40.5 per cent is controlled under lease.

"The outstanding example of excess reserves of coal-bearing lands is the Philadelphia & Reading Coal & Iron Co., which owns 85,000 acres of coal lands. According to a semi-official estimate made some years ago the coal in these lands is sufficient to last for 216 years. The engineering department of the Coal Commission estimates the life of the property at a still higher figure. The taxes on the excess land add to the already high production cost of the Reading and reduce its margin. Freed from this extra tax burden the margin might be sufficient to pay a modest return if applied to a simple investment in operating properties. Spread

TABLE VIII—INCREASE IN ACCUMULATED SURPLUS OF THE RAILROAD COAL COMPANIES

(Exclusive of revaluations of assets)

Year	Six Coal Companies Paying Dividends	Lehigh Coal & Navigation Co. a	Companies paying no Dividends Philadelphia & Reading b	Scranton Coal
1912	\$9,688,000	\$1,655,000	\$1,460,000	\$936,000*
1913	13,295,000	1,884,000	2,599,000	911,000*
1914	17,091,000	2,390,000	3,315,000	721,000*
1915	24,522,000	2,770,000	3,375,000	730,000*
1916	30,028,000	3,452,000	6,550,000	537,000*
1917	34,527,000	5,238,000	11,986,000	114,000*
1918	39,107,000	5,712,000	16,146,000	349,000*
1919	53,063,000	6,177,000	19,013,000	44,000*
1920	52,094,000	7,434,000	25,685,000	154,000
1921	37,108,000	8,075,000	29,167,000	460,000
1922	27,245,000	7,467,000	29,074,000	32,000*

* Deficit.

a Includes surplus accumulated out of transportation income.

b Company paid little or no interest on advances to it from holding company during this period.

c Total of certain companies' reports for fiscal year and others for calendar year.

TABLE X—YEARS LIFE OF COAL IN GROUND CONTROLLED BY COMPANIES WHOSE BOOKS WERE EXAMINED

(Figures represent years the coal owned or leased by each operating company or interest will last at present annual rate of output)

Company	Life in Years	Per Cent of Coal in Fee	Per Cent of Coal in Leaseholds
1	480	100.0	.0
2	260	86.8	13.2
3	123	100.0	.0
4 }	115	98.0	2.0
5 }	109	.0	100.0
6 }	98	59.5	40.5
7 }	70	.0	100.0
8 }	65	81.1	18.9
9 }	60	4.7	95.3
10 }	53	94.3	5.7
11 }	49	81.4	18.6
12 }	48	50.0	50.0
13 }	39	82.1	17.9
14 }	32	.0	100.0
15 }	29	40.6	59.4
16 }	28	5.0	95.0
17 }	27	.0	100.0
18 }	21	.0	100.0
19 }	19	.0	100.0
20 }	18	100.0	.0
21 }	10	.0	100.0
22 }	10	17.8	82.2
23 }	8	.0	100.0
24 }	8	.0	100.0
25 }	7	.0	100.0
26 }	7	.0	100.0
27 }	7	.0	100.0
28 }	7	.0	100.0
29 }	7	.0	100.0
30 }	7	.0	100.0
31 }	7	.0	100.0
32 }	7	.0	100.0
Mined out			

over this vast future reserve, the actual margin has paid a very small return.

"At first sight it would appear that the Philadelphia & Reading Coal & Iron Co. has been extremely unprofitable. Its production cost has indeed been high. The peculiar difficulty of the Reading has apparently been to pay the taxes and interest on its enormous reserve of coal lands. Had the anthracite business been an ordinary competitive business and the Philadelphia & Reading Coal & Iron Co. an ordinary competing business enterprise one of two things would have happened long ago. The company would either have been forced out of business or else forced to sell part of its coal lands to someone else. The thing that saved the Reading Coal & Iron Co. was the absence of effective competition, due to the peculiar economic organization of the anthracite industry.

"The Supreme Court of the United States has declared this combination of the [Reading] railroad and coal companies to be in violation of law and has ordered a dissolution. This is in line with good public policy. The business of mining and transportation should be kept separate, not intermingled, as now, in a maze of accounts.

"The Commission insists that the dissolution ought not to be made the occasion for further increases in the price of coal. The coal company has been operating under an arrangement by which the railroad paid the carrying charges on the excess coal lands. If this arrangement is illegal, the excess reserve should be taken care of by some other means than through an advance in the price. The American people do not want their coal at prices that will not yield a fair profit, but they do not believe that it is an inherent right of any corporation to embark on a two-hundred-year speculation in land and ask the public to pay the cost of carrying it out of the present price of coal.

"Summary and Conclusion.—The principal facts found by the Commission in its investigation of anthracite profits are:

"(1) No average figure either of margin per ton or per cent return on investment can fairly represent the profit in anthracite mining. Because of great inequalities in cost and in selling arrangements some operators make very large profits and others very small profits. The margins per ton between cost and sales realization in ordinary times range from less than nothing to over \$2 a ton. The per cent return on book value of investment in coal ranges all the way from a loss to 138 per cent (one independent operator, year 1917).

"(2) There has been a very large increment in value so that the lands are now worth on the market more than they used to be although a third of the coal is gone. The Commission could not obtain the original cost of more than

one or two of the properties. It did find that the present book values contain certain "Write-ups" or revaluations of assets amounting to at least \$186,000,000 and in addition there were memorandum accounts kept for Federal Tax purposes indicating further appreciation of \$40,000,000.

"(3) The latest of the foregoing revaluations, however, was as of 1913. Since 1913 a further huge increment in market value has accrued to the owners of the property. A committee of engineers appointed by us estimates the present market value of mines and minerals as \$989,000,000. The book values, allowing for companies and holdings not examined by the accountants, are in the neighborhood of \$600,000,000. This indicates a further increment of hundreds of millions of dollars inuring to the owners if the engineers' estimates based on earnings are accepted.

"(4) The profits are increasing. Total net income is increasing, dividends are increasing, and surpluses are increasing, earned surpluses as well as surplus arising through revaluations. The margin per ton is increasing.

"During the year 1922, when there was a five-months strike, the average total f.o.b. mine cost for the year as a whole exceeded the sales realization of the operators. Their margins per ton for the last quarter of 1922 and the first quarter of 1923 were the largest on record. Though the market conditions of 1923 are not expected to last, it is found that the present margins show a large increase over pre-war, even after deducting federal taxes.

"(5) Labor cost and other costs also show a large increase over pre-war figures, but the increase in price has been such that the operator's margin since the war has on the whole been about the same percentage of the sales realization that it used to be.

"(6) The practice of many companies of carrying large reserves of coal lands held for future use adds to costs through taxation and conceals profits. The largest of the railroad coal companies—the Philadelphia & Reading, a high operating cost company—is overburdened with reserves sufficient to last more than two hundred years. On this total investment it has shown an inadequate return, the loss having been made up by the large earnings of the affiliated railroad. Freed from the carrying charge of this excess reserve it could make an adequate return.

"The amount of the increment in value of coal lands is a matter deserving careful consideration, not only with respect to anthracite but also with respect to bituminous coal. If this increase in market value is to continue indefinitely piling up carrying charges to be added to current prices, an intolerable burden will be laid on the consumer. Taxes and interest on coal not to be mined within forty years are not properly chargeable to present operations. Speculation in land should not be confused with mining coal.

"We make the following specific recommendations for the attention of the industry, the states and the Federal Government:

"(1) In order to permit the public as a whole to share in the good fortune of the low-cost, high-profit operator, we recommend that differential taxation shall be applied to differential advantage. Sweeping horizontal cuts cannot be made in present mine prices and margins without serious injury to many high-cost operators, whose output is needed. Taxes falling lightly on the low-profit operator and more heavily on the high-profit operator in proportion to his ability to pay will benefit the consumer indirectly through lightening the tax burden elsewhere and will accomplish this without raising prices.

"(2) To protect the public against unjustified increases in price, we recommend complete publicity of accounts through a federal agency with power to compel reports, and to prescribe the form of accounts. Because of the large increase in operators' margins per ton since the strike of 1922, and the possibility of further increases in price as a result of the recent settlement, we believe that such current publicity as to costs, margins and profits should begin at once. Unless the public is protected by publicity of accounts, we are apprehensive that the concentrated control of the industry may take indefensible profits.

"(3) The consumer has in his own hands a measure of protection against unreasonable profits. We commend to consumers the use of substitute fuels."

Explosion in Glen Rogers Mine Kills 27

A gas explosion in one entry of the Raleigh Wyoming Coal Co. mine at Glen Rogers, W. Va., just as the men were starting work Nov. 6, caused the death of twenty-seven miners. Sixty-three men had checked in at the mine mouth that morning, and it is believed that the thirty-six survivors owe their escape to the modern ventilating system with which the mine was equipped.

Carl Scholz, vice-president and general manager of the Raleigh Wyoming Company, and R. M. Lambie, chief of the state mining department, could assign no cause for the explosion. In some manner unexplained, gas had accumulated in the entry where the blast occurred, but how it came to be ignited is not known at the present time.

The mines were not working the night before the explosion although until recently double shifts had been operating regularly. Through the night 28,000 cu.ft. of air had been passing through that heading, and the large ventilating fan had never stopped for a minute. Two night firebosses had made an inspection of the mine at 7 o'clock on the morning preceding the explosion and reported it safe.

QUESTIONS INVOLVED in the case of the Diamond Coal & Coke Co., versus the Oregon Short Line R.R. will be argued before Division 4 of the Interstate Commerce Commission in Washington Dec. 21. The case of the Southwestern Interstate Coal Operators' Association versus the Arkansas Western Ry. will be argued in Washington Dec. 28. The traffic questions raised by the South Side Lumber & Coal Co., the Peoples Coal & Material Co., and the Citizens Coal & Supply Co. will be considered at an Interstate Commerce Commission hearing in Indianapolis Dec. 4. Examiner Carter will preside.

BANKERS' ACCEPTANCES, secured by warehouse receipt, are eligible for rediscount by Federal Reserve banks when used to finance the storage of coal on docks, provided they comply as to maturity and in all other respects with all

other provisions of the Federal Reserve Act and the board's regulations, says a ruling of the Federal Reserve Board. The ruling, which was made in response to a request as to the validity of such financing, also provides that the acceptances, secured by warehouse receipts, are eligible for acceptance by member banks.

September Mine Fatalities at Low Level

Fatal accidents at coal mines in the United States during September, 1923, numbered 137, according to a report by the U. S. Bureau of Mines. The fatality rate was 2.79 per million tons, based upon 49,133,000 tons of coal produced during the month, as compared with a rate of 5.11 for the preceding month based on a production of 57,732,000 tons and of 3.87 for September last year based on an output of 44,488,000 tons. The fatality rate for bituminous mines alone was 2.62 as compared with 3.76 for the same month last year; the rate for anthracite mines was 5.49 as compared with 4.73. The average fatality rate for September for both classes of mines during the past ten years was 3.66 per million tons. Thus the rate for September, 1923, was not only lower than that for September last year but it was also much below the ten-year average rate for the same month.

The fatalities during September brought the total number of deaths in 1923 to 1,900, indicating a fatality rate of 3.92 per million tons, as against 1,234 fatalities during the same period last year, representing a rate of 4.11 deaths per million tons. The 1923 rate indicates a decrease of between 4 and 5 per cent.

The present year's record to date for all fatalities from all causes shows a reduction in the fatality rates per million tons for falls of roof and coal, haulage, explosives and electricity, and an increase in the rate for gas and dust explosions, as shown by the following figures:

	1922	1923
Falls of roof and coal.....	2.000	1.803
Haulage.....	0.760	0.670
Gas and dust explosions.....	0.393	0.642
Explosives.....	0.183	0.167
Electricity.....	0.183	0.134

COAL-MINE FATALITIES DURING SEPTEMBER, 1923, BY CAUSES AND STATES
(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground											Shaft				Surface						Total by States					
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	3		2	1				1					7													7	5
Alaska.....																										0	0
Arkansas.....																										0	6
Colorado.....	1												2													2	6
Illinois.....	11		3	2				1					17											1	1	17	20
Indiana.....	5		1										6													6	3
Iowa.....	1												2													2	3
Kansas.....																										1	0
Kentucky.....	3		1										4	1					1							4	5
Maryland.....																										0	1
Michigan.....																										0	0
Missouri.....	1																									0	0
Montana.....																										0	2
New Mexico.....		1	1										2													2	0
North Dakota.....																										0	2
Ohio.....	10		2										12													13	5
Oklahoma.....	1		1										2													2	1
Pennsylvania (bituminous).....	21		3			1		3	1	1		1	31							1				1		32	36
South Dakota.....																										0	0
Tennessee.....			1										1													1	4
Texas.....																										0	0
Utah.....	1												1													2	0
Virginia.....	1												1													1	1
Washington.....	12	1	6	3				3		1			26			1			1							27	43
West Virginia.....																										1	2
Wyoming.....																										0	8
Total (bituminous).....	72	2	22	6		1		8	1	2		1	115	1		1		2		1				3	4	121	148
Pennsylvania (anthracite).....	3	1	2	1		2		2				2	13			1		1						2	2	16	24
Total, September, 1923.....	75	3	24	7		3		10	1	2		3	128	1		2		3		5				5	6	137	
Total, September, 1922.....	64	10	31	2		6		14	2	1		4	146	2		6		8		2	3		1	1	6	18	172

Engineers' Valuation Committee

Appraises Anthracite Industry at \$989,900,000; That of Soft Coal at \$11,442,864,000

Norris Report to Be Submitted to Congress Though Not Accepted by Coal Commission—Valuation of Coal Industry Arrived at by Capitalizing Present and Expected Profits

IN ITS report on investments and profits in the anthracite industry the Coal Commission makes reference to a study of the valuation of the coal industry undertaken at its request by a voluntary committee of "especially qualified" engineers. This committee, of which R. V. Norris, of Wilkes-Barre, was chairman, the other members being S. A. Taylor and Howard N. Eavenson, of Pittsburgh; H. M. Chance, of Philadelphia, and J. H. Allport, of Barnesboro, Pa., made a report to the Coal Commission on the present value of both the anthracite and bituminous-coal industries. This report was not accepted by the Coal Commission, but will, it is understood, be transmitted to Congress with other supplemental data for printing in the completed report of the Commission.

Mr. Hammond authorized Mr. Norris, chairman of this Engineers' Advisory Valuation Committee, to make public the text of their report. This committee estimates the total present value of the anthracite industry, including reserves, at \$989,900,000, and of the bituminous-coal industry at \$11,442,864,000. The above figure for anthracite includes \$146,400,000 as the present value of the reserve tonnage, and \$5,156,650,000 for the reserve tonnage of bituminous coal and lignite.

The report points out that various methods of valuation have been suggested for mining properties, but that authorities seem to agree in accepting as the fairest, most practicable and logical a capitalization of the estimated future earnings if an estimate can reasonably be made. Hoover and Finlay are quoted as authorities on this point.

Cost, assessed valuations, sale value, royalty valuation and tonnage values were considered by the committee as possible means of arriving at a general value of the coal industry. The method adopted, and "used as far as practicable," was the present-value method for operating properties considered as covering the "available coal"—defined as that to be mined in forty years. Other coal was classed as reserves.

This Engineers' Committee used data available from the records of the Federal Trade Commission and the Geological Survey, and that material collected by the Coal Commission which was available when their study was made, in the late summer.

The report on valuation in detail follows:

Basis of Valuation.—The weighted average of data for the years 1920 and 1921, where such is available, was used as a base; first, because this was believed to fairly represent present conditions; second, any changes of conditions in costs would, we believe, be reflected in the realization; third, the data in the possession of the Commission is most complete for those years. Where the 1920-21 earnings were unavailable or misleading the most reliable available data was used.

As the total value of the properties is desired, costs are figured before royalty, depletion, depreciation and interest charges. Royalty in the case of leased and depletion in the case of fee lands represents the value of the undeveloped coal in the ground, depreciation the value of improvements and developments, and interest charges and profits the returns to capital used in operation. Federal taxes are a charge against income and must be deducted from the realization before it can properly be used in estimates of value.

Future tonnage is estimated from consideration of past tonnage and of reserves in each district.

Value of Operating Property.—From the above the value

of the operating properties is determined by discounting at 6 per cent compound interest the net yearly returns, as a varying annuity estimated for each field for the period noted, the latter obtained by applying the values as above indicated, per ton to the estimated tonnage for each year.

Value of Reserves.—The reserve tonnage is determined by the difference between the operating tonnage as above and the total estimated tonnage in each field. This is considered as a whole in each field as undeveloped coal and its value is based on either actual sales or virgin areas where such values of recent date are available and sufficient to justify their general employment in the estimates, or, lacking that, on the present value of the reserve coal at the present rates of royalty, but considered deferred for the life of the operating lands.

Total Valuation.—Based on the above the total valuation is made up of the value of operating coal land and reserves, including development and equipment, as well as all land values, regardless of whether the ownership is in the operating company or the lands are operated under lease.

Anthracite Situation.—Reasonably complete data, as requested, were furnished by your statisticians, together with the Commission's estimate of coal.

Estimated Reserves of Anthracite

Field	(In Gross Tons)		Recoverable Coal Remaining
	Total Coal Remaining	Per Cent Recoverable	
Northern.....	3,276,763,000	67	2,195,431,000
Eastern Middle.....	248,628,000	69.4	172,548,000
Western Middle.....	3,573,025,000	58.1	2,075,928,000
Southern.....	9,256,260,000	49	4,535,567,000
Totals.....	16,354,676,000		8,979,474,000

From a study of past production we estimate as a conservative basis of value that the field as a whole can increase its output by 1935 to about 100,000,000 gross tons per year, and hold this average production to the end of the 40-year period allowed for available coal.

The reserves, mostly in the Western Middle and Southern fields, are expected to maintain an annual output of 100,000,000 tons for about ten years longer and then gradually decrease to 50,000,000 tons per year with a total life of about seventy years additional.

As important factors in production we estimate for the Northern field a life of fifty years, for the Eastern Middle thirty-five years, the Western Middle 100, and the Southern field 110 years. All of these fields, of course, will produce coal long after the above limits, but in small quantities and of negligible present value.

The Western Middle and Southern fields will have to carry on after the other two fields cease to be important factors. Owing to depth and to geological conditions which cause a much smaller percentage in production of domestic sizes, the coal from these fields is more costly to mine and brings a smaller realization on all sizes. As a natural consequence these fields are developed only to supply the surplus demanded by the market over that furnished by the cheaper Northern and Eastern Middle fields. These more costly fields have the greatest reserves, however, and can be expected to maintain a large production long after the more favored fields are exhausted.

The average royalty paid on all coal sold was found to be 16.5c. per ton, the average depletion 14.7c., and average depreciation charged on plant 10.8c. Valuing the available coal, plant and improvements on the basis of the returns

Estimate of Present Value of Coal Lands, Plant and Improvements, in the United States

State	Net Tons		Estimated Present Values		
	Available for Mining Within 40 Years	Reserves of Present Value after 40 Years	Available Tonnage, Including Plant and Improvements	Reserve Tonnage	Total
Alabama	1,020,000,000	32,000,000,000	\$130,560,000	\$162,000,000	\$292,560,000
Arkansas	106,000,000	860,000,000	22,048,000	21,500,000	43,548,000
Colorado	680,000,000	157,000,000,000	144,160,000	157,000,000	301,160,000
Illinois	4,920,000,000	49,000,000,000	984,000,000	490,000,000	1,474,000,000
Indiana	1,640,000,000	25,000,000,000	229,600,000	125,000,000	354,600,000
Iowa	380,000,000	14,000,000,000	30,400,000	14,000,000	44,400,000
Kansas	354,000,000	14,000,000,000	49,560,000	14,000,000	63,560,000
Kentucky	2,290,000,000	60,000,000,000	421,360,000	600,000,000	1,021,360,000
Maryland	144,000,000	160,000,000	37,440,000	8,000,000	45,440,000
Michigan	72,000,000	30,000,000	11,520,000	900,000	12,420,000
Missouri	278,000,000	20,000,000,000	33,360,000	20,000,000	53,360,000
Montana	232,000,000	1,500,000,000	33,408,000	98,250,000	131,658,000
		181,500,000,000			
New Mexico	210,000,000	9,000,000,000	47,670,000	88,000,000	135,670,000
		86,000,000,000			
Ohio	2,640,000,000	32,000,000,000	485,760,000	640,000,000	1,125,760,000
Oklahoma	270,000,000	18,000,000,000	37,800,000	90,000,000	127,800,000
Pennsylvania	8,920,000,000	26,000,000,000	1,998,080,000	780,000,000	2,778,080,000
Tennessee	402,000,000	8,000,000,000	70,752,000	20,000,000	90,752,000
Texas	124,000,000	2,000,000,000	7,440,000	11,000,000	18,440,000
		12,000,000,000			
Utah	350,000,000	46,000,000,000	64,400,000	230,000,000	294,400,000
		10,000,000,000			
Virginia	660,000,000	100,000,000	132,000,000	201,000,000	333,000,000
		32,000,000,000			
Washington	178,000,000	61,000,000,000	35,600,000	80,000,000	115,600,000
West Virginia	5,540,000,000	40,000,000,000	1,196,640,000	915,000,000	2,111,640,000
Wyoming	494,000,000	300,000,000,000	71,136,000	350,000,000	421,136,000
		2,000,000,000			
*Miscellaneous	96,000,000	4,000,000,000	11,520,000	41,000,000	52,520,000
		350,000,000,000			
Total excluding lignite		1,049,650,000,000			
Total lignite		543,500,000,000			
Total	32,000,000,000	1,593,150,000,000	\$6,286,214,000	\$5,156,650,000	\$11,442,864,000
Pennsylvania-Anthracite	3,907,900,000	5,071,600,000	843,500,000	146,400,000	989,900,000
Grand total	35,907,900,000	1,598,221,600,000	\$7,129,714,000	\$5,303,050,000	\$12,432,764,000

* Miscellaneous includes Arizona, California, Georgia, Idaho, North Carolina, North Dakota, Oregon, South Dakota.

in the Commission's figures, discounted to the present time, and the reserves on probable margins deferred forty years, we estimate the present value of the properties comprising the Pennsylvania anthracite field as follows:

Available recoverable tonnage	3,907,900,000
Reserve tonnage	5,071,600,000
Total tonnage	8,979,500,000
Present value of plant, improvements and available tonnage	\$843,500,000
Present value reserve tonnage	146,400,000
Total present value	\$989,900,000

Bituminous Valuation.—In appraising bituminous coal your committee, in addition to considering recent earnings submitted, has given full consideration to all data available on earnings of earlier years, sales values, royalty rates, past performances, and present estimates of tonnage and value, which it believes to be most conservative and fully justified by the data obtained.

The total tonnage is based on estimates of the U. S. Geological Survey and of various state surveys, all revised and reduced to allow for losses in mining and for thin and unavailable coal. The total tonnages considered in the committee's estimate are actually materially less than half of the tonnage estimated by the U. S. Geological Survey as remaining at the end of 1920.

"Available coal" is estimated as that commercially minable within forty years, allowing for probable gradual increases in the rate of output to a total for the whole industry of 1,000,000,000 tons per year at the close of the 40-year period. "Reserves" are considered as such coal as would be available after the exhaustion of the "available" coal, excluding from any consideration all coal so situated as to be impracticable of access, and all coal so thin or of such depth as to have no present sale value.

In determining the amount of reserve coal an effort has been made to confine this item to coal which at the present time, or at least within the 40-year life of the "available" coal, would have actual ascertainable sale value, and be capable of beneficiation.

As the values of "available coal" were obtained by discounting probable earnings, these values necessarily include all working capital, plant, development, equipment, mine housing and other properties directly connected with the business. They do not include outside factors, as interest or rentals received, profits from connected undertakings as stores, farms, selling of purchased coal and the like. The values of reserves are those of the coal land only, which in general are far below the market price of

similar lands in the same localities. It is the feeling of your committee that all the coal to be mined within forty years, whether from present or future operations, is included in "available coal" and that all reserve values should be treated as deferred.

The committee's estimate of the value of the coal properties of the country, not including coal in Alaska or in the island dependencies of the United States, is as shown in the accompanying table.

The value of the available tonnage, \$7,129,714,000, is the minimum on which earnings should be based. Considerable amounts of reserve tonnage are and should be held by operators to protect their future interests, and earnings must be sufficient to cover the carrying of reasonable holdings of such reserves.

Plant.—The data presented are not sufficient to permit the determination of the actual value of plant and equipment, nor do we believe that it would be possible to obtain data on that subject that would be sufficiently accurate to warrant its general application. The total value of plant and equipment in the bituminous fields varies from \$1 to about \$3 per ton of annual output; in the anthracite region of Pennsylvania it is from \$1.50 to as high as \$4.50 per ton of annual output. Employee housing of good type costs, under present conditions, from \$1 up per annual ton.

Your committee, having endeavored to be distinctly conservative in estimating both tonnages and values, desire collectively and separately to express most forcefully the opinion that the properties valued either as "available" or "reserve" could not be purchased in the open market except at a price far beyond the committee's estimates. The discount rates used—6 per cent for anthracite and 8 per cent for bituminous—are those adopted by the U. S. Treasury Department for income tax valuations.

Assigned-Car Order Now Set for Jan. 1

The Interstate Commerce Commission on Nov. 9 announced a further postponement of the date on which its order in the assigned coal car case becomes effective, fixing the new date as Jan. 1.

The order was to have become effective Dec. 1, but now it will not become effective until Jan. 1. Argument on the rehearing in the case will be heard Dec. 17, 18 and 19. It is regarded as probable that another postponement of the effective date of the order will be made prior to Jan. 1 because of the probability that the commission will not have reached a final decision on the rehearing.

Decisive Action Only Hope of Coal Trade Against Federal Control

Congress Leaders Ready to Push Legislation Sought by Coal Commission—Wadleigh Retirement a Setback—Commend Hoover Policy

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

In the message which he will read to Congress less than three weeks hence the President is fully expected to urge the translation into legislation of the recommendations of the Harding Coal Commission. Administration leaders in both Houses are known to be ready to expedite such legislation. It is improbable that there will be opposition to this legislation from the Democrats as a party; the opposition will come from certain individuals in both parties. There is little likelihood that the coal legislation will be regarded in any way as a partisan matter.

It is known that a considerable number of the members of both houses are willing to go much further in the matter of regulation than the Coal Commission has suggested. In fact, the whole drift is toward federal regulation and away from self-regulation in the coal industry.

The coal industry is not aware, perhaps, that it is under the closest surveillance on the part of certain legislators. It is true that these men probably favor federal regulation, but they recognize that the one thing which can weaken support for regulatory legislation is determined action on the part of the industry itself, not only in the matter of the voluntary publicity pledged to the Coal Commission just prior to the conclusion of its work but along the lines of broad activities.

Two recent developments have done much to discourage action on the part of the industry. One was the striking unfairness of the Federal Trade Commission's report on anthracite. The other was the resignation of F. R. Wadleigh from the position of chief of the Commerce Department's Coal Division. The coal industry had faith in Mr. Wadleigh and was willing to embark on co-operation under his guidance. Time now is being marked until his successor will have been appointed. Neither the National Coal Association nor the American Wholesale Coal Association has named its members to serve on the Coal Division's advisory committee. If Mr. Wadleigh's resignation halts the mere naming of members on a committee, it is certain to hold up the formation of an actual plan for the voluntary submission of cost and wage data.

The unfortunate Federal Trade Commission incident gives ground for the industry to say that it always is abused and double-crossed by the federal government. It supports the position of those who are willing to go to the mat with the government on the whole question as to whether or not the government has the right to exercise any degree of control over private business activities—and many operators believe that the production of coal is entirely an intrastate activity, into the conduct of which the federal government may not legally pry.

Another influence which is working toward federal regulation of the coal industry is the apparent determination of the Department of Justice to hamstring trade associations. Its recent course in the case of the United States versus the Tile Manufacturers' Credit Association, in which the department is forcing an agreement that statistics of production, stocks and other things may be collected only at the request of a government agency, is frightening members away from these associations. Statistics such as trade associations collect are essential to business. Congress, recognizing that point, is likely to look with favor on compulsory returns to a government agency.

There are many who think industry should rally to the support of the policy followed by Secretary Hoover. He has urged the capitalization of the constructive forces within industry. He would encourage the forward-looking and the honest to put into effect voluntary efforts which

would curb dishonest or gouging practices. He believes 95 per cent of the activities of trade associations are constructive and in the public interest. Unquestionably he regards regulation as a depressing and non-constructive step. It does not educate and encourage. It simply says: "Thou shalt not."

There are many who are wondering why the coal industry is allowing itself to drift at this critical time. No headway has been made in the simple matter of transmitting certain summaries of costs. There is a feeling in Washington that the coal industry would be well advised to get in touch with Secretary Hoover to see if more could not be done by way of expansion of the Coal Division so that studies could be made, in co-operation with industry, of the various suggestions made by the Coal Commission. It might be established that some of them are not practical. In other instances studies might be made which would be of benefit to the public and to the industry alike. The retailers might go to Mr. Hoover and suggest that he set up a section of the Coal Division which would study some of their problems. The wholesalers might do likewise.

Trade Commission Blames Wholesalers and Operators for High Anthracite Prices

Wholesalers who take exorbitant margins and operators who charge the wholesalers high prices are to blame for present "premium" prices that the public must pay for anthracite, according to a report issued Nov. 11 by the Federal Trade Commission. In the course of the report, the commission cites recent profits of \$1.50 and \$1.75 per ton on anthracite by wholesalers compared with pre-war margins of 10 to 15c. per ton.

"High prices exist in the wholesale trade either because they are charged by producers, or because of high margins taken by wholesalers," says the report. "At the present time they are due to both causes. About 25 per cent of the tonnage is being sold by the producers at 'premium' prices ranging from \$9.85 to \$12.25 per gross ton f.o.b. mines for domestic and from \$6.75 to \$9 for pea coal. Much of the anthracite sold at these prices goes directly from the producer to the retailer or consumer, but a part passes through the hands of wholesalers."

Figures for gross tonnage would be larger in the report, says the commission, if it were not that "a considerable number of wholesalers, including some of the largest, reluctant to let the public know what prices and margins they are realizing, have refrained from making reports." The commission reports that as a result of this failure to obtain facts, it is employing its coercive powers.

During the week ended Oct. 13 the highest margin taken by wholesalers reporting sales of anthracite at \$10 or more per ton for nut and larger sizes and \$8 for pea coal, was \$1.75 per gross ton, taken on six cars sold at prices ranging from \$12.75 to \$13.75 per ton. In the following week the highest margin was \$1.50 per ton taken on two cars sold at \$13 and \$12.75 per gross ton f.o.b. mines, respectively. Over against these high figures, during the week ended Oct. 13 six cars were sold at purchase price, one was sold at 50c. less, two at 75c. less, and one at \$2 less than purchase price per ton. During the week ended Oct. 20 four cars were sold at purchase price and two at 25c. less than purchase price.

Presenting details on profits, the commission says:

"The exorbitant character of the higher margins can only be realized by a comparison with pre-war and war-time gross margins.

"Prior to the war the customary wholesalers' gross margin on domestic sizes of anthracite was from 10 to 15c. per ton, while during the war the Fuel Administration allowed 20c. per ton east of Buffalo. The U. S. Coal Commission, in its report on the wholesale and retail coal trade, shows that for the four years immediately preceding 1917, the average rate of return on investment for wholesalers, handling anthracite only, ranged from 12.5 to 27.5 per cent, while during 1918 they made over 25 per cent.

Commerce Commission Broadens Rate Probe; Soft Coal and Coke Included in Inquiry

The Interstate Commerce Commission on Nov. 9 broadened its order to investigate freight rates for anthracite to include rates on bituminous and semi-bituminous coal and coke from points in Virginia, West Virginia, Kentucky, Ohio and Pennsylvania to points in New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and the District of Columbia.

The order was entered, the Commission said, because of complaints of shortage of fuel for domestic and other uses in the New England States and other states included in the order and that it decided the scope of the inquiry should be enlarged "in order that the Commission may elicit information sufficient to enable it to take appropriate action to require the establishment of railway routes and reasonable rates that will insure transportation of an adequate supply of fuel to the destinations indicated."

Following hearings in Rochester and Albany, the first of last week, Chief Examiner Butler moved to New York, where on the 9th two sessions were held at which a few witnesses were questioned. Attorneys for the railroads were on hand to defend the present rates. A representative from the State of North Carolina, another the Chamber of Commerce of Trenton, and the Secretary of the Long Island Coal Dealers' Association were the principal witnesses, Mrs. Louise Reed Welzmilller, Deputy Commissioner of Markets, represented New York City.

The hearings were scheduled to be continued in Philadelphia on Nov. 13 and in Washington on Dec. 3.

Signs Decree Separating Lehigh Valley Railroad and Coal Properties

Segregation of the Lehigh Valley R.R. Co. from its coal properties is ordered in a final decree signed Nov. 8 by Judge Learned Hand in the U. S. District Court at New York City. It provides that the railroad shall dispose of all shares of stock, bonds and other evidence of indebtedness as is necessary to establish its entire independence of and from the coal companies. There remain the agreement as to trustees under the plan, the preparation of the stock and the necessary agreement of 85 per cent of the stockholders to the assessment of \$1 levied for exchange of the stock.

The decree directs that the Lehigh Valley R.R. Co. shall, subject to the lien of its general consolidated mortgage, sell, assign and transfer its entire right, title and interest in and to the stock of the Lehigh Valley Coal Co., including the present right to vote and receive dividends thereon, to a trustee to be appointed by the court, but meanwhile, pending the appointment of a trustee, the coal company may pay the railroad company a cash dividend. The amended plan provides that the rights for subscription by Lehigh Valley R.R. stockholders for certificates of interest be extended until April 15, 1924.

Shareholders who buy certificates in the coal company must dispose of them before Dec. 31, 1927, if they have not in the meantime disposed of the railroad stock. If they have not done so the certificates will be called and the subscription price of \$1 a share refunded. The plan provides that neither the railroad company nor any corporation controlled by it shall acquire any coal stock.

The Lehigh Valley R.R. Co. shall transfer to a trustee to be named by the court its right, title and interest in the stock of Coxe Brothers & Co., Inc., the trustees to hold said right, title and interest in said shares of stock until the maturity of the collateral trust agreement on Feb. 1, 1926. The amended plan further provides that the railroad shall transfer to a trustee its right, title and interest in the stock of the Delaware, Susquehanna & Schuylkill R.R. Co., to be held until the maturity of said collateral trust agreement.

One of the most interesting points made by Judge Hand was that "It will not constitute a contempt of this decree for the Lehigh Valley R.R. Co. to apply to the Interstate Commerce Commission for leave to retain the stock and to

lease the property of the Delaware, Susquehanna & Schuylkill R.R. Co. or to merge and consolidate that company, provided that this provision shall not be construed as the expression by this court of any opinion as to the propriety of granting said application."

Another provision of the amended plan points out that "the Lehigh Valley Coal Co. and Coxe Brothers & Co., Inc., on the one hand, and the Lehigh Valley Coal Sales Co. on the other, their officers, directors, agents, servants and employees are hereby perpetually enjoined from further carrying out the contract dated March 1, 1912, cancelled and annulled by the decree or mandate entered by this court on Feb. 24, 1921, and from entering into any like contract in the future, the purpose and effect of which would be in any manner to hinder or restrain the Coal Sales Company from extending its business of buying and selling coal where and from and to whom it chooses with entire freedom and independence, or otherwise to violate the spirit and purposes of this decree."

Judge Hand further exhorts the parties to the decree to move with "due diligence" to carry out the provisions of the decree and asks that a written report of progress be handed to him within six months from the date of the decree.

Terre Haute Wants Mine-Rescue Station; Vincennes Team Slow at Hunt Fire

Federal aid in the establishment of a mine-rescue station in Terre Haute is to be sought, as a result of the tragedy at the Hunt mine, near Staunton, Saturday, Oct. 27, in which four lives were lost. Mine Workers' officials and Indiana operators expect to co-operate in backing a bill to be introduced by Representative Everett Sanders providing for an appropriation for this purpose.

Attention is called to the fact that the entire northern portion of the Indiana bituminous coal field has its center in Terre Haute and that with the paved highways radiating from there to all mines in the territory, they can be reached quickly. The nearest station at the present time is located at Vincennes.

Phil Penna, secretary of the Indiana Bituminous Coal Operators Association, and John Hessler, president of District No. 11, U. M. W., both issued statements that their organizations have always favored the location of such a station in Terre Haute and would assist Congressman Sanders all they could.

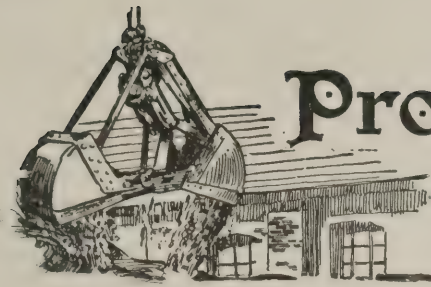
Much criticism was heaped upon the rescue team at Vincennes for its performance at the Hunt mine fire. Not only did the team require a long time to reach the mine but it used up so much time getting ready to enter that miners and firemen from Terre Haute and Brazil went in and brought out three of the four bodies.

Utilities Coal Consumption Drops Slightly In September; Power Output Gains

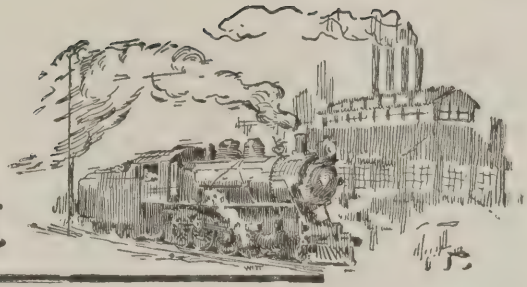
Electric public-utility plants consumed 3,182,075 net tons of coal during September, according to a report just issued by the U. S. Geological Survey. This compares with 3,211,124 tons consumed during August, according to corrected returns.

Fuel oil consumed by public-utility plants in September totaled 1,352,933 barrels, compared with 1,352,299 barrels in August. The average daily production of electricity by public-utility power plants during September was 152,400,000 kw.-hr., compared with 150,800,000 kw.-hr. in August.

Stockholders of the Philadelphia & Reading Coal & Iron Co., the stock of which is owned by the Reading Company, at a meeting held on Nov. 8, approved of the segregation plan in so far as it affects the coal company, including the creation of a new mortgage, under which bonds will be issued in exchange for the coal company's one-third proportion of the present general mortgage. The plan has been filed with and accepted by the U. S. District Court at Philadelphia.



Production and the Market



Weekly Review

The bituminous coal market, in regard to both production and prices, continues to drag along week after week with no change. Accounts in several newspapers on Monday of this week portraying the operators and union miners girding their loins for a big scrap next spring may have been inspired by the hope that the consumer could be scared into buying more coal. According to the estimate of the Geological Survey the consumer for the past twelve months has been buying more than he burns and there is nothing to indicate that he can be induced to increase his rate of purchase. Stocks of soft coal in the hands of industrial consumers and railroads are now well above the average for this time of the year. The bulk of the soft coal produced continues to move forward on contracts at prices \$1 to \$1.50 above the spot market.

Coal Age Index of spot prices of bituminous coal gained one point last week, reaching 184 on Nov. 12. This corresponds to the average weighted price of \$2.23 per net ton at the mines. Anthracite prices are holding firm, independent quotations of around \$12 at the mines being not uncommon for stove coal.

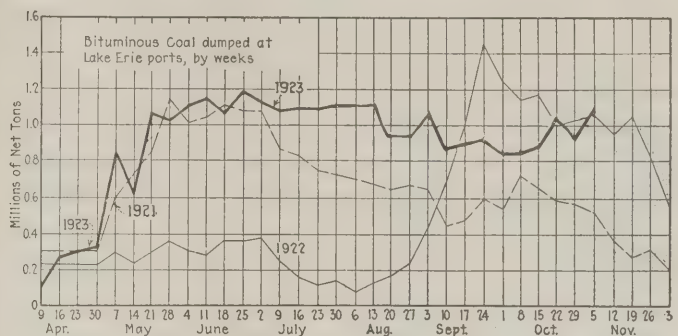
OUTPUT AND PRICES UNAFFECTED BY SHUTDOWNS

Reports from all sections are to the effect that more and more mines are being closed. These mines in part are those of large companies, which are shutting high-cost operations and increasing the activity of their better mines. So far the number of mines shut down has not been sufficient to affect production or influence prices.

The resolution passed by the Smokeless operators, opposing wage reductions is expected to influence other non-union fields to take the same course. The Interstate Commerce Commission, by opening up the anthracite rate hearings to let in the West Virginia smokeless shippers is believed to have acted in conformity with the general policy of the administration, which is to

encourage the use of substitutes for anthracite. These shippers would have an all-rail rate to Boston from southern West Virginia, or such improved dumping arrangements at Hampton Roads as will not break up their coal.

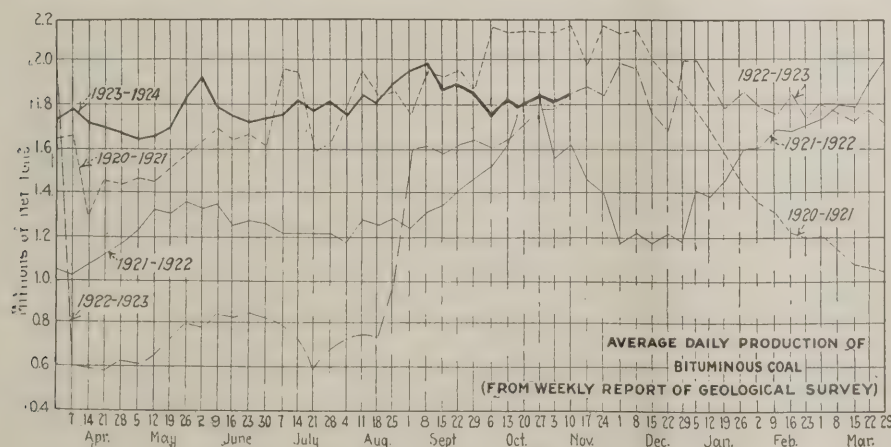
Shipments of smokeless coal to tidewater were temporarily checked by the strike on the Virginia Ry. last week, but there continues to be an abundance of coal



	Week Ended Nov. 5	Season to Nov. 5
Cargo	1,044,495	26,535,176
Fuel	43,609	1,433,363
Totals	1,088,104	27,968,539

available at Hampton Roads. New England is taking most of her industrial coal by water, which is assisting in keeping up the tidewater business. The Lake movement continues heavy and it is now expected that all records for bituminous coal movements over the lakes will be broken this year.

Demand for domestic sizes of anthracite is heavy. More Welsh anthracite is on the way to these shores and is expected to arrive during this month. Production of hard coal during the week ended Nov. 3 is estimated to have been 1,373,000 net tons, by the Geological Survey, a drop of 696,000 tons from the previous week.



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Oct. 20	10,378,000	10,694,000
Oct. 27 (a)	10,683,000	10,919,000
Nov. 3 (b)	10,666,000	10,560,000
Daily average	1,778,000	1,811,000
Calendar year	322,588,000	467,300,000
Daily av. cal. year	1,237,000	1,795,000

ANTHRACITE

Oct. 20	2,039,000	2,045,000
Oct. 27	1,836,000	2,069,000
Nov. 3	1,872,000	1,373,000

COKE

Oct. 27	237,000	276,000
Nov. 3 (a)	213,000	269,000
Calendar year	5,804,000	15,929,000

(a) Subject to revision. (b) Revised from last report.

There were dumped for all purposes at Hampton Roads during the week ended Nov. 8 225,627 net tons of coal, as compared with 344,120 tons the previous week.

Midwest Market Lower

Nothing happened during the past week to relieve the market monotony of the Midwest. Almost all coals droned along at a little less than the pace of the week before, with lump and egg from Illinois and Indiana holding practically the whole domestic trade of the region against "foreign" coals, but with steam trade dragging screenings prices down a shade. Production has slowed down a little more to meet this situation, however, so that the small volume produced in Illinois and Indiana has kept domestic prices fairly stable.

Southern Illinois lump goes for the market price of \$4@ \$4.35, Central Illinois lump for \$3.25 and Indiana Fourth Vein for \$3.25. A steady flow of anthracite into the Chicago region continues at the standard mine prices, but smokeless and other Eastern domestic coals are having a hard time West. West Virginia smokeless mine-run has

dropped to \$2@ \$2.50 and lump and egg is down a dollar to \$5@ \$5.25 with only moderate demand for it at any price.

Southern Illinois Fields Inactive

There is little activity in the movement of anything from the southern Illinois field. Some mines are able to keep their lump moving, but are unable to move the other sizes. Several of them have no bills of all sizes. Railroad tonnage has slowed up during the last week, and there is general discouragement over the entire field. Independent mines seems to get the fast working time, while the Association operators still maintain their prices.

In the DuQuoin field conditions are bad. Some mines are idle altogether, as is the condition in the Cartersville field, but prices are practically equal to those of the independent Cartersville operators and it is hard to move anything. In the Mt. Olive district a little domestic tonnage is moving, but it is under pressure, and there is no place to put steam sizes. A car shortage prevents certain mines from working, while they have no bills on hand and, generally speaking, conditions in this field are bad. The Standard district is plugging along, selling coal in some instances

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Midwest				
	Market Quoted	Nov. 13 1922	Oct. 29 1923	Nov. 5 1923	Nov. 12 1923†		Market Quoted	Nov. 13 1922	Oct. 29 1923
Smokeless lump.....	Columbus....	\$6.85	\$5.85	\$5.85	\$5.00@ \$5.25	Franklin, Ill. lump.....	Chicago.....	\$5.35	\$4.10
Smokeless mine run.....	Columbus....	6.25	2.30	2.30	2.10@ 2.65	Franklin, Ill. mine run.....	Chicago.....	4.10	2.55
Smokeless screenings.....	Columbus....	5.85	1.35	1.35	1.25@ 1.50	Franklin, Ill. screenings.....	Chicago.....	2.60	1.45
Smokeless lump.....	Chicago.....	6.00	6.10	6.10	5.00@ 5.25	Central, Ill. lump.....	Chicago.....	4.70	3.10
Smokeless mine run.....	Chicago.....	5.60	2.85	2.50	2.00@ 2.50	Central, Ill. mine run.....	Chicago.....	3.10	2.10
Smokeless lump.....	Cincinnati.....	6.00	5.85	5.75	5.00@ 6.00	Central, Ill. screenings.....	Chicago.....	1.85	1.05
Smokeless mine run.....	Cincinnati.....	6.10	2.50	2.10	1.75@ 3.00	Ind. 4th Vein lump.....	Chicago.....	5.10	3.35
Smokeless screenings.....	Cincinnati.....	6.25	1.50	1.60	1.00@ 2.00	Ind. 4th Vein mine run.....	Chicago.....	3.85	2.60
*Smokeless mine run.....	Boston.....	7.10	4.40	4.40	4.25@ 4.35	Ind. 4th Vein screenings.....	Chicago.....	2.05	1.20
Clearfield mine run.....	Boston.....	3.35	2.00	2.05	1.70@ 2.60	Ind. 5th Vein lump.....	Chicago.....	4.75	2.50
Cambria mine run.....	Boston.....	4.10	2.55	2.50	2.25@ 3.00	Ind. 5th Vein mine run.....	Chicago.....	3.60	2.10
Somerset mine run.....	Boston.....	3.75	2.25	2.25	2.00@ 2.75	Ind. 5th Vein screenings.....	Chicago.....	1.85	.80
Pool 1 (Navy Standard).....	New York.....	4.85	3.05	3.00	2.75@ 3.25	Mt. Olive lump.....	St. Louis.....	3.10	3.10
Pool 1 (Navy Standard).....	Philadelphia.....	3.10	3.10	3.05	2.85@ 3.20	Mt. Olive mine run.....	St. Louis.....	2.25	2.25
Pool 1 (Navy Standard).....	Baltimore.....	4.50				Mt. Olive screenings.....	St. Louis.....	1.25	1.00
Pool 9 (Super. Low Vol.).....	New York.....	4.20	2.30	2.30	2.00@ 2.50	Standard lump.....	St. Louis.....	4.25	3.05
Pool 9 (Super. Low Vol.).....	Philadelphia.....	4.30	2.35	2.30	2.15@ 2.45	Standard mine run.....	St. Louis.....	2.50	2.05
Pool 9 (Super. Low Vol.).....	Baltimore.....	4.10	2.15	2.15	2.00@ 2.15	Standard screenings.....	St. Louis.....	1.30	.45
Pool 10 (H. Gr. Low Vol.).....	New York.....	3.50	2.05	2.00	1.75@ 2.25	West Ky. lump.....	Louisville.....	4.75	2.40
Pool 10 (H. Gr. Low Vol.).....	Philadelphia.....	3.50	1.90	1.85	1.75@ 2.00	West Ky. mine run.....	Louisville.....	2.55	1.65
Pool 10 (H. Gr. Low Vol.).....	Baltimore.....	3.35	2.10	2.10	1.85@ 2.00	West Ky. screenings.....	Louisville.....	1.75	.65
Pool 11 (Low Vol.).....	New York.....	3.00	1.75	1.65	1.50@ 2.00	West Ky. lump.....	Chicago.....	4.10	2.60
Pool 11 (Low Vol.).....	Philadelphia.....	3.15	1.60	1.55	1.55@ 1.70	West Ky. mine run.....	Chicago.....	3.10	1.75
Pool 11 (Low Vol.).....	Baltimore.....	3.05	1.90	1.90	1.70@ 1.85				
High-Volatile, Eastern					South and Southwest				
Pool 54-64 (Gas and St.).....	New York.....	3.45	1.60	1.60	1.50@ 1.75	Big Seam lump.....	Birmingham.....	3.95	3.75
Pool 54-64 (Gas and St.).....	Philadelphia.....	3.50	1.60	1.60	1.50@ 1.75	Big Seam mine run.....	Birmingham.....	2.35	1.95
Pool 54-64 (Gas and St.).....	Baltimore.....	3.30	1.75	1.75	1.70	Big Seam (washed).....	Birmingham.....	2.60	2.35
Pittsburgh se'd gas.....	Pittsburgh.....	4.50	2.55	2.55	2.50@ 2.60	S. E. Ky. lump.....	Chicago.....	5.50	3.00
Pittsburgh gas mine run.....	Pittsburgh.....		2.25	2.25	2.20@ 2.30	S. E. Ky. mine run.....	Chicago.....	4.25	2.25
Pittsburgh mine run (St.).....	Pittsburgh.....	3.35	1.90	1.90	1.85@ 2.00	S. E. Ky. lump.....	Louisville.....	6.60	3.00
Pittsburgh slack (Gas).....	Pittsburgh.....	3.60	1.05	1.05	1.00@ 1.15	S. E. Ky. mine run.....	Louisville.....	4.25	1.75
Kanawha lump.....	Columbus.....	5.85	3.15	3.00	2.85@ 3.15	S. E. Ky. screenings.....	Louisville.....	4.00	.75
Kanawha mine run.....	Columbus.....	4.25	1.85	1.85	1.75@ 2.00	S. E. Ky. mine run.....	Cincinnati.....	6.25	3.35
Kanawha screenings.....	Cincinnati.....	3.60	.90	.80	.60@ .75	S. E. Ky. mine run.....	Cincinnati.....	3.85	1.50
W. Va. lump.....	Cincinnati.....	6.10	3.35	3.25	2.75@ 3.50	S. E. Ky. screenings.....	Cincinnati.....	3.60	.75
W. Va. Gas mine run.....	Cincinnati.....	4.25	1.50	1.50	1.25@ 1.75	Kansas lump.....	Kansas City.....	5.75	5.00
W. Va. Steam mine run.....	Cincinnati.....	3.75	1.50	1.50	1.25@ 1.75	Kansas mine run.....	Kansas City.....	3.75	3.50
W. Va. screenings.....	Cincinnati.....	3.75	.75	.85	.60@ 1.00	Kansas screenings.....	Kansas City.....	2.50	2.25
Hoeking lump.....	Columbus.....	5.50	3.06	2.95	2.85@ 3.00				
Hoeking mine run.....	Columbus.....	3.50	1.85	1.85	1.75@ 2.00				
Hoeking screenings.....	Columbus.....	3.00	.85	.80	.60@ .80				
Pitts. No. 8 lump.....	Cleveland.....	3.81	2.55	2.55	2.10@ 3.00				
Pitts. No. 8 mine run.....	Cleveland.....	3.56	1.85	1.85	1.85@ 1.95				
Pitts. No. 8 screenings.....	Cleveland.....	3.31	.90	.85	.90@ 1.10				

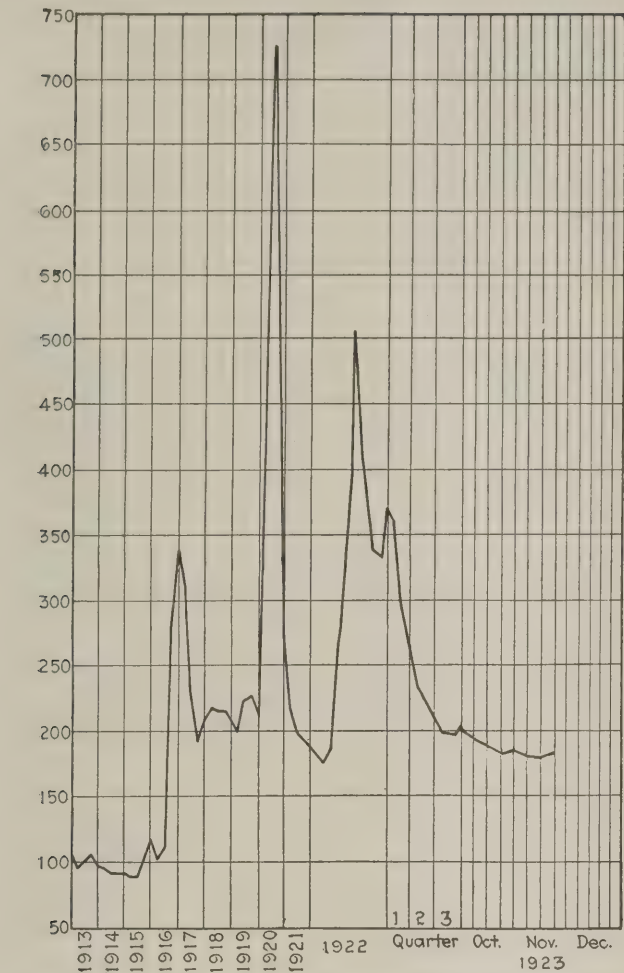
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Nov. 5, 1923		Nov. 12, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34		\$9.00	\$7.75@ \$8.25	\$9.60@ 10.50	\$8.00@ \$9.25	\$9.60@ 10.50	\$8.00@ \$9.25
Broken.....	Philadelphia.....	2.39			7.90@ 8.10				
Egg.....	New York.....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Egg.....	Philadelphia.....	2.39		9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago.....	5.06		12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove.....	New York.....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Philadelphia.....	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Stove.....	Chicago.....	5.06		12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York.....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Chestnut.....	Philadelphia.....	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Chestnut.....	Chicago.....	5.06		12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Ranges.....	New York.....	2.34			8.25		9.00		9.00
Pea.....	New York.....	2.22		7.00@ 11.00	6.15@ 6.30	6.75@ 8.25	6.15@ 6.65	6.75@ 8.25	6.15@ 6.65
Pea.....	Philadelphia.....	2.14		7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea.....	Chicago.....	4.79		7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York.....	2.22		4.00@ 5.00	4.00@ 4.10	2.00@ 3.00	3.50	2.00@ 3.00	3.50
Buckwheat No. 1.....	Philadelphia.....	2.14		5.00	3.00@ 4.00	3.00@ 3.50	3.50	2.25@ 3.50	3.50
Rice.....	New York.....	2.22		3.00@ 3.25	2.75@ 3.00	1.50@ 2.15	2.50	1.50@ 2.00	2.50
Rice.....	Philadelphia.....	2.14		2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....	2.22		1.75@ 2.00	1.50@ 2.00	1.00@ 1.50	1.50	1.00@ 1.25	1.50
Barley.....	Philadelphia.....	2.14		1.00@ 1.75	2.00	1.25@ 1.50	1.50	1.00@ 1.50	1.50
Birdseye.....	New York.....	2.22			2.10		1.60	1.45	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Index	1923				1922
	Nov. 12	Nov. 5	Oct. 29	Nov. 13	
Weighted average price	\$2.23	\$2.21	\$2.23	\$4.12	

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

below cost. Steam is the hardest size to move but even 6-in. lump, which moves the easiest, is frequently noted among the no-bills.

St. Louis Trade Still Quiet

Mild weather continues to maintain a soft market in St. Louis. The general condition is discouraging. Many oil burners have cut into the demand for better grade coals. The little tonnage that is moving is of the middle and lower grades and while there has been some movement the past week, it is in small quantities. Anthracite trading is light in comparison with past years. Coke and smokeless are not factors. Country domestic business is slow and calls for cheaper grades only. Country steam is hard to find, although a little movement of steam egg and nut has been noted to Omaha, Minneapolis and Chicago. Wagonload steam seems to maintain its own, but everything is far below normal.

Kentucky Market Unsettled

Although lower markets on prepared coal had been anticipated over the week as a result of cessation of Lake shipping, cool weather has created a better demand for prepared sizes from retailers, while potteries have been operating at capacity, and general consumption has been fair, with the result that prices are holding, and in fact are a shade

stiffer in western Kentucky, where there is an effort to advance lump from \$3 to \$3.25. Steam prices continue low, and with production of prepared at its present level there is not much prospect for a good price for steam coal or screenings at this time.

The general market shows little change over levels in effect over the past two or three weeks. Railroad reports show full car supply on all western Kentucky divisions, and eastern Kentucky is not complaining.

No general reductions in wage scales in eastern Kentucky are expected before April 1, but a few scattered operations are now on the 1917 wage scale, and are producing some cheap coal that will be a mean factor in competitive selling, and which may force numerous other reductions. Most of the reductions in eastern Kentucky and Tennessee have been in small mines.

Northwest Trade Is Moderate

Coal trading continues fair throughout the Northwest but without excitement except a little that is stirring up over a possible slight shortage of anthracite in the northward regions. Hard-coal receipts at Duluth-Superior have not been as heavy as expected for the past three weeks and it now appears the country trade has bought up about all there is on docks. In spite of high prices, this is stimulating the hard-coal market.

Anthracite shipments have been made to the Dakotas, western Minnesota and some points in Canada from Duluth and more orders have been accepted and will leave the docks before the closing of navigation. The Duluth market is fairly well depleted and two docks have stopped local sales of stove and nut. Most of the docks are not taking orders for car lot shipments of anthracite from outside points.

Receipts at Duluth-Superior up to Oct. 31 are as follows: Hard, 1,179,779 tons; soft, 9,691,680 tons; total, 10,871,459 tons. The increase as compared with last year's shipments to the same date are: Anthracite, 925,280 tons; soft, 6,187,492 tons. The average receipts to Oct. 31 over six years is 7,924,492. In all, twenty-four cargoes of hard and 168 cargoes of soft coal have arrived.

The Milwaukee coal market is quiet. Jobbers and retailers report little doing and a minimum amount of fuel is being consumed. Coke and the domestic grades of soft coal are the best sellers since anthracite has been lifted to the luxury class. Coal is coming freely by lake. The average receipts during the first five days of November were 40,312 tons per day. November receipts thus far aggregate 37,300 tons of anthracite and 205,156 tons of soft coal, making the season's receipts to date 821,624 tons and 2,802,857 tons, respectively. The dock yards are nearly filled to capacity with soft coal. Prices remain unchanged.

Western Trade

There was little life in coal trade throughout the West and Southwest during the week beyond the fact that steam trade began picking up in and around Kansas City, and Kansas lump, after a long period of slow running time at the mines, was able to raise its top price from \$5 to \$5.25. There are fewer no-bills in the Kansas and Oklahoma fields just now. Most mines get about 50 per cent of full time.

In Colorado there is a slight stimulation of domestic trade by reason of cool weather and the demand for steam coal has come up slightly also, but the whole effect has been small on production and running time. In Utah trade is quieter than it has been for weeks. The last vestige of car shortage which afflicted a few operations a little a couple of weeks ago has passed and now there is no need for many of the cars available. Running time averages little over two days a week. Stocks of all sorts of coal are rolling up.

Ohio Buyers Limiting Purchases

Buying of both domestic and steam coals is limited to immediate wants in the Columbus market and there is little disposition to buy for the future. On the whole the trade is quiet. Retail stocks of domestic coals are fairly good, and while this trade probably is the best feature of the market, it is not as active as a few months back. West Virginia

splints and Pocahontas are in best demand for domestic use and there also is a fair demand for Pomeroy, Crooksville and Cambridge grades. The steam trade at Columbus is quiet, as reserves are heavy.

In the Cincinnati market cool weather failed to arouse the market materially. Domestic coals move slowly and slack is hard to place at almost any price. Consignment and distress coals, which were so prominent in this market a few weeks ago, have been pretty well cleaned up. The under-current in the low-volatile market seems to be the point of interest now. There are reports that large tonnages are being moved at \$5 or less, but these sales are not being acknowledged by the companies. Quotations for West Virginia and southeastern Kentucky 2-in. lump range from \$2 to \$2.50.

Reports from the Cleveland market are pessimistic. Industrials are not inclined to add to their already heavy reserve stocks and inquiries are not numerous. The retail dealer is not reporting the usual activity.

Very little distress coal is to be had in the Pittsburgh market, and the coal now being offered at low prices, below what operators claim is the real cost, is nearly all fresh-mined product. Production in the Pittsburgh district continues to decrease, as one mine after another closes on account of having completed its lake shipments. It was expected that the closing of mines would improve market conditions, but as the market has not stiffened it is assumed that other mines have not completed their lake deliveries and are still offering coal in the spot market.

There are few signs of improvement in central Pennsylvania. Producers say there is no business to be had and the mines are working two or three days a week, while many of the smaller operations are closed down.

New England Quotations Lower

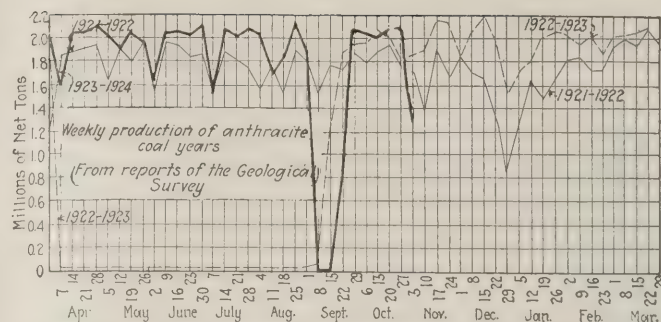
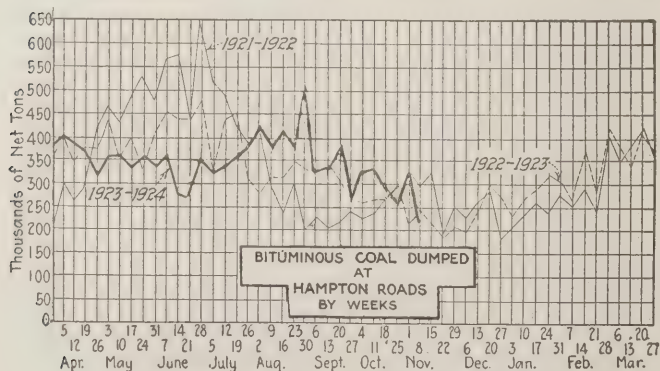
In New England quotations for spot coal are even lower than a week ago. Aside from distress coal, No. 1 Navy standard Pocahontas and New River are rumored to have been sold within a few days at less than \$4.25 f.o.b. vessel, Hampton Roads. On cars Boston there have also been sales at correspondingly low figures. On mine run, \$5.18 and \$5 have been named, and slack has been disposed of at more than 50c. less. It should be said, however, that receipts are running less than they were, and judging from the number of operations that have closed down the past week it is expected the latter half of the month would make November totals very much less than figures for October.

On all-rail from Central Pennsylvania there is almost nothing doing in this territory. A few scattering sales are made in areas west of the Connecticut River, but from there east there is practically no outlet for anything but tide-water coal.

Reserves are heavy, and it will be interesting to watch the course of the market during the next few weeks. There are some who think there will be no pronounced turn for the better until January, when possible labor complications may begin to loom up.

Less Coal at New York Tidewater

Slowing up of shipments to the New York tidewater resulted in a partial cleaning up of loaded boats and distress coal. Demand did not improve, however, and shippers had



to keep busy in order to move their supplies. Tenders received last week by the U. S. Shipping Board for delivering alongside vessels, New York harbor, 2,000 gross tons Pool 9 bituminous coal, resulted in prices ranging from \$4.21 to \$5.47, as compared with \$4.18 to \$5.25 submitted about ten days previously. There is no improvement in the Philadelphia market and some interests believe there has been a shrinkage in business moving for the last three weeks. The consumer is indifferent. Several important jobbers at Baltimore report getting inquiries involving large tonnages and it is said some important closings were made. One of the disturbing elements has been reports of bad preparation.

More mines are closing down in northern and southern West Virginia. Demand continues slow, although cool weather created a little better call for screened coals and stiffened the price slightly, but the increase was not general. No-market losses are reported as large in the southwestern Virginia fields.

Conditions at Birmingham are not promising. Inquiry and new business is confined to spot sales. Sales of domestic grades are fairly good, while production is being closely confined to trade requirements. There has been a marked decrease in iron production and consequently less demand for furnace coke, while the market for foundry coke is quiet and easy.

Welsh Anthracite for New England

The situation in New England with regard to anthracite is in a fair way to be relieved slightly by the arrival of about 30,000 tons of Welsh anthracite, which will be brought to these shores this month and landed at Boston, Providence and Portland. Some of this tonnage is now on the way. Activity continues to be confined to the domestic sizes. Demand is active and retail dealers desire larger shipments. Egg and pea coals are the easiest in supply, but there is no surplus of either size.

Stove and chestnut sizes are most in demand in New York and Philadelphia, and retail dealers say they are not receiving enough of these coals to take care of their trade. Dealers at Baltimore are disappointed over the lack of shipments but are able to take care of emergency orders. However, while there is a considerable tonnage of unfilled orders on the books, practically all consumers have been given some coal. Demand for anthracite at Buffalo far exceeds the demand, but shippers there are not disturbed over the situation, for they believe there is going to be coal enough to go around.

The steam sizes move slowly. Considerable storing is being done by both the larger producers and some independents. In many instances retail dealers are taking car for car of the smaller coals in order to get the domestic sizes, and in some cases are able to get the larger coals at lower prices but are quoted slightly higher prices for the smaller coals.

Car Loadings, Surplusages and Shortages

	Cars Loaded			
	All Cars	Coal Cars		
Week ended Oct. 27, 1923.....	1,073,965	195,535		
Previous week	1,072,881	190,451		
Same week in 1922.....	999,718	193,809		
	Surplus Cars			
	All Cars	Coal Cars		
Oct. 31, 1923.....	24,477	7,205	12,336	3,068
Same date in 1922.....	3,716	1,584		
Oct. 22, 1923.....	23,895	5,674	13,655	3,250

Foreign Market And Export News

British Coal Consumers Close Contracts; Output Declines Slightly

There was a decrease of 5,000 tons in the production of coal in Great Britain's mines during the week ended Oct. 27, as compared with the previous week's output, says a cable to *Coal Age*. The output was reported as 5,675,000 tons as against 5,680,000 tons the previous week, while the production for the corresponding week of 1922 was 5,388,000 tons.

Though the Welsh coal market has not improved materially it is understood that a number of large consumers have contracted for coal for the early part of next year. The tonnage involved was not announced but it is understood to aggregate about 500,000 tons and that the prices accepted range from 6d. to 1s. over last year's contract figures.

Several small orders have been placed for Admiralty large steam, at a slight advance in price, but as operating and labor costs have also increased the benefit of the advance is not felt.

One company has sold between 100,000 and 150,000 tons of machine-broken anthracite cobbles and nuts to America and Canada. It is understood that this same company has arranged for the installation of breaking plants at New York, Montreal and Quebec.

Welsh operators are expecting the French, Italian and German demands to increase during the winter months.

The Newcastle market is still in a strong position and no anxiety is felt over business during November. Various contracts are reported for lots of 10,000 to 20,000 tons for delivery over next year, and 30,000 best steams at 24s. 6d. per ton for January-February delivery. Tenders have been cabled for 25,000 tons of steam coal for the Norwegian State Railways.

Hampton Roads Dumpings Decrease

Business at Hampton Roads did not improve last week, while dumpings for the week ended Nov. 8 amounted to 225,627 net tons, a decrease of 118,493 tons when compared with the previous week. Coastwise trade and bunkers constituted the bulk of the business, with the former showing signs of increasing.

The strike of the Virginian railway engineers caused a complete tie up at the piers of that road at Sewalls Point, with a consequent strengthening in the coal market, but which was regarded as temporary. The effect of the strike was not felt as it would have been at any other time of the year, because the demand for coal was not brisk.

There is less stringency in the domestic coal business than has existed at this period for the last two years, because consumers appear to be content to confine themselves largely to soft coal, of which there is an abundant supply. The tone of the market was somewhat stronger than for the previous two weeks.

"Popular" Coals for French Consumers

To combat the high cost of living the French authorities have asked retail dealers to make a special selection of coals to be sold as "popular" coals at reasonable prices. Due to mild weather demand for house coals is weak, otherwise the present supplies would soon be exhausted. Industrials coals are in fair demand.

Wage negotiations looking to a readjustment of miners' pay are now under way and it is generally believed that the workmen will secure some concessions.

Imports of British coal show a slight increase, but consumers are not inclined to make heavy purchases due to the condition of the money market.

France and Luxembourg received about 30,000 tons of indemnity coal during the period Oct. 11-20, 61,100 tons of coke and 4,900 tons of lignite, a total of 96,000 tons, as compared with 109,200 tons for the previous ten days. The Minister of Public Works who recently returned from an inspection of the Ruhr district, reports that actual daily shipments must not be expected to average more than 7,000 tons of coal and 3,000 tons of coke.

Imports of coal during September amounted to 2,619,831 tons as compared with 2,241,157 tons in August. This included 1,667,185 tons from

Great Britain and 41,768 tons from the United States. Exports during the same period was 171,853 tons, as compared with 185,725 tons in August. Coke imports amounted to 280,116 tons in September as against 274,606 tons in August, with exports of 49,944 tons in September as compared with 59,976 tons in August. Imports of patent fuel in September amounted to 46,374 tons and exports of 19,536 tons. In August the imports were 64,460 tons and exports 12,545 tons.

Export Clearances, Week Ended Nov. 10, 1923

FROM BALTIMORE

For France:	Tons
Belg. SS. Eglantier.....	6,523
For Canada:	
Nor. SS. Otto Sverdrup.....	5,741
For Porto Rico:	
Am. SS. Major Wheeler.....	348
For Cuba:	
Br. SS. Berwindvale	8,333
Am. Schr. Charles D. Stanford.....	1,112

FROM HAMPTON ROADS

For New Brunswick:	
Nor. SS. Songa, for St. John.....	4,304
Dan SS. Dorte, for Chatham.....	3,304
For Bermuda:	
Amer. Schr. Margaret Spencer, for Hamilton	991
For Cuba:	
Nor. SS. Runa, for Preston.....	1,430
Nor. SS. Gefion, for Cayo Mambi....	603
Amer. Schr. Friendship, for Manzanillo	892
Br. SS. Berwindmoor, for Havana...	9,410
For Italy:	
Ital. SS. Maria Enrica, for Porto Ferrajo	10,840
For Halifax:	
Amer. Schr. Lydia McClellan, Baxter.	1,758
For Egypt:	
Br. SS. Langton Hall, for Port Said..	2,533

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Nov. 1	Nov. 8
Cars on hand.....	1,899	2,297
Tons on hand.....	114,718	143,943
Tons dumped for week.....	101,618	86,761
Tonnage waiting.....		7,500

Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,684	1,739
Tons on hand.....	99,400	104,850
Tons dumped for week.....	97,702	79,971
Tonnage waiting.....	7,100	7,332

C. & O. piers, Newport News:		
Cars on hand.....	972	1,437
Tons on hand.....	51,750	73,970
Tons dumped for week.....	107,931	34,721
Tonnage waiting.....	1,525	

Pier and Bunker Prices, Gross Tons

PIERS

	Nov. 3	Nov. 10†
Pool 9, New York.....	\$4.65@ \$5.00	\$4.65@ \$5.00
Pool 10, New York.....	4.00@ 4.75	4.10@ 4.50
Pool 11, New York.....	3.90@ 4.25	4.00@ 4.25
Pool 9, Philadelphia.....	5.20@ 5.35	5.00@ 5.20
Pool 10, Philadelphia.....	4.30@ 4.85	4.00@ 4.70
Pool 11, Philadelphia.....	4.05@ 4.40	3.95@ 4.15
Pool 1, Hamp. Roads.....	4.20@ 4.40	4.25@ 4.50
Pools 5-6-7 Hamp. Rds....	4.15@ 4.25	4.00
Pool 2, Hamp. Roads....	3.85@ 4.00	3.75@ 4.00

BUNKERS

Pool 9, New York.....	4.95@ 5.30	4.95@ 5.30
Pool 10, New York.....	4.30@ 5.05	4.10@ 4.85
Pool 11, New York.....	4.20@ 4.55	4.30@ 4.55
Pool 9, Philadelphia.....	5.35@ 5.75	5.20@ 5.55
Pool 10, Philadelphia.....	4.80@ 5.10	4.60@ 5.00
Pool 11, Philadelphia.....	4.35@ 4.65	4.25@ 4.50
Pool 1, Hamp. Roads....	4.20@ 4.40	4.25@ 4.50
Pool 2, Hamp. Roads....	3.85@ 4.00	3.75@ 4.00

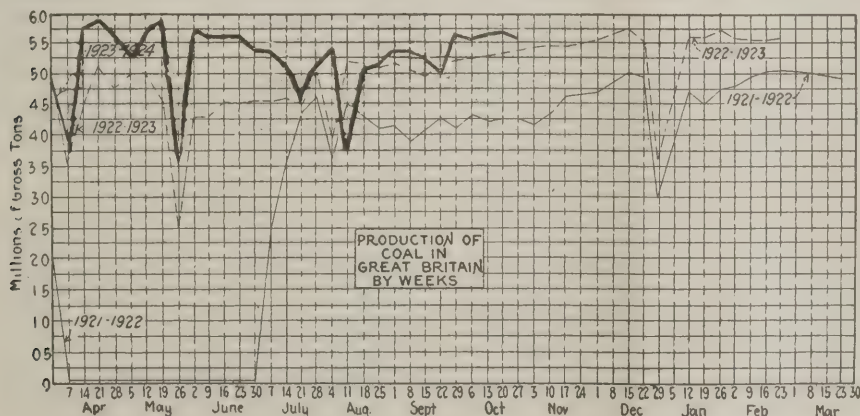
Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Nov. 3	Nov. 10†
Admiralty, large.....	27s. @ 27s. 6d.	27s. 6d. @ 28s.
Steam smalls.....	15s. 6d. @ 17s. 6d.	

Newcastle:		
Best steams.....	25s.	25s. 6d. @ 26s.
Best gas.....	24s.	24s.
Best bunkers.....	23s. @ 24s.	22s. 6d. @ 24s.

† Advances over previous week shown in heavy type, declines in italics.



News Items From Field and Trade

ALABAMA

George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Co., has accepted the chairmanship of the State harbor board, created by an act of the recent Legislature to supervise the development of port and harbor facilities at Mobile, for which the state will lend its credit to the extent of \$10,000,000.

The **Pratt Fuel Corporation** has purchased the mineral lands and plants of the **Bryan Coal Corporation**, consisting of about 10,290 acres of valuable coal lands in Jefferson and Walker counties and a number of producing mines. The consideration is said to have been between \$600,000 to \$700,000. The acquisition of the new properties will give the Pratt Corporation a potential capacity of about 1,000,000 tons of coal annually. **Walter Moore** is president of the Pratt Corporation and also is vice president of the DeBardeleben Coal Corporation, formed several months ago by the merger of three independent commercial producing companies.

William Dockerty, foreman of No. 1 Pratt mine of the Tennessee Coal, Iron & Railroad Co., was **fatally injured** Oct. 27 when struck by a tram car in the mine. Mr. Dockerty had been identified with mining operations in the Birmingham district for many years and was widely known.

The annual meeting of the **Alabama Mining Institute** will be held Nov. 21 at the Roebuck Country Club. Officials will make report on activities of the Institute during the past year and officers and committees for the new year will be elected. The meeting will be addressed by **Harry L. Gandy**, of Washington, executive secretary of the National Coal Association, and possibly by President **Erydon**, the latter having been invited to be present.

ARKANSAS

Fire destroyed the tippie of the Mine No. 1 of the Southern Anthracite Coal Co. at Russellville, Oct. 16, causing a loss of approximately \$100,000.

Work will be started at once, it is understood, on the **rebuilding of the tippie and top works at the Bernice mine No. 1** of the Southern Anthracite Coal Co. which were recently destroyed by fire near Spadra, with a loss of \$100,000.

COLORADO

Fred Ewing recently with the National Fuel Co. of Denver is now associated with the **Ewing Fuel Co.** which includes Mr. Ross and Mr. Campbell. This company is in the brokerage of coal, handling **Ross Coal Co.**, anthracite from Crested Butte.

The **Midwest mine** located at Palisades, recently closed on account of explosion in which six men lost their lives, **has reopened** and is operated by the sons of **R. T. Scott** who formerly had the lease before the explosion.

ILLINOIS

The **United States Steel Corporation** has transferred to the **Burton Coal Co.** of Chicago its 3,000 acre tract of virgin coal land in **Williamson County**. This property, which has been held by the steel interests as a reserve for the future, will be operated soon by the **Burton Company**, through the **Freeman shaft** of that company on land adjoining. It is improbable that a new shaft will be driven.

The **Nason Coal Co.**, Chicago, announces the appointment of **John D. Ristine** as assistant to the vice-president, effective Nov. 15.

The **Southern Coal Co.**, 343 S. Dearborn Street, Chicago, has been granted a charter of incorporation by the Secretary of State at Springfield. Capital stock is given as \$50,000. The company will mine, buy and sell coal, coke, etc. Incorporators are: **Wil-**

liam G. Worthey, **Louis C. Horner** and **Joseph B. Lawler**.

INDIANA

Reductions in the price of domestic bituminous coal and coke ranging from 50c. to \$1.50 a ton have been announced by the Indianapolis coal dealers. This is the first time in 25 years that fall coal is cheaper than spring coal in Indiana. **Pocahontas** shoveled lump was reduced from \$11.50 a ton to \$10.50, **Pocahontas** mine run from \$9 to \$7.50 a ton. **West Virginia** lump from \$9 to \$7.75 and **Kentucky** lump from \$9 to \$8. **Coke** dropped from \$12.25 to \$11.75 a ton, and crushed coke from \$12.25 to \$11.75. **Linton Fourth Vein** forked lump was reduced from \$6.75 to \$6.25, and **Linton Fourth Vein** shoveled lump from \$5.50 to \$4.95 a ton.

After being entombed in the **Hunt Brothers' Mine** at **Staunton** for more than seven hours Oct. 27 the **lifeless bodies of three miners and a boy** were taken from the fire-wrecked mine. The bodies were removed by volunteer workers after an all-day fight to subdue the flames, which wrecked the interior of the mine following the explosion of a gasoline engine in the workings of the mine. The four victims of the explosion were: **John Landis**, 44, of near **Eagles**; **Peter Buttermann**, 45, **Brazil**; **Joe Hardy**, 65, **Turner, Ind.**, and **George Harvey**, 10-year-old son of **Joe Hardy**, who was spending the day in the mine with his father. Four other men were rescued shortly after the explosion, when a rope was let down the air shaft and they climbed to safety.

The **Burnett Mutual Mining Co.**, of **Burnett**, has been incorporated with a capital of \$50,000 to mine coal. The directors of the company are **Walter Foxworthy**, **J. L. Revonald**, **Ed Hoffman**, **Noble Christopher**, **Elmer Marquis** and **Fred Christopher**.

KENTUCKY

Underground coal-loading machines are coming into greater use in western Kentucky and several companies which haven't them have heard good reports concerning their operation, and are planning to install. **Western Kentucky**, a section of thick coal, can use loaders to advantage. While it is a union field, the union workers, although plainly showing that they do not care for labor-saving machinery, have used the machines and have not been directly hostile to the idea. **Eastern Kentucky**, a field largely non-union, contains a good many thin-seam mines, and it is contended that the coal-loading machine cannot be operated as well there. However, it is believed that eastern Kentucky in a number of instances will come around to loaders.

Amended articles have been filed by the **Wallins Creek Coal Co.**, Louisville, operating in Southeastern Kentucky, the capital being placed at \$150,000 and debt limit at \$500,000. **T. L. Young**, **L. H. Young** and **J. L. Laurent** are the incorporators.

Western Kentucky is feeling rather good as a result of a decision of the Interstate Commerce Commission placing the freight rate from western Kentucky to the Northwest on the basis of 25c. a ton over the rate from the southern Illinois mine group. The **Western Kentucky Coal Bureau** had been fighting for this rate for a year or more. The new rates go into effect Jan. 24, 1924.

It is reported that **J. D. Wheeler**, of **Pike County**, is one of the organizers of the **Barking Coal Co.**, a \$100,000 company, which will install a new operation in **Dickinson County, Va.**, on the **Carolina, Clinchfield & Ohio R.R.**, a few miles from the Kentucky border.

J. H. Sudworth, of **Central City**, has been appointed an assistant state mine inspector, to succeed **J. A. Lewis**, in the third state district.

There is no movement of river coal now, as the **Ohio River** is lower than within a period of 40 years or more.

MISSOURI

Missouri coal is becoming an important fuel source to industries within the state. There is an apparent notable increase in mining over the strike year of 1922. Coal lands are acquiring increased values. Public-utility plants in the state are not only using more Missouri coal than in the past, some of them have purchased and are operating their own mines, while others are seeking mines, according to the **Missouri Committee on Public Utility Information**. An electric light and power company is operating its own mines at **Clinton**. Another company has acquired mining rights to 60,000 acres of coal land near **Salisbury**. Coal mining at **Novinger**, **Kirkville**, **Bevier**, **Lexington**, **Richmond**, **Moberly** and **Fulton** has been greatly stimulated by the demand of public-utility plants for fuel, the committee states.

W. G. O'Fallon, fuel agent for the **St. Louis Terminal R.R. Association** for fifteen years, has resigned to engage in private business. During the strike in 1922 he was one of the four experts appointed by the **American Railway Association** to allocate railroad fuel when the situation was worst. His territory was the southwestern region.

C. B. Bee, chief rate expert for the **Public Service Commission of Missouri**, has resigned to accept a similar position with the **Oklahoma commission**, effective Nov. 1. He leaves for an increase of \$1,500 a year. The **Missouri salary** was \$4,200. He will be succeeded by **V. E. Smart**, traffic expert of the **Board of Railway Commissioners of North Dakota**.

NEW YORK

Charles S. Allen, who was secretary of the **Wholesale Coal Association of New York** and is now connected with the **Cory Mann George Corporation**, of **New York** and **London**, has been appointed manager of the office of the corporation recently opened in **Scranton, Pa.**

Robert L. Kyte, formerly with **Bulah Coal Mining Co.**, has become associated with **Fred D. Gearhart, Inc.**, of **New York City**, as combustion engineer.

M. A. Hanna Co. for the quarter ended Sept. 30, reports total net income of \$679,936 after interest, depreciation, depletion and federal taxes, equivalent, after allowing for preferred dividend requirements, to \$1.47 a share earned on the outstanding 282,844 shares of no par common stock. For the nine months ended Sept. 30, total net income was \$1,938,137, equivalent, after allowing for preferred dividends, to \$4.82 a share on common.

Colorado Fuel & Iron Co. for the quarter ended Sept. 30, 1923, reports a deficit of \$316,644 after fixed charges and depreciation, compared with a deficit of \$131,462 in the corresponding quarter of 1922. Gross receipts amounted to \$7,762,931, compared with \$7,266,964 in the 1922 period, while operating expenses aggregated \$7,096,421, against \$6,376,400. Non-operating income was \$105,365, compared with \$73,391 in the third quarter of 1922. Fixed charges, etc., were \$712,448 against \$719,407 and depreciation charges were \$382,671, compared with \$376,011 in the 1922 period.

Chas. A. Owen, **Howard Adams**, and **James E. Manter**, Receivers of the **Tidewater Coal Exchange, Inc.**, announce that **J. O. Wolcott**, Chancellor of the State of Delaware issued on Oct. 26 the following order in connection with the dissolution of the **Tidewater Coal Exchange, Inc.**: "It is hereby ordered that the time for filing claims against the said receivership estate be and the same is hereby renewed and extended until the 1st day of January, A.D., 1924, and the time for receivers and all other persons in interest to file exceptions to claims filed against said estate be and the same is hereby extended until the 1st day of April, A.D., 1924." Probated claims, the receivers say should be filed with the Register in Chancery, Wilmington, on or before Jan. 1, 1924.

OKLAHOMA

The **Oklahoma School of Mines** has established a branch school in **Henryetta**, to instruct miners in different phases of mine work. The school opened with 60 men enrolled. Under the direction of **W. E. Howard**, it will have three additional instructors. Classes will be held in the afternoon and evenings. The school is supported by an appropriation of both state and federal funds, and is open to any person more than 16 years old who is not a pupil in the city schools.

OHIO

The Tildesley Coal Co., of Cincinnati, has purchased the P M C mines at Sprigg, W. Va., on the Norfolk & Western Ry. and will operate them in their own interests.

L. C. Halloran, formerly connected with the mining side at Omar, W. Va., with the Main Island Creek Co., has become connected with the Universal Coal Co.'s Cincinnati office as a salesman in the Northwest. His headquarters will be in Chicago.

The Bethlehem Coal Co., Cleveland, has been chartered with an authorized capital of \$10,000 to operate coal mines. Incorporators are W. F. Maurer, T. B. Bolton, Norton McGriffin, L. M. Coolidge and E. H. Bevier.

R. N. Osborne succeeds W. W. Austin as secretary of the Borderland Coal Sales Co., of Cincinnati, and A. S. Bitters, for eight years with the Matthew Addy Co., has become the traffic manager and credit man for the Borderland.

The mine of the John Donald Coal Co., near Millersburg, which has been burning for several weeks, cannot be sealed up because of several holes burned through the surface which admits the air to the blaze underground. The mine, which was one of the largest producers in Holmes County, was set on fire by a stove used for heating purposes. Cave-ins, which have prevented the sealing of the mine, have occurred from time to time, and an attempt to flood the mine also failed.

The Penn-Ohio Coal Co., near Lisbon, is preparing to resume operation after several weeks' idleness to install modern electrical equipment. It is expected to produce 100 tons of coal a day.

PENNSYLVANIA

At the present rate of consumption, Somerset County, one of the leading bituminous coal counties in central Pennsylvania, will have coal enough to last 500 years. A statement issued on the coal reserves of Somerset County by the Pennsylvania Bureau of Mines discloses that there are 3,987,900,000 tons of unmined coal in the county. This area represents the largest reserve of high-grade low-volatile steam coal in the state. The Berwind-White Coal Co. mines are in that district. Approximately 8,000,000 tons of coal is produced annually in Somerset County, which is taken from at least eight mineable coal beds. The lower and upper Kittannings are the thickest and best beds, most of the present production being from these beds.

A conference was recently held at Harrisburg by Attorney General George W. Woodruff, Dr. Ellen C. Potter, Secretary of Welfare, and T. Henry Walnut, chairman of the State Workmen's Compensation Board, to consider a change in the ruling of the Workmen's Compensation Board made some months ago. This was that the maximum which any hospital may receive for medical, surgical or hospital treatment of an injured workman shall not exceed \$100. Dr. Potter contended that the ruling was most unfair to the hospitals as frequently the value of the services rendered for an injured worker is in excess of the maximum amount allowed. Full service is rendered, she said, but full payment cannot be collected.

Thomas Kennedy, president of District No. 7, United Mine Workers, in an address before the City Club, at Philadelphia, on Nov. 9 defended the coal miners' position and said that with reasonable profits for the coal operators, fair and equitable freight rates, elimination of unnecessary middlemen and a reasonable profit for the retailer, the price of coal could be reduced at least \$3.50 per ton. In his address and in meeting a fire of questions afterward, the speaker stoutly held to it that the miners' wages are only fair and reasonable, and not responsible for high prices. He lauded Governor Pinchot. "The governor and his advisers," he said, "in one week found out more about the operators and more facts about the coal situation than the Coal Commission found out in a whole year, with the expenditure of something like \$760,000.

Announcement has been made of the organization of a company which has taken a 99-year lease on a 371-acre coal tract near Pottsville, where bore-hole drillings are said to have shown coal of an excellent quality. The new concern is to be known as the Jordan Coal Co. with P. E. Jordan, of Scranton, as president. Plans of the stockholders call for the construction of a \$200,000 breaker on the tract, while work has already been undertaken on the building of a road leading up the mountain side.

The breaker construction will be started in the Spring. Officers of the company, in addition to Mr. Jordan, are: William Mack, vice-president; William Willis, treasurer; James T. Hanlon, secretary, and Albert Zenke, assistant treasurer. James J. Wilson, Joseph F. Moran and Richard Philbin are also among Scranton men interested in the project.

The Union Trust Co., of Pittsburgh, trustees of the Consolidated Connellsville Coke Co. first-mortgage 15-year 6-per cent sinking-fund coupon gold bonds, dated Dec. 1, 1910, has announced that at the request of the company it will pay and redeem on Dec. 1 all of the outstanding bonds, numbering 197, at par and accrued interest to that date, together with a premium of 5 per cent. Interest on the bonds will cease Dec. 1.

As a result of the ending of an agreement with B. Nicoll & Co., Inc., as sales agents the Pittsburgh Terminal Coal Co. will market its own product. The agreement, which had existed for many years, was terminated by mutual consent on Oct. 31. H. K. Stauffer, vice-president in charge of sales and formerly vice-president of B. Nicoll & Co., will look after sales for the Pittsburgh Terminal Coal Co. with offices at Pittsburgh.

The Fairbanks coke plant, consisting of 230 acres of land from which much of the coal has been removed, 200 ovens, 40 houses and plant equipment, has been sold by the receivers of the American Coke Corporation to George Santos, Jr., of Uniontown. The consideration was \$90,000. The plant, located at Fairbanks, in the Lower Connellsville district, was originally built and operated by the Struthers Furnace Co. It was taken over by the American Coke Corporation in 1920.

The tipple and boiler house of the Corrado Coal Co. at Fort Hill, which were only recently purchased, were destroyed by fire Nov. 5. It is believed the blaze had its origin in a spark from a passing locomotive.

Mayor Durkan, of Scranton, held a conference Nov. 1 with James B. Smith and J. Rossa McCormick, of the city's mine-cave bureau; A. W. Long, H. L. Harding and E. F. Blewitt, mining engineers, and discussed the advisability of increasing the valuation of coal lands in the city from \$320 to \$581 per foot-acre for taxation purposes during 1924. It is understood that the city officials are figuring on an average value of approximately 41c. per ton on coal in place, with the number of tons per foot acre placed at 1,400.

Philip Maue, for the last 15 years a mining engineer, has been appointed superintendent of Mt. Lookout colliery of the Temple Coal Co. at Exeter Borough. Since the retirement of Bruce Weir, in February last, the colliery has been without a superintendent. Mr. Maue will move from Shamokin to Wyoming. For the last four years he has been mining engineer for the Susquehanna Collieries Co.

W. H. Brights, of Elmira, N. Y.; M. H. Reap and Joseph A. Murphy, of Scranton, have obtained a lease on a coal dump at the Manville colliery of the Hudson Coal Co., near Carbondale. They also leased the Manville breaker and washery. It is estimated that there are over 90,000 tons of marketable coal in the dump and the new owners are organizing a company to market the product which they will obtain after washing the culm pile.

UTAH

Speaking at the Harvard Club, New York City, to the New York Section of the American Institute of Mining and Metallurgical Engineers, Nov. 7, J. V. W. Reynders said that byproduct coke ovens and blast furnaces soon would be operated at Provo, using coal from Carbon County, about 100 miles away, and iron ore from a point in Iron County about 200 miles distant, the point chosen for the furnace being favored because of the water available and the existing railroad routes. The blast furnaces will be ready in the spring. At present the pig iron will be shipped to the coast for further treatment. The aggregate assembly cost of material at Provo will be less than that to be met in the Pittsburgh or Chicago district.

WASHINGTON, D. C.

In compliance with a request from the Department of Commerce, the National Retail Coal Merchants' Association has designated its members of the committee which is to act in an advisory capacity on coal matters, as follows: S. B. Crowell, of the George E. Newton Coal Co., Philadelphia; M. E. Keig, of the Consumers' Coal Co., of Chicago and Roderick Stephens, of the Stephens Fuel Co., New York.

The Navy Department has awarded contracts for 25,000 tons of steaming coal for delivery into storage at the Naval Fuel Depot, Sewalls Point, Va., based upon the bids submitted on Nov. 1, as follows: W. H. Brown Coal Co., Inc., Norfolk, Va., 5,000 tons at \$4.42 per ton; Eastern Coal & Export Corp., Richmond, Va., 10,000 tons at \$4.75 per ton; and Fayette Smokeless Fuel Co., Mt. Hope, W. Va., 10,000 tons at \$4.87 per ton.

Bids will be received by the Bureau of Supplies and Accounts of the Navy Department, Washington, until noon, Nov. 21 for the transportation of coal from Hampton Roads by vessel to Portsmouth (N. H.) Navy Yard, Puget Sound Navy Yard and Pearl Harbor Naval Station. From 3,500 to 5,000 tons are to be carried to Portsmouth between Dec. 1, 1923, and Jan. 15, 1924; 6,500 to 8,000 tons to Puget Sound between Jan. 1 and May 15, 1924, and 6,500 to 9,000 tons to Pearl Harbor.

WEST VIRGINIA

Colonel C. W. Watson, of New York, president of the Consolidation Coal Co., headed a party of officials of that company who inspected the mines of the concern in Kentucky during the early part of November. Others in the party in addition to Colonel Watson were Sprigg D. Camden, vice president of the company; A. Brooks Fleming, assistant to the president; Dr. F. H. Birmingham; Miss Lucy Watson, a sister of Colonel Watson, and Graham Turnbull, private secretary to Colonel Watson.

According to estimates made by A. O. Wilson, statistician of the Kanawha Coal Operators' Association, there will be more coal produced in West Virginia during the present calendar year than during any previous year in the history of the industry in the state. Mr. Wilson estimates that the total production of the state will reach not less than 90,000,000 tons, or about one-fifth the total tonnage for the United States as a whole. Such a production will be reached notwithstanding the fact that in recent months there has been an extremely poor market for coal in West Virginia. The Chesapeake & Ohio loaded more coal during October than during any previous month in the history of the road. It is estimated that total loadings reached 78,000 cars, or about 3,900,000 tons.

The Westmoreland Coal Co., operating in the Irwin Basin of Westmoreland County, Pennsylvania, has taken title to the Laurel Coal Land Co.'s property of 5,518 acres on the waters of Spruce Fork and Little Coal River in Boone County, lately owned by the Chilton family, of Charleston. The consideration was in excess of \$600,000.

Five grievances in dispute between miners and operators were settled at a recent meeting of the joint board of the Northern West Virginia Operators Association and representatives of the United Mine Workers of America, held in Morgantown. All the cases involving disputes within the territory of the Northern West Virginia association are understood to have been settled without much difficulty.

Announcement has been made of the appointment of John Stewart as general mine manager of all the J. S. Sullivan mines in southern West Virginia. Mr. Stewart has had charge for some time of the J. C. Sullivan mines on the Norfolk & Western. His headquarters will be at Tralee, a central point for the mines which are located in Raleigh, Wyoming and McDowell Counties.

The large wooden tipple at the No. 1 mine of the Tidewater Coal & Coke Co., at Vivian, owned by the Houston interests, is a total loss as the result of a fire, the origin of which has not been established. The tipple was not being operated at the time of the fire, which started about an hour before the day's work began. It is thought that the wooden structure will be replaced with a modern steel tipple.

Plans are being laid by the West Virginia Department of Mines, co-operating with the West Virginia University, to increase the enrollment of students in the night school mining classes held throughout the coal fields to 1,200. R. M. Lambie, chief of the department, has announced. The enrollment now is between 800 and 900.

The Raleigh Coal & Coke Co., which is establishing a modern mining community at Raleigh Heights, in the Winding Gulf field between Raleigh and Sylvia, has awarded the contract for twelve dwelling houses, which will be built of red tile. It is planned to build 250 modern dwellings in all for miners.

The Gibraltar Coal Co. has just been launched by Charleston capitalists with a

view to operating in the Kanawha field. The company has a capital stock of \$100,000, and its principal office is to be at 110 Hole Street, Charleston. Having an active part in organizing this company were H. Steen, H. W. Bowers, I. F. Somerville, E. F. Huddleston and F. H. Withrow.

The Roberts & Schaefer Co. is erecting a steel tippie equipped with late model screens and loading booms at the Nellis mine of the American Rolling Mill Co.

CANADA

Canadian mines during August produced 1,585,000 net tons of coal, an increase of 60 per cent over the previous month and 27 per cent over the average for the same month of the three preceding years, according to the Dominion Bureau of Statistics. The output for the month showed increases of 489,000 tons in Nova Scotia, 98,000 tons in Alberta, 3,000 tons in British Columbia and 1,000 tons in Saskatchewan. The cumulative output from all mines for the eight months of 1923 amounted to 11,376,000 tons, an increase of 22 per cent over the preceding three-year average for the same period. Imports of coal during August totaled 2,746,000 tons, as compared with 2,445,000 tons in July. During August 36,900 tons of coal came from Great Britain. Importations of coal for the first eight months of the year amounted to 15,393,000 tons, an increase of 55 per cent over the preceding three-year average for the same period. Imports of anthracite in August amounted to 488,300 tons, which was 2 per cent less than in July and 40 per cent higher than the three-year average for the month. Of this tonnage, 468,700 tons came from the United States and 19,600 tons from Great Britain. The total amount of anthracite imported during the eight months ended Sept. 30 was 3,675,000 tons. Coal exported during August was 103,500 tons, as compared with 73,300 tons in the previous month. The cumulative exports for the eight months to date totaled 1,191,500 tons, or 17 per cent less than the three-year average for the same period. The tonnage of coal available for consumption in Canada during August was 4,227,000 tons, or 20 per cent more than in July, when 3,510,000 tons was made available. The total number of men employed in the coal mines of Canada during August was 28,670, of whom 21,516 worked underground and 7,154 on surface. The monthly production per man was fifty-five tons for August, as against thirty-six tons per man for July.

The collapse of the Home Bank of Canada hit the mining settlements in the Crow's Nest coal field, eastern British Columbia, pretty hard. The miners of Coal Creek are said to have suffered to the extent of \$200 per head on an average. The Crows Nest Pass Coal Co. used to keep its account in the Home Bank, but at the last general meeting of the company one of the directors of the Canadian Bank of Commerce became a director of the coal company, and the account shifted to that bank.

Silby Barrett, provisional president of District 26, United Mine Workers of America, has gone to Indianapolis to confer with John L. Lewis, International president, regarding a new wage contract for the miners of that district. While no announcement has been made when the conferences of the officials of the union and the Dominion Coal Co. with regard to wages will begin it is expected they will start soon after Mr. Barrett's return to Sydney.

Foundation Fuels Ltd., of Toronto, has been incorporated to deal in coal and other fuels with an authorized capital of \$20,000. The provisional directors include Frank X. Burrows, Hollis E. Beckett, and William N. Robertson.

Obituary

Reuben J. Humphries, 66 years old, coal operator and well-known resident of Scottsdale, Pa., died on Nov. 3. He had been in poor health for the past several years. Mr. Humphries resided in Scottsdale for a number of years. He operated a coal mine near Uniontown.

Jacob Rapp, one of the oldest coal dealers in Columbus, who retired from the active head of the J. Rapp Co. about 10 years ago, died at Columbus, Ohio, last week, at the age of 81 years. He had been in the coal business more than a half century.

Trade Literature

Tachometers. The Bristol Co., Waterbury, Conn. Bulletin No. 317. Pp. 31; 8x10 in.; illustrated. Describes recording and indicating models, both pneumatic and electric. Charts and list prices are included.

Cottrell Vibrating Screen. Southwestern Engineering Co., Los Angeles, Calif. Bulletin SC-1. Pp. 5; 7x10 in.; illustrated. Describes Cottrell screens, types A and B, the former being designed for either coarse or fine screening, both wet and dry, and the latter particularly adapted for coarse screening.

The Leahy No-Blind Screen. The Deister Concentrator Co., Fort Wayne, Ind. Bulletin No. 10. Four-page folder illustrating and describing the features, uses, operations and specifications of the Leahy No-Blind screen, suitable for screening either wet or dry materials from 2-in. opening to minus 80 mesh.

New Model Multiple Retort Underfeed Stoker. Westinghouse Electric & Mfg. Co., Stoker Dept., South Philadelphia, Pa. Catalog 1678. Pp. 14; 8x11 in.; illustrated. The distinguishing features of this stoker are its fuel-feeding mechanism, fuel burning and refuse disposal parts.

Erie Electrical Equipment Co., Inc. Johnstown, Pa., has issued a 53-page catalog on Fittings. The book is well illustrated and covers all types of fittings.

W. A. Jones Foundry & Machine Co., Chicago, Ill., has issued the following catalogs: No. 27, on Pulleys, covers cast-iron pulleys, ball-bearing loose pulleys and ring-oiling loose pulleys; also steel, wood and paper pulleys. No. L-28 contains data on Friction Clutches.

Seven Wonders of Wrought Pipe. National Tube Co., Pittsburgh, Pa. This booklet, 3x6 in., tells of instances where National pipe has come through accidents unscathed.

Publications Received

Engineering Features of the Moffat Tunnel; address by D. W. Brunton, chairman of the Board of Consulting Engineers to the Moffat Tunnel Commission, consulting mining engineer and former president, American Mining Congress. Delivered at a dinner of Colorado Scientific Society, Oct. 6, 1920. Describes topography and advantages of tunnel in shortening route from Denver to Salt Lake City, geologic considerations, method of construction of one railroad and of one water or pioneer tunnel, at proposed cost of \$5,250,000, also ventilation and sociologic provisions. 17 pp., 6 1/2 x 9 1/2 in., 3 ill., paper covers. Publishers, Colorado Scientific Society, Denver, Colo.

The Pennsylvania Department of Forests and Waters has announced the completion of a bulletin on "Volatile Matter in Pennsylvania Coals." It has been prepared by James D. Sisler, of the State Topographic and Geologic Survey. The bulletin contains a map showing the percentage of volatile matters of coals in the bituminous and anthracite fields. The discussions in the bulletin are based upon analyses of coal from 700 mines in Pennsylvania, made by the U. S. Bureau of Mines in co-operation with the State Geologic Survey. The bulletin presents for the first time the location of lines of equal volatile matter in Pennsylvania coals and shows graphically the relation of folding, faulting and movement to the chemical character of coals. It also shows the relation of oil and gas pools to volatile matter in Pennsylvania coals and points out the fact that great caution must be used in drilling in areas known to be much altered by folding and faulting.

Design of Concrete Structures, by L. C. Urquhart. Pp. 450; 6x9 in.; illustrated. Price, \$4. A textbook on concrete and reinforced concrete design. McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

Electrical Machinery Apparatus and Supplies. Census of Manufacturers, 1921. Bureau of the Census, Washington, D. C. Pp. 19; 6x9 in.; tables. This report is one of the series presenting the results of the first biennial census of manufactures, which covered the operations of manufacturing concerns during 1921.

The Merchants' Association of New York has issued its 1923 Year Book, comprising

394 pages. It contains alphabetical and classified lists of its members, index, plan of organization and reprint of its bylaws.

The Destruction and the Reconstruction of the Mines of Lens by E. C. Cuvelette, general manager of the Len mines; 9 x 11 1/2 in., pp. 20, paper cover; translation of "La Destruction et La Reconstitution des Mines de Lens"; Publisher, L. Danel, Lille, France.

Traffic News

Questions involved in fourth section applications in connection with rates on coal from points in Ohio to points on the Grand Trunk Ry. will be considered at an Interstate Commerce Commission hearing in Columbus, Dec. 10. Examiner Disque will preside. On the same date a hearing will be conducted in Cleveland by Examiner Satterfield in the case of the Cleveland & Western Coal Co. vs. the Director General of Railroads.

Rates applicable on coke, in carloads, from Indianapolis to Marshalltown, Iowa, are not unreasonable, the Interstate Commerce Commission has found in the case brought by Tuffly Brothers Pig Iron & Coke Co. In similar fashion the Commission upheld the rates on coke from Indianapolis to Omaha. In that case the rates have been attacked by the Citizens Gas Co.

Decision by the Interstate Commerce Commission relative to leasing of the Carolina, Clinchfield & Ohio R.R. to the Louisville & Nashville R.R. and Atlantic Coast Line R.R. is expected soon after Nov. 20, according to Edward S. Jouett, vice-president and general counsel of the Louisville & Nashville R.R.

The Louisville & Nashville R.R., recently announced that in October it handled 57,462 cars of coal, representing the largest month since May and June of 1922, when the general mine strike in union fields resulted in a great demand on Kentucky mines which favored with big demand and free car supply, operated at near capacity.

The Rocky Mountain & Santa Fe Ry. has applied to the Interstate Commerce Commission for authority to acquire the line of the Santa Fe, Raton & Eastern R.R. for the purpose of furnishing carrier service for the Sugarite and Yankee coal mines, in the Raton field of New Mexico.

Having been notified by the Interstate Commerce Commission that the appeal of the coal operators of southeastern Kansas for reduced freight rates from the fields near Pittsburg, to Kansas City, Mo., had been reported unfavorably by the commission's examiner, operators in Pittsburg are bringing up their resources to continue the fight.

Questions involved in the following coal traffic case will be considered at public hearing in Indianapolis, Dec. 4, before Examiner Carter: Citizens Coal & Supply Co. vs. Big Four; Hub Coal Co. vs. Wabash R.R.; Fourth section applications from points in the Clinton, Brazil and other coal-producing districts in Indiana.

The Baltimore & Ohio R.R. has placed orders for 500 all-steel hopper cars and 500 steel underframe box cars with the Pressed Steel Car Co., McKees Rocks, Pa., and the American Car & Foundry Co., Berwick, Pa., respectively.

Coming Meetings

Harlan County Coal Operators' Association, Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Illinois Mining Institute. Annual meeting Nov. 24, Springfield, Ill. Secretary, Martin Bolt, Springfield, Ill.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

West Virginia Coal Mining Institute. Annual meeting Dec. 4 and 5, 1923, Huntington, West Va. Secretary, R. E. Sherwood, Charleston, West Va.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, NOVEMBER 22, 1923

Number 21

Waste in Antiquated Power Plants

IT SO happens that the peak demand for power at the mines coincides with the peak demand for coal and this has furnished the excuse for firing the larger, more valuable sizes of anthracite at mine power plants at such times. Antiquated power-plant equipment will not respond to overload demands unless fed with the cream of the coal. The practice is inexcusable, wasteful and expensive.

Doubtless a potent reason for the trend toward purchased power is found in the backwardness of the coal companies in modernizing their own power plants. Purchased power is cheaper than that generated by old methods, but there is nothing inherent in central-station practice that cannot be duplicated by coal companies. In fact many coal companies have large and efficient power plants comparable to the best of the central stations.

The best practice in the anthracite region now is to concentrate power production in modernized plants designed to utilize that part of their product which is least salable. The soft-coal fields with less incentive have made as much progress in this direction as the hard-coal regions.

A Stacked Deck

THAT the National Academy of Political Science should lend itself so obviously to a partisan exposition as that staged in Philadelphia last week adds nothing to the reputation of that organization as an open forum. The management of the two-day program on "The Price of Coal" was in the hands of Clyde King, Secretary of State for Pennsylvania, by appointment from Gifford Pinchot. In his contacts with the coal men Mr. King had already shown his colors and if a glance at the program of the Philadelphia meetings did but warn in advance, attendance confirmed the feeling that the deck was stacked.

Starting off with a talk by J. J. Walsh, Secretary of Mines, who defended the Pennsylvania State tax on anthracite and charged that 20 per cent of the anthracite now being shipped is below the normal standard of purity, the program veered to wages and earnings of the hard-coal miners. Whatever theory Mr. Drury may have had about the relativity of earnings of miners and other labor was obscured by his presentation, but John B. Andrews, secretary of the American Association of Labor Legislation, was clear in his exposition of "Needless Hazards in the Coal Industry." And so it went. Free discussion was practically eliminated by advance selection and by the lack of time afforded those who were on the program. Francis Walker read into the record the painful history of the anthracite combination, and J. W. Adams decorated the pages with the story of too many middlemen, all profiteers. Hugh Archbald gave a lugubrious picture of the inef-

iciency of the coal industry, sharply challenged, however, by those who followed.

It remained, however, for Governor Pinchot himself to divulge the real purpose of the symposium on "The Price of Coal." Defense, labored and statistical, of his 10-per cent increase to the miners and offhand characterization of anthracite as a "hard-boiled monopoly" summarizes his stock in trade. Such savage attacks, in which facts play small part and citation of gossip is in the forefront, ill becomes the stage of the National Academy of Political Science. It should be reserved for the political arena, where demagoguery is expected.

Would Compulsory Arbitration Work?

GEORGE OTIS SMITH does not hesitate to say in his address in New York this week, an abstract of which appears elsewhere in this issue, that the Coal Commission may have overlooked a bet in opposing compulsory arbitration of labor disputes. Harking back to the anthracite difficulties of last summer, he plainly says that "some of us" would rather have seen this dispute between the hard-coal operators and miners settled by compulsory arbitration than by political machinery. This is much plainer talking than any indulged by the Commission. But then the Commission is defunct and a fair target for all, even former commissioners. Incidentally Dr. Devine, in the November *Survey Graphic*, expresses huge satisfaction with the work, conclusions, and recommendations of the Commission.

There is an aspect to Dr. Smith's suggestion for compulsory arbitration that should not pass unnoticed. He says: "In the bituminous industry, however, compulsory arbitration of a wage-scale structure, to be fully successful as an agency of economic welfare, would need to have its awards enforceable throughout all coal fields, whether organized or unorganized." [Italics ours.] Now the common understanding of arbitration is the determination by a third party of a cause in controversy. Just how, then, could the wage rates of non-union mine workers be settled or adjusted by arbitration, since they are never in controversy, as between workers and employer?

Mr. Smith supplies the answer when he says "If coal mining, like transportation, is clothed with a public interest so great that its uninterrupted service requires public supervision of settlement of wage disputes [and he frankly holds to that belief] then those wage rates must be governed only by economic conditions, general and local, not by membership or non-membership in a union." Public welfare, he says, "must soon force such legislation as will insure an uninterrupted supply of coal."

If it be so that the only way the public may have a continuous supply of coal is to legislate against strikes and if when it does so legislate it must then bring the

present non-union fields under the cloak with John L. Lewis and the United Mine Workers of America, one will have nothing less than a National Coal Labor Board. Would the union swallow that as a price for getting the non-union fields in? Is it the price the non-union operator may have to pay for the doubtful advantage to him of strikes in the union fields?

We are not ready to concede the inevitableness of federal wage fixing in coal on a national or on any scale. We prefer to believe that the operators and the union are taking a broader view now than when they were cooking up the trouble that precipitated the 1922 disagreement. If for once the politician may keep hands off we look for a logical, non-contentious settlement next spring.

Hounding the Trade Association

THERE is no dodging the conclusion that the effort of Secretary Hoover to promote better business statistics and that of the Attorney General to hamstring trade-association activities represent fundamentally opposing theories. The Department of Justice has one, and apparently only one, test to be applied when the legality of any phase of trade-association activity is under fire. That is—Does this activity serve to enable the association members to profit? If it does; if it in any way benefits the participants, then it is enjoined.

We would not be thought of as criticising the endeavors of the Department of Justice to bring before the courts those who conspire to enhance prices under the guise of innocent co-operative action. We but point out that no trade association can persist—can obtain current financial support—that does not show some return on the investment in it. This is particularly true with respect to the function of business statistics.

A case in point is found in the draft of a proposed consent decree in the case of the U. S. vs. the Tile Manufacturers Credit Association. The Department of Justice here proposes to enjoin the association from collecting statistical information except such data as some government department should request, and even that information could not be distributed among the members of the association. This in effect would serve notice on all trade associations that the Department of Justice regards the collection of statistical and other trade information within the condemnation of the law and to be prohibited in so far as possible.

Carried to a conclusion such reasoning would prevent local coal associations from collecting the figures used by the Geological Survey in its weekly reports of mine operation and causes of lost time. It would cut off the sources of much of the essential production data published in the Survey of Current Business by the Department of Commerce. It would bring to an early death the growing body of business information that primarily is by and for the business man.

The Department of Justice appears obsessed with the purpose of making all co-operative business effort criminal. It would make light its work of judging the right from the wrong by prohibiting all. It will not give a single constructive interpretation to the law aimed to permit or encourage trade associations perhaps until it has carried to a conclusion all its pending actions. It does not add to the credit of the department that it thus tenaciously holds to the literal law any more than it is to the credit of some trade associations that they have actually abused, yes seriously abused, the association idea.

The Passing of the Siphon

NEED for continual nursing has made the siphon unpopular. For this reason the use of it is rapidly declining; so much so that it comes rather as a surprise that such an instrumentality is discussed by a subcommittee of the Standardization Division of the American Mining Congress. Much of the objection to the siphon might be eliminated if some of the facts of its operation were understood. One that few consider is that the water in the lower end of the suction leg during filling is under the combined pressure of the atmosphere and of the water column say 23 lb. and that after the water begins to move that pressure is reduced to about 5 lb., or about one-fifth as much. The pressure in the discharge leg is even more before the column starts. Consequently every bubble large and small trapped in a pipe joint or resting in some slight elevation in the pipe becomes magnified five or more fold and expands. In both ends these bubbles become disengaged by the suction and tend to rise to the summit, and if they are not washed out by the rapid flow of the water will block the pipe.

Unless the water flows fast enough to drive these bubbles out the siphon will soon stop. Hence unless a siphon expels air it is not likely to continue to run long. To aid in dislodging the air a few sharp raps on the various lengths of pipe forming the siphon during the filling process will help the air to rise to the high point and escape, provided, of course, the siphon is being filled at the summit. If there are elevations along the line the pipe can be tapped at these points and plugged with tight pine plugs removable during the filling process, the method being to remove them all and replace them as fast as the line fills. In fact one man of experience would arrange for small elevations at which bubbles can be removed in the filling process, leaving the pipe reasonably free of air. The pipe at each of these elevations is tapped with a small hole and a plug inserted.

More air, however, is brought with every gallon of water admitted. Consequently these elevations might be undesirable. All the water brought to the siphon is relieved of about one-third of its pressure, and the natural effect is that air is disengaged as bubbles. This air, not being absorbed by the water, must be expelled by it in a segregated form and a siphon is not working well unless it is voiding air at the lower end.

The siphon has another disadvantage in that it cannot be allowed to run dry. Therefore it must never complete the work it has on hand. Sometimes to prevent its completing the drainage of the sump it is throttled down, but the effect of the throttling is to make it retain air in its system. In consequence it soon ceases to run.

The object of most endeavors being to perform the desired end promptly and not to achieve the object sought in part or in a long time the siphon is unsatisfactory in draining working places, apart altogether from its demands on labor and supervision. Where the water has to be voided from a working place the siphon must be made either dilatory in action or must be started and stopped frequently, unless, as suggested by the subcommittee on "Unwatering abandoned workings" of the committee on Mine Drainage of the Standardization Division of the American Mining Congress, several points of suction are provided which are used in turn and closed when the water in them is lowered to the suction level.



No. 14 Colliery, Pennsylvania Coal Co.

Advance in Steam-Boiler Practice in Anthracite Region

Importance of Burning Small Sizes of Coal at Mines—Changes in Boiler and Furnace Design to Obtain Efficient Combustion—Benefits of High Stacks—Economizers Obviate Need for Increased Boiler Capacity

BY M. M. PRICE
The Babcock & Wilcox Co.

THE increasing value of anthracite gives added interest and importance to the work which has been done and still remains to be done by the engineers of the anthracite mining companies in their efforts to produce steam more efficiently. The advantages to be gained as a result of the changes which are going on are sure to accrue both to the coal companies and the consumers.

It is only under the stress of economic conditions that the anthracite mining companies have a sufficiently large market to absorb the great quantities of buckwheat, rice and barley—frequently called buckwheat Nos. 1, 2 and 3 respectively. By adopting the best methods of burning these small sizes in their own power plants the coal companies at the same time create their own market for small sizes and release large volumes of the salable sizes of coal for outside markets and consequently for domestic consumption.

Progress in mine power-plant design has been well marked for the past thirty years, not alone in changes in boiler design in keeping with the general development of that art and in solving problems of boiler design peculiar to this kind of fuel but also in the design of furnaces for proper combustion of the fuel.

The necessity for a small ratio of heating surface to grate surface influenced the change to water-tube boilers. At first this ratio was obtained by installing boilers of small heating surface of 150 hp. rating under which it was easy to install grates as large as required without resorting to those of excessive depth. As the size of the boilers was increased the maximum depth of the grate was fixed at 7 ft. and the boilers so designed that the heating surface per foot of furnace width was kept small. This was accomplished in boilers of the bent-tube type by using a small number of short tubes per section and in the straight-tube type by using sections not over nine tubes high.

The use of larger boiler units was brought about by the design of furnaces with grates 10 to 12 ft. deep, and in the case of the Babcock & Wilcox boiler led to the use of the "Webster" furnace. This provided for the deeper grates by moving the bridge wall toward the rear of the boiler the required distance, but maintained the front baffles in their original position and closed the space from the bottom of this baffle to the bridge wall by a baffle on the lower tubes.

The development of the deep grate made possible the use of units of approximately 500-hp. rating in which the ratio of heating surface to grate surface does not exceed thirty-five to one and in which the furnace width does not exceed 15 ft. This is the limiting size of hand fire units unless the width is increased or units used which are fired from both ends. The use of larger units of moderate widths, has, however, been made possible by the installation of forced blast chain-grate stokers, which marks the latest stage of accepted design in this field to date.

Exhaustive experiments undertaken in using anthracite fuel in pulverized form have been carried to such a stage as to warrant the statement that burning anthracite in this form will be the next step in the advance from present methods. The greatest difficulty seems to be in the crushing of the fuel rather than in its combustion. This has led to the consideration of a better preparation of the fuel before powdering by removing much of the abrasive ash before it goes to the pulverizers. This in turn has led to the suggestion that such preparation be given to coal that is to be burned without being pulverized. In view of the loss occasioned by the quantity of carbon in the ash and the high amount of ash when the coal is either hand or stoker fired, it would seem that the adoption of such a practice would produce real results in economy and capacity in both hand-fired and stoker-fired furnaces.

An inspection and study of the proximate analyses of samples of small sizes of anthracite give us an indication of one of the difficulties met with in using this kind of coal on hand-fired grates. Table I gives actual results of proximate analyses of a number of samples gathered from hand-fired plants at the mines.

It will be noted that the ash averages 20 per cent or over and with a combustion rate of 25 lb. per hour per square foot of grates, 5 lb. of ash per square foot of grate accumulates per hour. Such a quantity of ash means cleaning fires on hand-fired furnaces every three to four hours with the loss in efficiency due to the cold air entering the furnaces and high loss of unburned carbon in the ash. The importance of the last-named loss is indicated by Table II, which shows data taken from a number of observations at hand-fired plants giving the percentage of boiler ratings, the rate of combustion, the consequent percentage of carbon in the ash and the percentage of loss resulting therefrom.

The analyses and sizes of coal used when these data were observed are those given in Table I for the corresponding numbers.

The data quoted in Table II indicate that the loss due to carbon in the ash is the most serious one encountered in burning this kind of fuel, but much heat is lost in the flue gas; in fact the loss is larger than when burning other kinds of coal. This is due in part to three things: first, the excess air necessary to effect combustion; second, the difficulty in obtaining the mixture of the excess air with the gas distilled from the coal and, third, the slowness with which combustion takes place under the best conditions.

The small units of straight-tube boilers first installed were set with a distance of 5 ft. from the boiler room floor to the bottom of the front headers, and it was not until grates of a depth greater than 7 ft. were installed that this height was increased so as to increase the distance from the lowest tube to the grate surface at the bridge wall. In boilers of the bent-tube type with arches over the furnaces, an effort has always been made to cover as much as possible of the grate surface with the arches.

As the depth of the grate was increased, in order to provide sufficient clearance from the ends of the arches to the front bank of the tubes, where the length of the arches was extended to cover the grates, the boilers were raised and the arches lowered. This latter construction resulted in long shallow furnaces of small volume, with the fuel body cut off by the arch from any direct radiation to the front bank of tubes. This feature has been gradually changed by raising the boilers and shortening the arches so that they could be raised to a greater height above the grate, thus giving more volume in the primary furnace and exposing more of the front bank of tubes to the radiation from the fuel bed.

TABLE I—PROXIMATE ANALYSES OF SAMPLES OF FUEL USED AT HAND-FIRED MINE PLANTS

Sample No.	Per Cent Moisture	Per Cent Volatile	Per Cent Fixed Carbon	Per Cent Ash	B.t.u. per Lb. Dry	Per Cent of Various Sizes of Buckwheat			
						No. 1	No. 2	No. 3	Under No. 3
1	10	6	74.5	20	11,350	14	22	56	8
2	9.7	6.05	75	18.95	11,350	18.5	32.5	46	3
3	8	7	75	18	11,900	3	10	79	8
4	10	7	73	20	11,470	31.5	24.5	36.5	7.5
5	15.31	6.88	74.16	18.96	11,470	4	14	74	8
6	7.65	5.85	75.05	19.1	11,122	5.5	13	69	12.5
7	11	5.2	75.74	19.06	10,500	12	25	58	5
8	10.23	6.10	76.41	17.41	11,700	3	19	71.5	6.5
9	9	6	73	21	10,800	6	20	66	8
10	11.61	9.16	67.97	22.87	10,800	21	26	48	5

TABLE II—HEAT LOSSES AT VARIOUS BOILER RATINGS

Sample Number	Per Cent Rating	Coal per Sq. Ft. Grate	Per Cent Carbon in Ash	Per Cent Heat Lost in Carbon
1	188	33	50	25.7
	133	18.8	25	8.57
2	127	21.39	40	16.32
	98	14.75	25	7.69
3	134	23	49	21.22
	112	15.65	30	9.46
4	146	23.85	45	20.8
	110.7	17.25	29	10.89
5	148	24.65	47.89	22.2
	161.5	29.6	51.86	26.1
6	73.7	14.4	41.87	15.3
	35.2	6.68	39.1	16.1
7	136	20.98	36.26	15.09
	125	18.24	31.9	12.43
8	156	24.6	35.8	12.1
9	130	20.5	40	17.32
	64.8	9.43	14	4.59
10	169.5	32.95	53.3	35.25
	152	21.62	42.52	22.88

The furnace construction used in the bent-tube boiler was perhaps responsible for the idea entertained by many, that no furnace could successfully burn the small sizes of anthracite unless its entire surface was covered by an arch. This idea led to the installation of a number of boilers of the straight-tube type with extension furnaces or with deep grates partly covered by arches underneath the tubes. Such construction made it necessary to set the boilers 10 ft. or more from the floor to the bottom of the headers, with a resulting increase in the furnace volume. The furnaces operated successfully, but as the arches gave out they were never replaced. The boilers were reset with the grates directly under the heating surface and operated with apparently the same or greater capacity and efficiency when burning even the small sizes.

Another cause of loss in burning the small sizes is that found in the "unaccounted for" item of a careful heat balance, a large part of which is unconsumed carbon blown out of the furnace by the draft. This loss when burning a fuel made up of 4 per cent, No. 1; 14 per cent, No. 2; 74 per cent, No. 3; 8 per cent under No. 3 buckwheat, amounted to 4.11 per cent when the boiler was operated at 93 per cent of rating and 6.63 per cent when the boiler was operated at 130 per cent of rating.

No direct measure of the loss due to unconsumed carbon in the flue dust was made in the observations which were available to me, but by assuming a definite loss for radiation and heat in the ash, the balance of the "unaccounted for" may be safely assumed as representing the loss due to the unconsumed coal. The changes in furnace design described above, leading to not only a greater furnace volume but to a construction in which the velocity of gas is low, probably do much to cut down loss from this cause.

Coincident with the development in boilers has been the improvement in the arrangement and proportions of the drafting apparatus. Note has been made already of the low rate of combustion possible with the small sizes on account of the large percentage of ash present and the difficulty of forcing sufficient air for combustion through the fuel bed. The air pressure necessary for the combustion of various sizes at different rates is given in Table III.

It will be noted from this table that a pressure equivalent to nearly 2 in. of water is required to burn 25 lb. of No. 3 buckwheat per square foot of grate surface per hour, which is equivalent to approximately 150 per cent of rating for a boiler with a ratio of heating surface to grate surface of thirty to one. If the boiler is of the straight-tube type with a bank nine

TABLE III—AIR PRESSURE RECOMMENDED AT VARIOUS RATES OF COMBUSTION

Rate of combustion, lb. per sq.ft. grate area	Air pressure required for No. 1 buckwheat	Air pressure required for No. 3 buckwheat
10	0.25	0.40
15	0.45	0.75
20	0.68	1.25
25	1.00	1.90

tubes high, the draft loss would be equivalent to not quite one half inch of water and a stack 110 ft. high would be required to overcome this resistance.

The earlier plants were equipped with stacks of a height seldom exceeding 50 ft. while in nearly every plant the boilers were equipped with apparatus for developing a plenum draft either by means of a steam blower or fan. Such an arrangement gave an insufficient stack draft, which resulted in a plus pressure in the furnace with a consequent deterioration of brick-work, arches and baffles, and loss in efficiency due to such deterioration.

The Lehigh Valley Coal Co. was one of the first companies to correct this draft condition in a plant which was erected at Hazleton Shaft. In this plant, built about 1897, both plenum and vacuum fans were installed to supply pressure under the grates and pass the gases through the boilers. The installation was the first in which this combination was used.

For a long time no one attempted to do away with the vacuum fans by building high stacks. This was partly due to the nature of the ground on which most colliery power plants were built. However, in 1911, the engineers of the Pennsylvania Coal Co. with great courage and enterprise built a stack 175 ft. high in connection with their plant at Underwood, and later built two stacks of the same height at their No. 14 colliery.

The difficulty of obtaining a fair rate of combustion and therefore a high rate of evaporation from the boilers together with the lack of sufficient stack draft has led in many instances to ill-advised changes in baffles to obtain larger gas passages and the resultant lowering of draft resistance. Or, if these changes have not been deliberately made, the lack of draft sufficient to meet the demands for steam has been responsible for failure to maintain this important part of the boiler.

Very often no attempt is made to maintain a balanced draft, and in order to generate the steam required under the condition imposed by the lack of stack or induced draft, a pressure is used under the grate sufficient to create a plus pressure in the furnace with ensuing deterioration of the walls and arches.

The loss due to unconsumed carbon in the ash at hand-fired plants is attributable to the manner in which the fires are cleaned and could be cut down by saving all the live coal in the cleaning by pushing it back or to one side. In almost all hand-fired plants, however, the process of cleaning consists in either dumping or pulling a large part of the fires and leaving very little of the old fire bed for kindling the new. There is nothing that can be done in the construction of the furnaces which will cut down this loss; it can be controlled only by better operation.

A development in the design of the traveling chain grate has been the placing of an arch over the rear of the stoker surface so that the gases which have passed through the rear part of the grate pass over the surface of the fuel bed in a direction opposite to that of the travel of the grate and throw any particles of

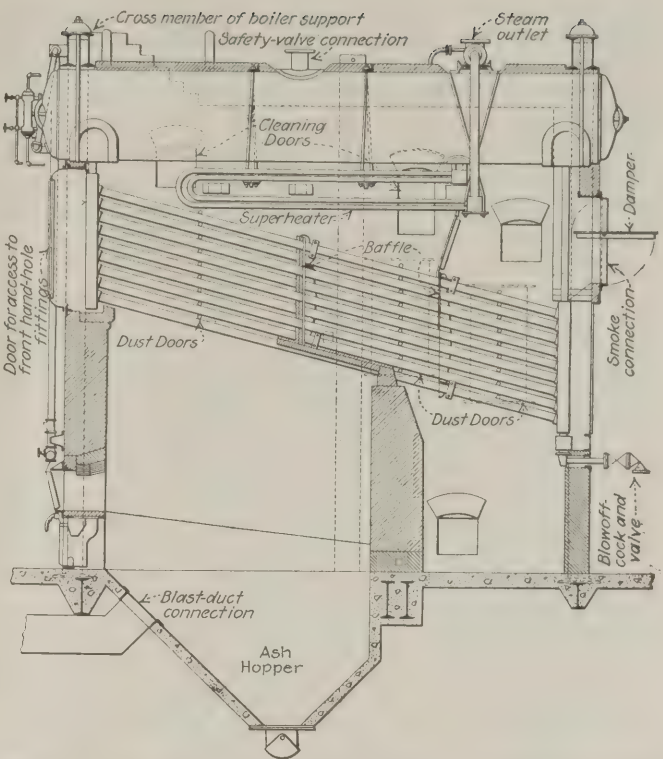


FIG. 1—STRAIGHT-TUBE BOILER WITH DUMPING GRATES FOR BURNING SMALL SIZES OF ANTHRACITE

The baffle on the lowest row of tubes helps to provide the desired ratio between grate surface and heating surface. This arrangement of the ash hopper is desirable for all grates having a depth in excess of 8 ft.

incandescent carbon which have been lifted from the grate by the blast toward the front of the grate. This construction has been remarkably successful, yet its control is still largely dependent upon the operator.

Another difficulty is presented in the removal from the fire bed and the disposal of the large quantity of ash resulting from the combustion of the small sizes of anthracite. Passageways are installed under the fire-room floor for handling it, and in the use of grates of a depth exceeding 7 ft. this construction is imperative as the difficulty of scraping the ashes from a pit of this depth is as great as, if not greater than, cleaning a fire on a stationary grate of a corresponding depth.

Several ingenious ways of handling the ashes by flushing have been devised. In some of these the ashes are flushed directly into abandoned workings in the mines for surface support, but in others, notably at the Nanticoke and Hampton plants of the Glen Alden Coal Co., where this opportunity does not exist, the ashes are flushed into wells from which they are removed by clamshell bucket and crane.

As already noted, the principal source of loss in burning small sizes of anthracite is in the large percentage of carbon in the ash. No changes in the design of the hand-fired boiler itself suggest themselves to remedy this, but it is apparent from an examination of Table II that great economies may be accomplished by cutting down the rating at which it is necessary to operate the boilers.

In a boiler plant burning bituminous coal the principal loss is the heat in the flue gases. In the boiler plants under consideration burning anthracite this loss is large also, although equalled or surpassed by that due to the carbon in the ash. Of a number of representative analyses of flue gases at these plants the best average analysis showed 10.12 per cent CO₂, which is

equivalent to 80 per cent excess air over the theoretical amount required for combustion, or 14.63 lb. of gas per pound of coal burned. With a stack temperature of 524 deg. F. the heat loss represented 14 per cent of that of the coal. This analysis was obtained with an average combustion rate of approximately 25 lb. of coal per hour per square foot of grate with the boiler operating at 148 per cent of its rating, which was 463 hp. The fuel fired contained 83 per cent of No. 3 buckwheat and smaller.

A higher rate of combustion often is maintained in hand-fired plants, but it is difficult to do so and keep the CO_2 even up to the figure noted above. At these higher rates a delayed combustion occurs, which results in high stack temperatures and trouble with dampers, baffles, etc. Increasing the volume of the furnace has overcome this difficulty to some extent, but there is room for investigation along those lines, and it still remains for some courageous person to omit entirely the arches from a hand-fired boiler of the bent-tube type.

The loss and trouble from delayed combustion is accentuated in the stoker-fired boiler both by a more uneven distribution of air and a demand for higher ratings from this type of apparatus. The reverse-arch construction already referred to helps to overcome this difficulty by causing the gas to move in opposite

direction from the two ends of the furnace and mix at the outlet. Later types of construction of straight-tube boilers with stokers have been built with furnaces 15 ft. and 20 ft. high and boilers of the bent-tube type have been installed with several arches to further the mixing of the gas. These plants are just being put into service and while in consequence there is no authentic data as to their performance, they should reward the designers and builders with both capacities and efficiencies higher than those of boilers with lower and less elaborate settings.

Reducing the rate of combustion will not only cut down the ashpit losses as noted, but will help to keep down the loss in the chimney gases. An increased rating means a thicker fuel bed and an increased air pressure under the grates, not only to supply the additional air required for the combustion of the larger amount of coal but to provide sufficient force to drive the air through the thicker fuel bed.

We have seen from the foregoing that the ashpit losses and the chimney losses increase at extravagant rates and that the efficiency decreases as the rate of combustion increases beyond a limited amount of coal per square foot of grate in furnaces equipped with either hand-fired grates or stokers. In plants of this character, however, there is a very large demand for

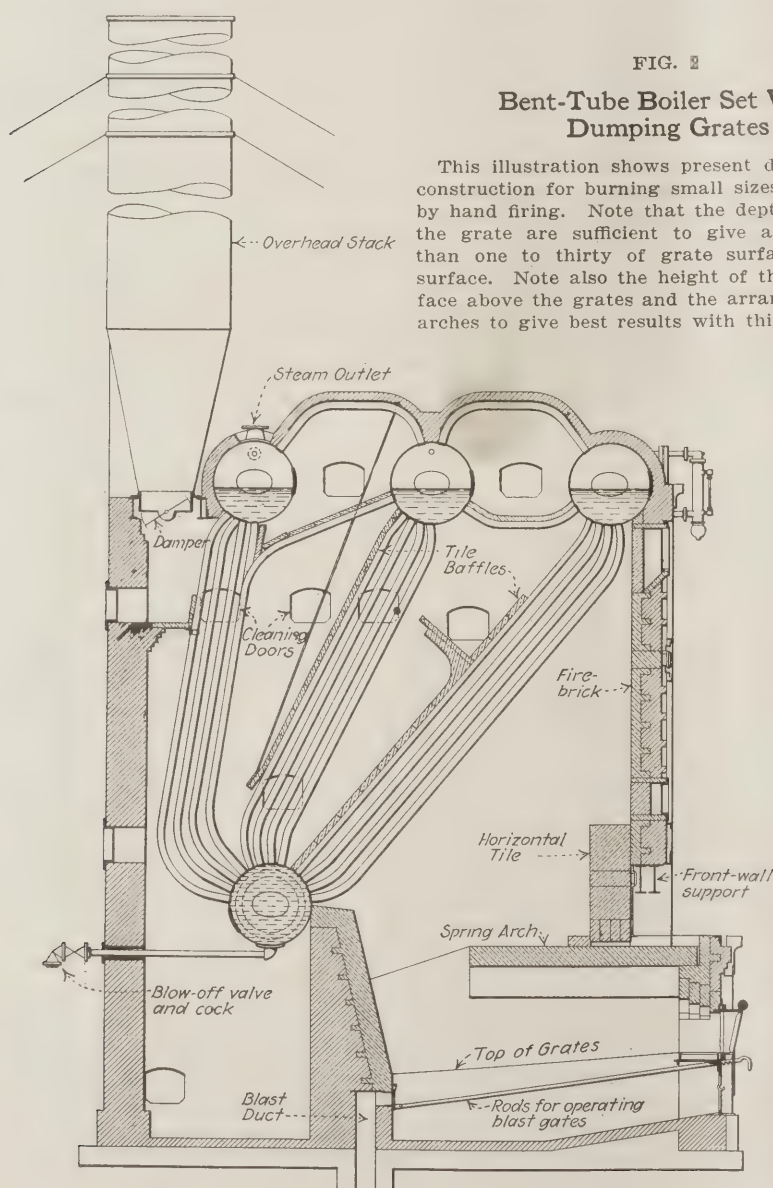


FIG. 2

Bent-Tube Boiler Set With Dumping Grates

This illustration shows present day practice of construction for burning small sizes of anthracite by hand firing. Note that the depth and area of the grate are sufficient to give a ratio of less than one to thirty of grate surface to heating surface. Note also the height of the heating surface above the grates and the arrangement of the arches to give best results with this fuel.

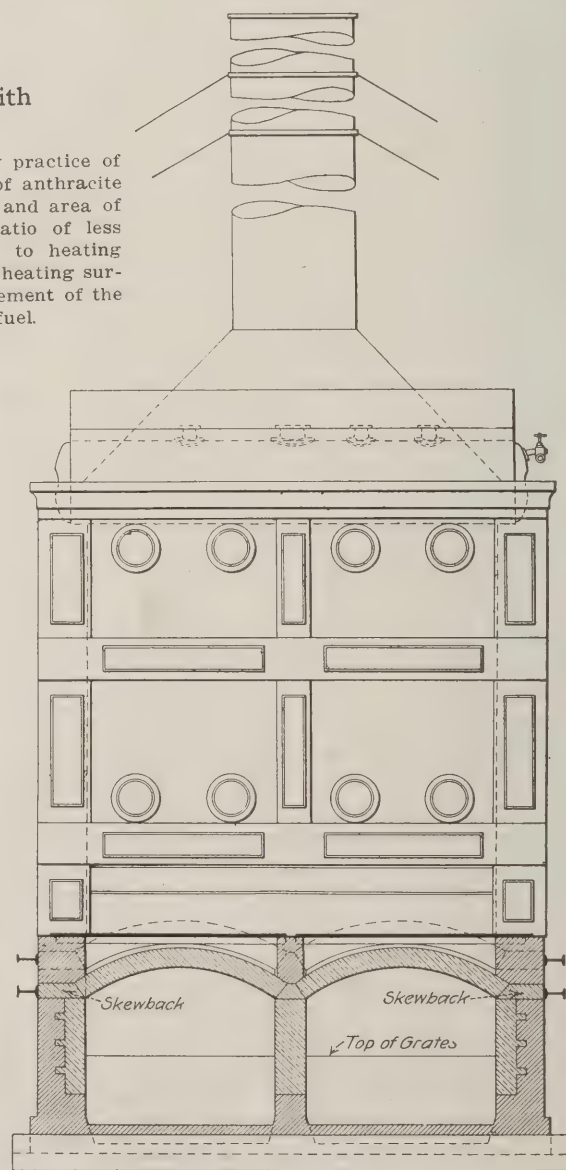
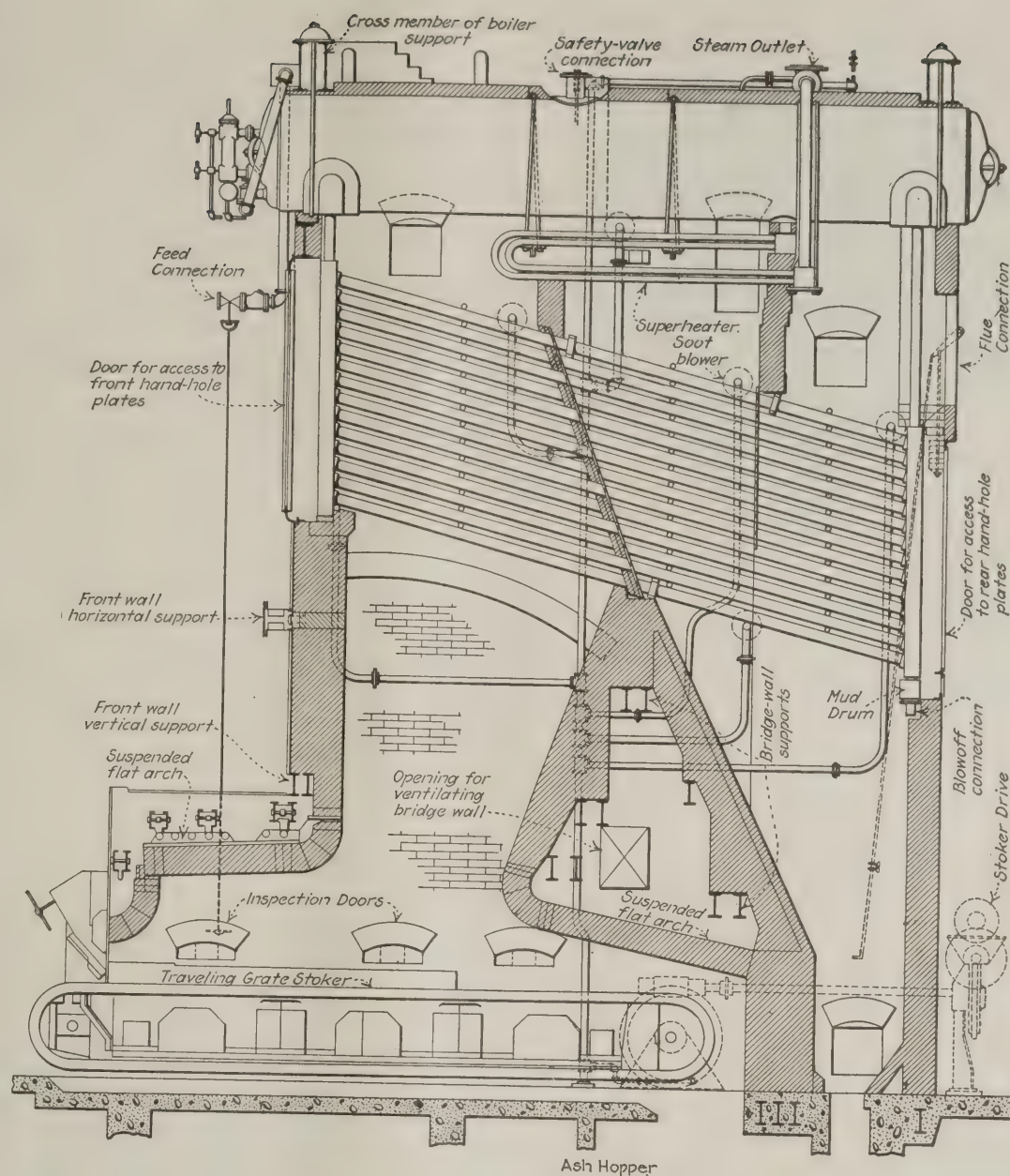


FIG. 3
Chain-
Grate Stoker
Under Straight-
Tube Boiler

This drawing shows how the boiler is set high above the floor to give a large combustion space and ample opportunity for the thorough mixing of the gases before they reach the heating surface. The construction of the bridge wall and flat arch over the rear end of the stoker causes the gases to move over the fire so as to get a better mixture of the suspended carbon and air.



steam and the problem seems to resolve itself into that of obtaining a greater capacity for a rate of combustion which is economical. Apparently we have reached the limit in the size of grate which can be installed per foot of furnace width; therefore to increase the efficiency we must—outside of giving the coal better preparation—increase the steam-generating capacity per square foot of grate by installing economizers or more and better feed-water heaters, or by installing more grate surface, which means installing more boilers.

Economizers have been installed in several colliery power houses, but at the time of their installation probably little thought was given to the increased steaming capacity of the plant which would result from the use of this equipment, or to the fact that this increased capacity would permit the operators to run with lower and therefore more efficient rates of combustion. The argument for economizers is generally the other way, viz.: that economizers permit higher ratings by cutting down the high chimney-gas losses consequent thereto, but in the plants burning small sizes of anthracite the ashpit loss is as great or greater than the chimney loss and increases with, and out of all proportion to, the rate of combustion.

Therefore the measure of gain from the installation of such equipment in these plants lies not alone in the amount of heat absorbed from the flue gases but also in the increased economy of combustion due to the lower rate demanded when the economizers are in use. The development of individual economizers for each boiler is thus justified, and besides this they require little additional boiler room space. The effect of economizers upon the capacity of a plant is readily seen from a study of the following concrete cases.

It is proposed to install a boiler plant which will evaporate 117,000 lb. of water with a feed temperature of 150 deg. F. into steam at 275 lb. pressure and 150 deg. superheat, which is equivalent to the evaporation of 137,726 lb. from and at 212 deg. F. for 4,000 b.hp.

If five 668-hp. boilers are installed with traveling stokers having a grate surface each of approximately 12 ft. x 17 ft. without economizers, this amount of steam may be generated by operating four of these boilers at 150 per cent rating, allowing one boiler to be always out of service for cleaning and repairs. If these boilers were equipped with economizers to raise the feed temperature 100 deg. F. the heat added to the feed water would be equivalent to the evaporation of

12,050 lb. from and at 212 deg. F., which would make possible the generation of the total steam required by operating the four boilers at 136 per cent rating.

Although the effect of heating the feed water in reducing the work required of the boilers and grates is considerable, and should be obtained in all plants of any magnitude, this effect is easily lost unless a sufficient number of boiler units are installed so that it will be possible to operate with a combustion rate not to exceed 25 lb. of coal per square foot of grate per hour, even when some of the boilers are off the line for cleaning and repairs. With a ratio of heating surface to grate surface of thirty-five to one, a coal with a heat value of 11,000 B.t.u. and a boiler efficiency of 60 per cent, this means a steaming rate of 140 per cent of rated capacity. A reduction in the ratio of heating surface to grate surface, assuming the same coal and efficiency, would bring this rating up to 160 per cent.

To persons accustomed only to the use of high-volatile fuels high in heating value and low in ash such limitation in rating may seem extravagant, but boiler plants designed on such liberal lines are a necessity at the anthracite mines, not only to permit the use of low-grade fuels but also to provide a plant which will generate the steam required and allow the removal of each unit from the line for cleaning and repairs at proper intervals.

We have come a long way from the practice which

prevailed with the use of the cylinder boiler, but there is still a lack of appreciation of the sensible limit of overcapacity possible with the use of small anthracite. And conversely, on account of this same limit in capacity, there is no other class of boiler plants which will show such fine returns for liberal design and proper upkeep.

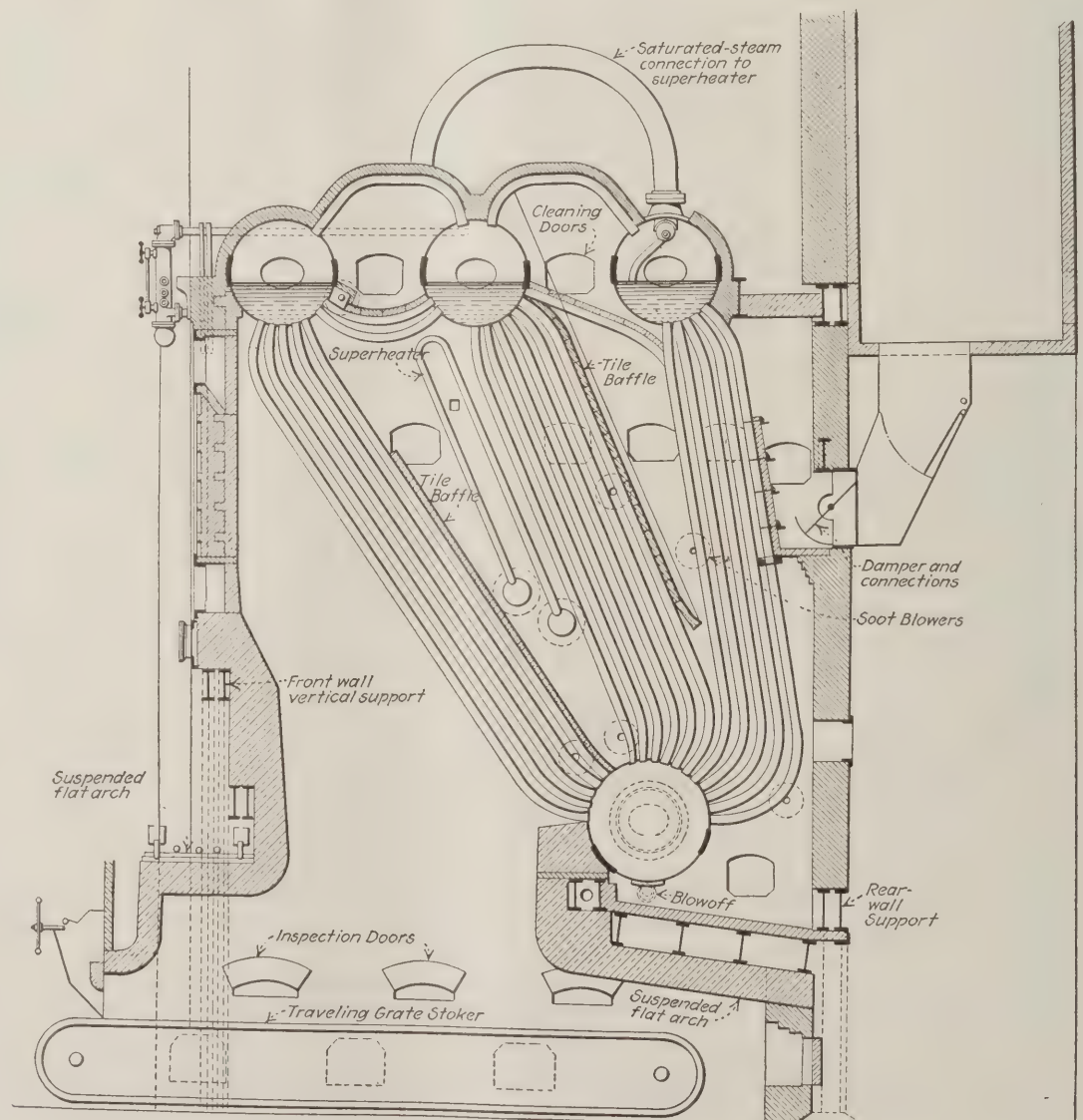
Every factor entering into the efficiency of the plant must be taken into consideration in order to make the use of the unmarketable sizes economical. This fuel may have no value before it is delivered to the boiler house, but handling and freight charges may readily bring its cost delivered to the boiler room up to 75c. to \$1 per ton. The low efficiency with which, of necessity, it must be burned calls for the consumption of greater amounts of fuel, the handling of more ash and the use of more labor than would be required with the use of larger sizes and better coal, so that it is difficult to determine just what proportion of the larger sizes may be mixed with it economically.

The same limitations as to rate of combustion and boiler rating, however, apply in the use of the better grades as apply in the use of the unmarketable sizes, but in the one case it improves the combustion of a fuel which can be sold, and in the other case makes possible the combustion of a fuel which is unmarketable and sets free for market a corresponding amount of the marketable coal.

FIG. 4

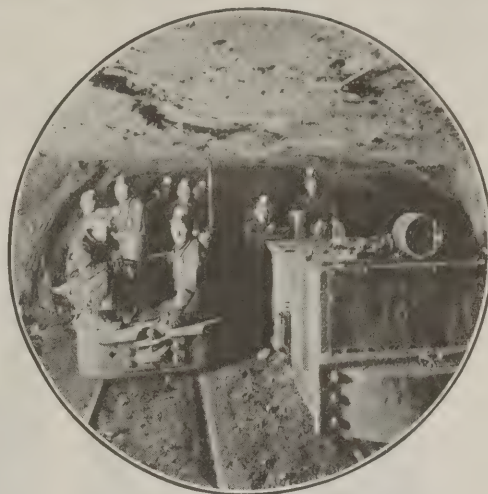
Automatic Stoker Under Bent-Tube Boiler

Note the large amount of heating surface exposed to radiation from the fuel bed, the height of the mud drum above the floor and the arrangement of the suspended arch at the rear end of the stoker for the better mixture of the gases.



Wasted Time at Partings Adds to Cost of Operation*

Evidence That Even in the Best Mines Cars Are Lacking at Partings to Keep Haulage Force Busy—Time and Size of Locomotive Trips Unequal and Uncertain—Haulage Units not Definitely Controlled



THE basic policies of production management in our industrial plants have been gradually undergoing a fundamental change during the last ten years—a change from the military type of control, where a superintendent or foreman is assumed to be omniscient in every branch of the operation—general supervision, maintenance of quality, inspection, the obtaining of large output, distribution of work and materials to men and machines, care of equipment, operation of machines, and repairs. From this the industry has advanced to the functional type of management, in which every supervisor is a specialist in his

foreman, the extent and diversity of the underground operations have been presented. The remark was made that the solution of the difficulty lies not necessarily in an increase in the number of foremen of the present type but in the development of management methods that will give specific attention to certain kinds of inefficiency.

Our examination of mining operations pointed out to us how necessary it is that underground management should follow the trend that has proved so effective in producing economies in those industries which operate above ground. In some directions this trend already has been exemplified at coal-mining plants. At several bituminous mines, for example, we find that stores are controlled with running inventories and a systematic plan has been devised for the issuing of supplies which is in every way as effectual as those of many of our best industrial plants.

We believe the cost-accounting and payroll records in coal mining are more systematic and uniform than in any other industry in the country. We question whether the plants, large and small, in any other business than mining would have had on file the unit cost and payroll data which enabled coal operators without difficulty to fill out certain of the Commission's questionnaires.

But mining-engineering problems in general are not well handled. A few mines are developing statistical information of incidental value in management. Underground, however, the methods of controlling the operations, except in a few instances, are scarcely different from what they were fifty years ago.

MINE FOREMAN MUST BE AIDED BY SPECIALISTS

The mine foreman with his long experience in mining must continue to function, but his efforts and his knowledge of mining must be supplemented by the aid and information supplied by specialists who are experienced in applying, to problems of management, engineering analysis and planning, for it is a physical impossibility for him to devote sufficient time to make these analyses. It is readily apparent that they are needed, and in no place is this more evident than in the control of underground haulage.

Irregularity of Haulage of Mine Cars.—Underground haulage is the circulation system of the mine. Upon the proper delivery of pit or mine cars to the miner

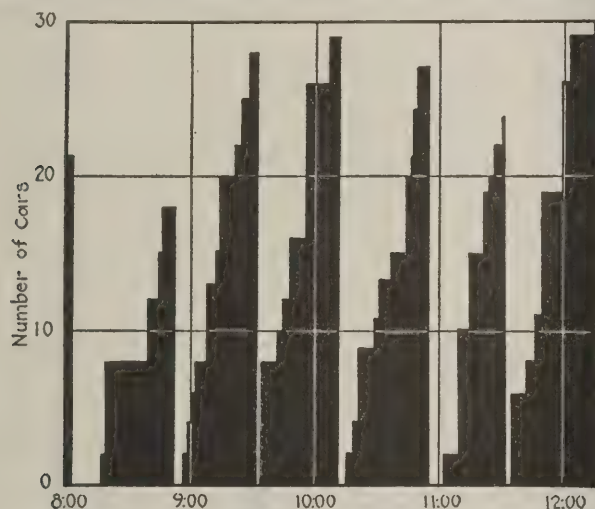


FIG. 1—NUMBER OF LOADED CARS ON PARTING AT ANY GIVEN TIME IN MORNING.

Where no black blocks rest on the base line, as is the case, for instance, in that part of the record for the period shortly after 8 a.m., a locomotive arriving would find no cars to take out. At other times it would find, it will be seen, an insufficient number for a full trip. It would have been helpful if the time when locomotives arrived and pulled out had been indicated in the diagram. In every case, whether the loaded track was full or empty, it was completely cleared by the locomotives, which apparently took trips of quite varying length.

particular line. Notably, the planning of the work and the determining and maintenance of standards have been separated from those duties that are strictly executive in character.

In the previous discussion of the work of the mine

*Third installment of report on "Underground Management in Bituminous Mines" made by Stanford E. Thompson and associates to the U. S. Coal Commission. Previous installments may be found in the issue of Nov. 8, p. 691, and of Nov. 15, p. 733. Other sections of this interesting report will follow later.

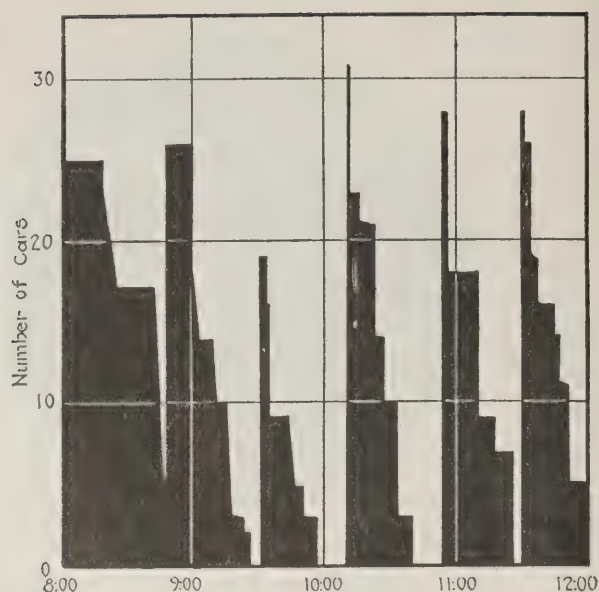


FIG. 2—NUMBER OF EMPTY CARS ON PARTING AT ANY GIVEN TIME IN MORNING

Where no black block appears resting on the base line the empty track was indeed empty, being empty of empties. At such times, trips of loads would come in, and the hauling equipment would have no empty cars to take back. Looking at the "sky line" it is easy to see that the main-line locomotives hauled trips of mine cars of varying length, that at 9:30 a.m. being unduly short.

depends his ability to do a good day's work. Moreover, the supply of coal to the tippie for shipment also is dependent upon the haulage.

Though the general schemes of transportation and trackage are fairly well planned, in the actual operation of the mine the whole control of transportation is almost universally in the hands of the assistant foreman or face boss or still oftener is handled at the will of the man driving a mule or a gathering locomotive. In one or two cases, however, we found a traffic man provided, to whom the motorman reported by telephone so that the trips might be taken up when ready, but even this did not directly reach or influence the delivery of cars to the miners.

The resultant irregularity in the distribution of mine cars is responsible for the agreement with the union that each loader shall have an equal or "square turn," which requires, in effect, that during each pay period every loader shall be given an opportunity to load as many cars as any other loader by being offered the same number of empty mine cars. This is intended to prevent favoritism and the possibility of one miner being required to spend the greater part of his day waiting for cars while another miner in a location where the management is anxious to push production would be given all the cars he could load.

MOVEMENT OF TERMINALS HAMPERS PLANNING

In non-union mines, in order to avoid complaints, keep the men contented, and produce as much coal as practicable, the foremen, so far as we are able to determine by conversation with the miners, treated them as equally as management methods permitted without the tendencies to restriction found in some union mines of keeping back cars from the exceptional men who desired to make large money.

The problem of underground haulage is a transportation problem complicated by the fact that all the terminals except the track to the tippie are continually advancing, and the number and location of the advance terminals change from day to day. The cumulative

advance of all inside terminals in a large mine may easily total 1,000 ft. daily, though each terminal will advance only a few feet.

Compared to the problems of transportation of the modern railroad or army those of the coal mine are relatively simple. They are in no way complicated by continual changes in the types and quantities of goods to be hauled, by perishable articles, blizzards, crop-moving seasons, or greatly varying velocities of travel.

Coal-mine transportation, however, falls heir to all the other troubles of the modern railroads, to which are added many special difficulties peculiar to mining. It is complicated by roof falls, explosive gas, multiplicity of terminals—400 or 500 being not uncommon—but is simplified by the fact that its freight is of only one type and is carried relatively short distances, four miles ordinarily being the maximum distance. Sufficient progress has been made in some mines to warrant a general assertion that mine haulage is susceptible to close control under proper management and that most of the losses now occurring can be eliminated.

Whether the problem is simple or not, as compared with that of the movement of material in other industries, underground haulage cannot be expected to run itself and this is practically the way in which the transportation in the majority of mines visited was

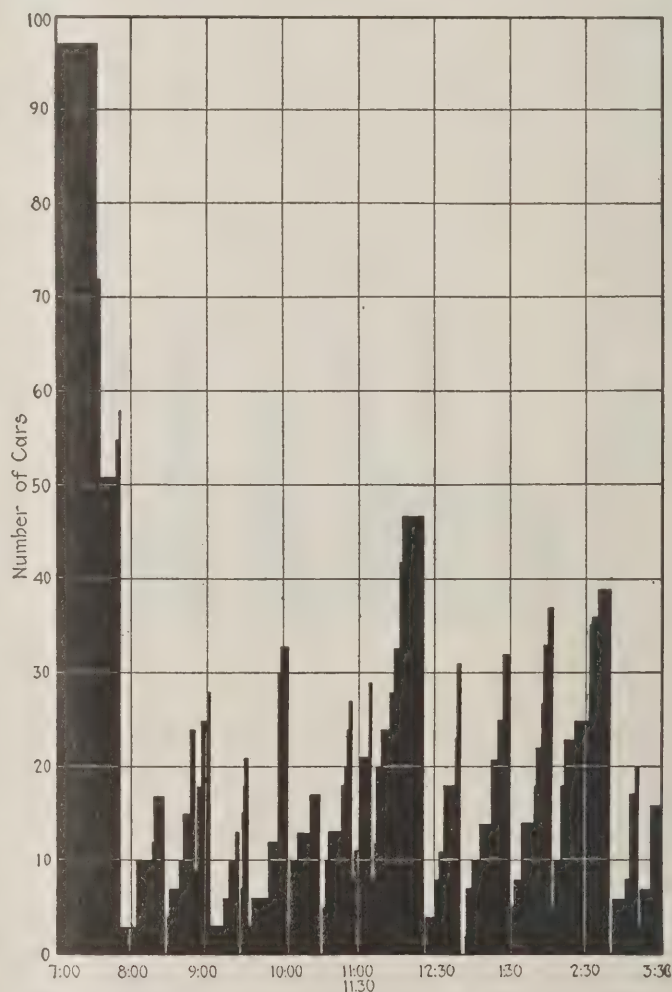


FIG. 3—ONLY AT THE BEGINNING OF THE DAY WERE THE MAIN-LINE LOCOMOTIVES REALLY BUSY

The morning started with 97 cars accumulated on the previous day, when the tippie and main-haulage system were idle. Note the irregularity in arrival of the main-haulage locomotives and the variation in the size of trips hauled. The two figures in the base line of the diagram, 11:00 and 11:30, show the noon half-hour during which loaded cars evidently arrived but did not leave the parting.

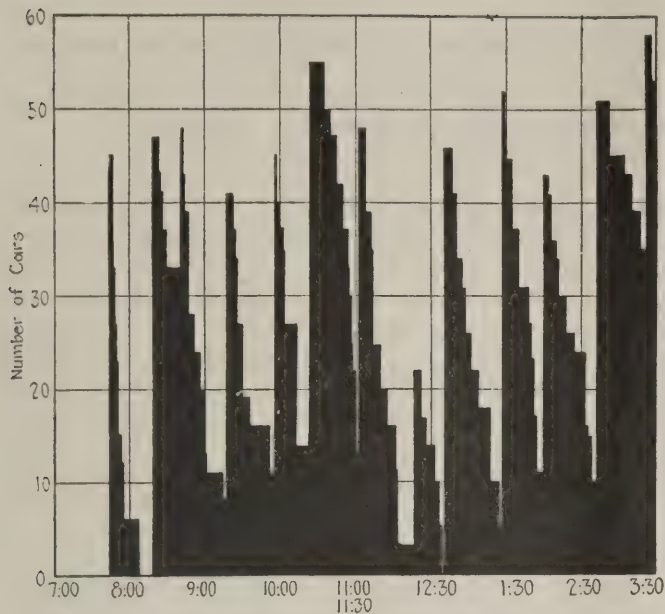


FIG. 4—RECORD OF FIG. 3 SEEN FROM OTHER SIDE

All the cars at the parting being full at starting time, the main-line locomotives were busy, but the seven gathering locomotives were idle for forty-five minutes. The day started splendidly at the tippie, but the scene was quite other at the parting. After 8.15 a.m. the faults were corrected and at all times thereafter empties were standing on the track.

being performed, notwithstanding the fact that these mines were among the best in the various regions studied. Generally the foreman is not equipped by training to handle transportation systematically. Even when he has the training it is of but little use, for he cannot spare sufficient time from his other duties properly to direct haulage.

Illustrations of Haulage Irregularities.—The efficiency of haulage is so great a factor, both to the miner in determining his day's work and money earned and to the operator in affecting output and ultimate unit labor costs, that several charts covering actual

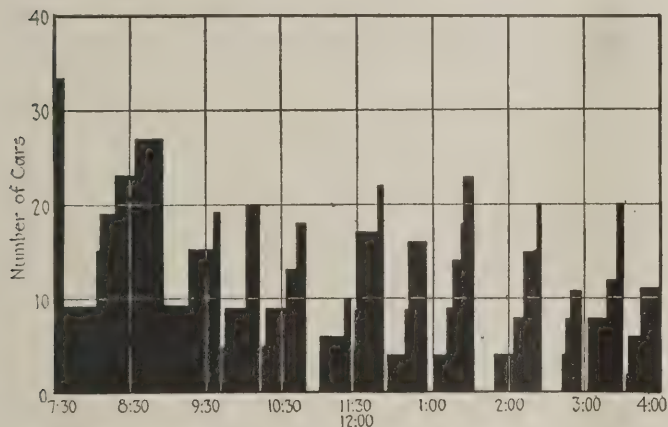


FIG. 5—IRREGULAR TIME IN MAKING STANDARD TRIP

The distance between the parting and the tippie is fixed and barring congestion at the latter, the time between trips should be equal, yet here the time of trips varied between twenty-six and seventy-nine minutes.

experience in the mine will be given for the purpose of showing the possibility of constructive progress. It is probable that these cases represent conditions if anything slightly better than average in the mine observed because it is natural that when operations are being timed the management and men should be interested to make a good showing.

Studies of the number of cars on partings from

which the main-line locomotive takes the loads are shown in Figs. 1 to 8. These diagrams exhibit graphically the number of loaded mine cars and empties during a day at partings in four representative mines the haulage conditions of which were analyzed. Horizontal distances in the charts represent the time of day and the vertical distances show the number of cars on the parting.

The horizontal distances between the longer vertical lines show the elapsed time between the arrivals of the loaded trips of the main-line locomotive at the parting, and the length of these longer vertical lines in each case shows the number of loaded cars taken per trip. The jogs represent the delivery of loaded cars or the removal of empty ones by mules or gathering locomotives.

Fig. 1, representing half a day, shows that there were twenty-one loads on the parting at the beginning of the day, that the time between the trips of the main-line locomotive was fairly uniform and that on

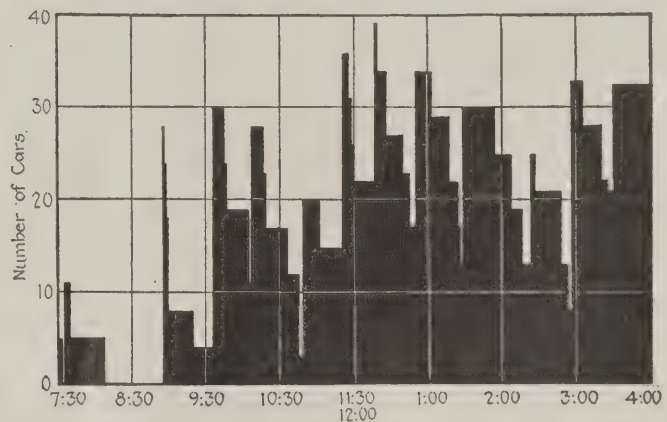


FIG. 6—GRAPH SHOWING EMPTIES HELD AT PARTING

This shows that the empties at the parting made a bad start. This parting is the same as that for which Fig. 5 shows the tale of loads. For 50 minutes in the first hour and a half there were no empties on the parting track and motormen were waiting for some to arrive. After that there were always more empties than the trips could remove.

each trip out the locomotive took all the loads on the parting, varying from eighteen to twenty-nine.

Fig. 2, which is for the same mine, shows four periods in four hours during which no empties were standing on the parting. During three of these periods drivers and mules were idle waiting for cars.

Fig. 3, which is for another mine, shows a large accumulation of loads (ninety-seven) on the parting at starting time, due chiefly to coal being loaded on the previous day when the mine was idle. Note also, how

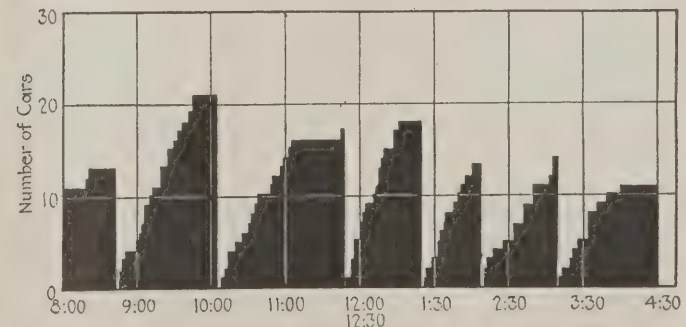


FIG. 7—FLAT PEAKS SHOW DELAYS ON MAIN ROAD

Mules brought in the loads to this parting and it is easy to see that they did it till there were no more empties to take away. Then came a long wait for the locomotives. Sometimes it was an unusually long one, as when the trip was away one hundred and one minutes. Fig. 8 shows that one mule must have gone away on that occasion without empties to gather a trip of loaded cars.

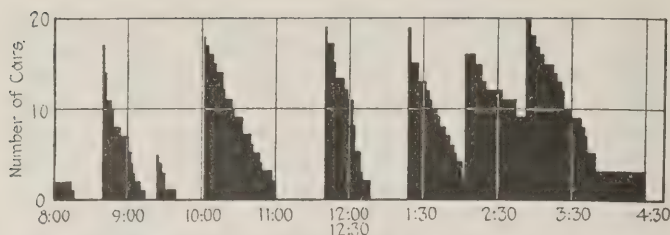


FIG. 8—GRAPH EXPLAINING FLAT PEAKS IN FIG. 7

The hollows in this graph correspond to the flattened peaks of Fig. 7. The quickened trips of the locomotives in the afternoon kept empties on the parting from about 1.20 p.m. till quitting time.

irregular was the time between main-line haulage trips—varying from eight to forty-five minutes—and the number of cars hauled—from thirteen to fifty-five. Sometimes the trip was pulled by one and sometimes by two locomotives.

This same mine, in Fig. 4, shows no empties at all delivered to the parting for forty-five minutes after starting time. Seven haulage locomotives with fourteen drivers and tripriders were idle during this entire period. Forty-five empties were then brought in but were all taken out by the gathering locomotives within twenty-two minutes and another period of twelve minutes of waiting ensued. By the end of the day there were fifty-three empties on the parting, and the following morning at starting time the haulage conditions at that parting would be the complete reverse

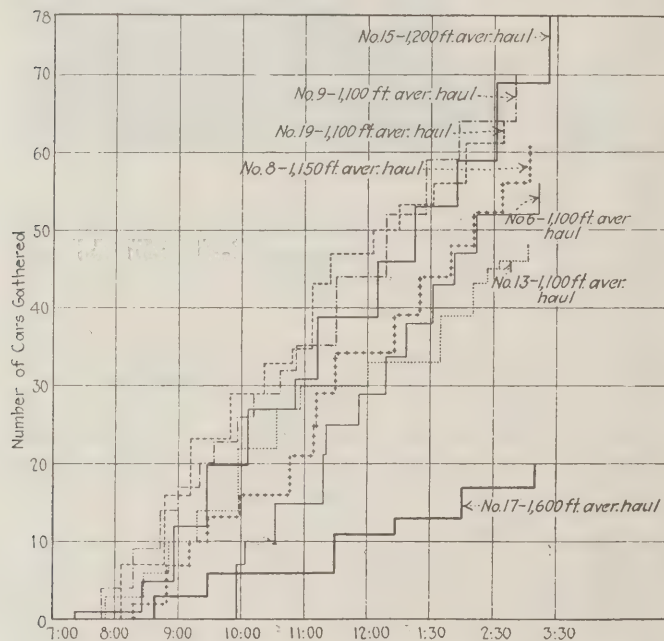


FIG. 9—CUMULATIVE RECORD OF LOADS GATHERED

The record of each locomotive is separately recorded. No. 17 was a consistently dilatory load gatherer to a degree not explicable by its greater length of haul. Unless it had peculiarly difficult grades it must have been out of condition, must have had derailments or been manned by a singularly inert motorman. The record seems to show in partial excuse, however, that he failed to get loads till a late hour and may have had to wait for empties.

of the day shown; the parting being full of empties and only sixteen loads waiting, in contrast to no empties and ninety-seven loads at the start of the former day.

Fig. 5 shows in another mine a pronounced variation in time between main-line haulage trips, varying from twenty-six to seventy-nine minutes.

In Fig. 6, for the same mine, the gathering units waited fifty minutes for empties during the first hour and a half. After that the supply was steadily in-

creased and from eleven o'clock on there was a surplus supply of from eight to twenty-two empties, more than were needed by the haulage locomotives. Whether the surplus at this parting was resulting in a shortage at other partings at the same time is not known.

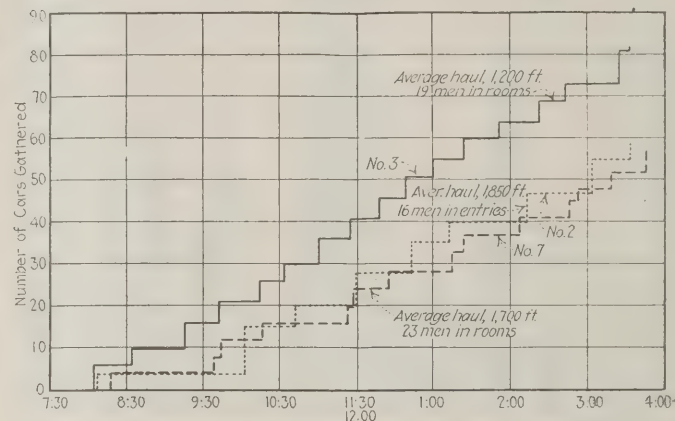


FIG. 10—ANOTHER RECORD OF LOADS GATHERED

This also is cumulative. It is clear that the twenty-three men dependent on locomotive No. 7 got poorer service than the nineteen men who were served by locomotive No. 3.

Fig. 7, which represents conditions at a parting in a fourth mine, shows a variation from forty-eight to one hundred and one minutes between the arrival of main-line locomotives, and, as is shown in Fig. 8, not only was there a big variation in the time between the arrival of empties but a comparatively long wait for the mule drivers after each of the haulage locomotive trips due to the fact that there were no cars on the parting. The first three of these periods of waiting did not, however, cause loss of time to the miner. The miner began to wait for cars about 11:30 a.m.

The difference in the number of loads hauled by mules or by gathering locomotives to the same parting in three different mines is shown in Figs. 9 to 11. The variation in the number of cars gathered by different mules or locomotives in the same mine is marked, but not all explained by the differences in the distances hauled or the grades to be surmounted. The time that a locomotive or mule spends in traveling is much less

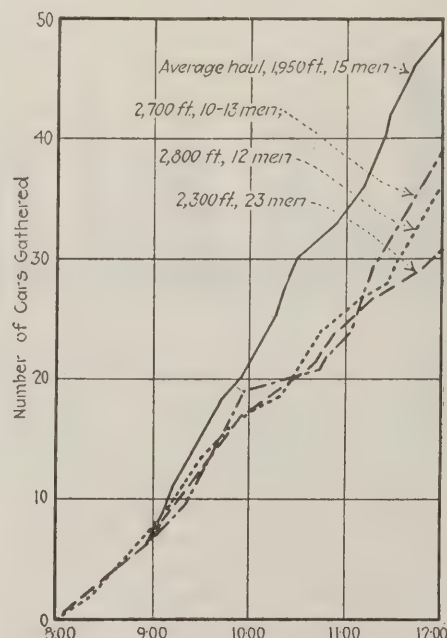


FIG. 11—WHERE GATHERING WAS BY MULES

Here also the mule with most places to serve gathered least loads, suggesting a need for a better arrangement of service.

than generally appreciated by the foreman or others who supervise mine hauling. This is particularly well borne out by Fig. 9. The gatherings of seven different locomotives to one parting are shown on this chart by accumulative plotting of the loads brought in from the time of starting until the last trip made by each locomotive.

It will be noted that locomotive No. 17 brought in only twenty cars, whereas the others hauled from forty-eight to seventy-eight. When the foreman was asked during the day why No. 17 was apparently bringing in so few trips his reply was "Oh, he has to gather way down in the south entries, and has a much longer distance to travel than the other locomotives." The actual average difference in distance of travel between locomotive No. 17, which brought in twenty cars, and locomotive No. 15, which brought in seventy-eight cars, was not over 900 ft. per trip.

The rate of travel of these locomotives was approximately 600 ft. per minute. The additional time, therefore, that should be allotted No. 17 for gathering greater distance would be only nine minutes for six trips. The fact that it consumed almost four hours more seemed perfectly natural to the foreman, and no effort was made by him to change the condition. Similar variations are shown in Figs. 10 and 11.

German Coal-Toasting Plant Has Scraping Gear to Clear Carbon Scale on Cylinder

A LONG slowly revolving horizontal retort is used in the Fellner and Ziegler process for the low-temperature carbonization of coal. Through this retort coal, crushed to about 1-in. cube, travels continuously, being heated externally by gas from a producer or by the rich gas evolved in the process. The temperature of carbonization is about 1,119 deg. F. (600 deg. C.). The retort is a steel cylinder, 65 ft. 6 in. long and of 8 ft. 3 in. internal diameter, inclined 1 ft. in 20 downward toward the discharge end, and set in suitable brickwork combustion chambers. It is revolved by suitable gearing which is actuated by a 40-hp. motor at the rate of about one revolution in 3 min. 25 sec. The output is three tons of coal per hour. Inside the first 23 ft. of the cylinder is a mechanical scraping gear, consisting of a number of arms projecting from a central revolving shaft, and extending to within $\frac{1}{2}$ in. of the inner surface of the cylinder. This detaches partly carbonized material which is deposited on the plates and which, if not removed, would soon reduce their conductivity.

The low-temperature fuel, with about 19 per cent volatile matter, is chiefly gasified in producers, and the small breeze is mixed with pitch and briquetted, or burned as pulverized fuel.

SALT AIDS MINERS TO ENDURE HEAT.—In England. George S. Rice, chief mining engineer, U. S. Bureau of Mines, had the opportunity of observing the experiments being made at Oxford and Birmingham universities into the health and working capacity of miners employed in excessively hot mines. As the result of the researches of Dr. J. S. Haldane, eminent mine physiologist, it has been developed that miners working in hot atmospheres lose chlorides rapidly, which is very weakening. The energy of the workers, it has been found, to a large extent can be re-established by the taking of salt in water, or through other liquid.

Is the Coal of Vancouver Island Nearly Exhausted?

Canadian Government Bulletin by the Late
J. D. MacKenzie Shatters Previous Beliefs—
Finds Only One-Sixth of Expected Reserve

BY F. H. MASON
Victoria, B. C.

"THE Coal Resources of Southern Vancouver Island", a government publication of which, as yet, only advance mimeographed copies have been issued by the Canadian Geological Survey, will tend to shatter preconceived ideas about the vastness of the coal reserve on that island. It indicates the presence of but one-sixth the coal supposed to have been available.

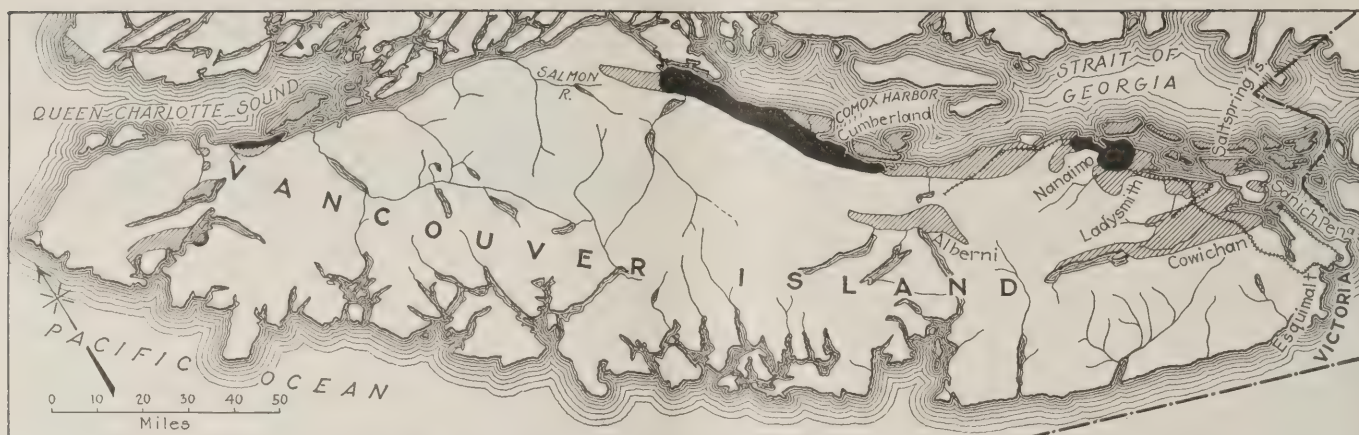
The memoir is so important that perhaps it will be well to say a word or two about the author, the late J. D. MacKenzie, who died last autumn as the result of a surgical operation, performed with the object of drying up a wound in the left lung; the wound was received in Flanders in 1917 and had not healed. Post-mortem panegyrics from colleagues on the staff of the Canadian Geological Survey and on that of the Massachusetts Institute of Technology and from geologists and mining engineers with whom he had come in contact all proclaimed MacKenzie as a painstaking and conscientious observer who was ever careful to take all possible precautions to verify his facts before arriving at definite conclusions.

NOT LIKELY TO MEET WITH APPROVAL OF PUBLIC

The field work on which the conclusions set out in the memoir are based was performed during the years 1921 and 1922, the last work done by the author, and in this work he had the wholehearted support of practically all the mining engineers now operating in the field. Records of boreholes and development and all available data were thrown open for his inspection; he had the run of the mines and surface croppings, and every aid that a generous and busy body of men could be expected to offer to a colleague. It will be well to bear this in mind, because the memoir is almost sure to meet with considerable opposition from some quarters. None of us likes to have his idols ruthlessly shattered, and MacKenzie's estimate reduces the present actual coal reserve on Vancouver Island to such proportions that, instead of its end being reached in some hazy, distant future that will trouble only our remote progeny, at the present rate of output the end will come during the lives of many now living. This statement, of course, refers to actual, not to probable and possible, reserves, some of which latter two are certain to be developed into actual reserves before the present actual reserves are exhausted.

MacKenzie reviews the work of previous observers—James Richardson, in 1871; George M. Dawson, in 1885, and C. H. Clapp, in 1911—the records of whom have appeared in publications of the Canadian Geological Survey, and he gives to each full credit for work performed often under exceedingly difficult conditions. Richardson examined the coast line from the head of Comox harbor to Victoria and that of the adjacent islands; he also traversed the rivers and creeks and the few trails available at that time.

In a map accompanying his final report (Geological Survey of Canada Report of Progress, 1876) he colored



COAL-RESOURCE MAP OF VANCOUVER ISLAND, B. C.

This map, made before the report was rendered by J. D. MacKenzie, shows the coal fields of Vancouver Island as they were believed to exist before his inquiry. Black shows anthracite and bituminous-coal areas and the cross hatching, beds that might bear such deposits.

a strip of land from the head of Comox harbor to the head of Sanich peninsula, some 130 miles in length, as being underlain by productive coal measures. The northern half of Saltspring Island and the adjacent islands to the north also were so colored. Evidently Richardson based his theories on the knowledge geologists had at that time of the more regular coal measures of the Carboniferous series in Nova Scotia, and he believed that the seams he had found along the coast would persist for great distances under the water and that other seams would be found below them.

"As a matter of fact," MacKenzie wrote, "the progress of exploration during the last fifty years has made it clear that there are only three principal coal-bearing zones in all this area, and that even those zones are not always productive. Further, throughout a great part of the area only one zone exists, and in the remainder only two of the three are found. Instead, therefore, of the probability of finding coal throughout a zone of rocks more than 100 miles long and covering a large area along the southeastern coast of the island, it is now known that the areas from which future production is likely to come are relatively restricted."

Dawson, who went over the ground in 1885, seems not only to have supported Richardson's findings but to have supposed that the coal-bearing area extended inland from the Campbell River in a northwestern direction to the Salmon River, a distance of 35 miles, thus greatly extending the productive area, a supposition, however, that MacKenzie has shown to be incorrect. Clapp's estimate, made in 1911, MacKenzie found to be altogether too optimistic.

As has been hinted, MacKenzie's findings are likely to meet with some opposition, but those who may wish to controvert them will find themselves facing a difficult proposition, for this survey, like all those made by MacKenzie, is thorough. He lucidly defines what he means by actual, probable and possible coal, and he states clearly how he has reached his conclusions. He takes the two main areas, subdivides them into lesser areas, and measures the various seams in each division.

In this way he finds that the Comox area contains 18,900,000 tons of actual, 39,000,000 tons of probable, and 245,230,000 tons of possible coal in seams thicker than 3 ft. and 12,000,000 tons of actual, 50,050,000 tons of probable, and 181,000,000 tons of possible coal in seams between 1 and 3 ft. thick.

In the Nanaimo area he finds 34,070,000 tons of actual, 67,220,000 tons of probable, and 68,000,000 tons of possible coal in seams more than 3 ft. thick and 7,802,-

000 tons of actual, 20,842,000 tons of probable, and 122,000,000 tons of possible coal in seams of between 1 and 3 ft. in thickness. To the quantity in the Nanaimo area he adds 35,000,000 tons of possible coal below 2,000 ft. in depth. In the Cowichan area he finds no available coal; in the Gulf island area, none; in the Alberni district—who knows?

Thus he finds a total of only 52,970,000 tons of actual coal in workable seams—that is, 3 ft. or more in thickness—and a grand total of 835,000,000 tons of possible coal—about one-sixth of the previous estimate.

But worse is yet to come. The foregoing estimate is of the quantity of coal in the ground. With regard to the mining of it MacKenzie said:

"It does not follow that anything like this quantity is available for recovery under present conditions of mining or under the conditions likely to obtain for some time to come. In the first place, it is only under exceptionally favorable conditions (which are, unfortunately, only too rare on Vancouver Island) that seams of less than 3 ft. average thickness can be profitably mined. Furthermore, the expense and difficulty of exploration, development and operation at depths exceeding 2,000 ft. prohibit economical production.

"Again, the coal in the ground and the coal that the mine reasonably may be expected to produce are not the same thing. There are always losses—sometimes large losses—incidental to mining. A certain quantity of coal is left in pillars too thin to remove or is crushed by movements of the strata after the surrounding coal has been extracted. Every coal miner on Vancouver Island is only too familiar with the 'rolls' and 'pinches' that have made the extraction of coal from certain areas of the mines impracticable, if, indeed, the movements of the overlying rocks have left any coal in these thin places. Some areas are so broken by faults that economical extraction is impossible.

"In one district knobs of the underlying barren pre-Cretaceous rocks project through certain parts of the seam. These knobs not only form areas of no value in themselves but by their effect on the seam as it approaches these old shore lines, interfere with the placing of haulage roads and their ventilation. Large areas of coal may be lost by mine fires, by excessive gas, by water, or by other causes. It is no exaggeration to state that in large areas of some of the Vancouver Island mines barely 50 per cent of the coal developed and actually found in the ground has been extracted, because of conditions quite beyond the control of the operators."

Coal-News Gatherer Finds A Near-Paradise In Cardiff Exchange



Leaders in Busy British
Coal Marts Descant Freely
on Varied Phases of the In-
dustry—All Eager to Help

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

FUEL DISTRIBUTOR WADLEIGH telephoned me one day shortly before I left for Europe and asked me to go over to his office to meet a man prominently connected with the British coal industry. On arriving there I was introduced to S. A. Bacon, one of the partners in the firm of D. L. Flack & Son, Ltd. When I told him of the trip I had in prospect he offered to do all within his power to help me and suggested that I call on him immediately on my arrival in London. He was so evidently sincere in his offer that I accepted his invitation and was in his office before I had been many hours in the British metropolis. He all but suspended his business for the day. I know he answered two hundred of my questions, but when I left his office I had a clear mental picture of the existing situation in the British coal fields, as well as a background that was to stand me in good stead afterward.

The next day, at his suggestion, I returned to his office and discussed with the various specialists on his staff their respective branches of the work. This gave me an insight into the problems of marketing, bunkering, chartering and rail transportation.

On the day following I left London for Cardiff. Mr. Bacon had advised his Cardiff office as to the purpose of my visit. On my arrival there, S. H. Lewis, in immediate charge of the South Wales operations of Flack & Son, had everything ready to put me in immediate touch with the best sources of information. To see that I was introduced properly, he unloaded his duties for the day on his efficient Mr. Larkin, and took me on to the floor of the coal exchange. He had arranged that I be accorded the privilege of the floor.

If there is a paradise for the gatherer of coal news, it will be something like that Cardiff exchange. Here all those interested in buying, selling or transporting coal put in an appearance at some time during the day. Here the dealing for most of the coal is carried on. Comparatively little business is done over the telephone or by calls at offices. There is a social feature, too, about the exchange. Whether members have coal to sell or not they put in an appearance and hear all the talk that is going the rounds. I will go into the details of the operation of this exchange in a separate article.

I was in clover on the floor of that exchange. I would talk a while with one man and then ask him to introduce me to someone else near by. In this way I was able to get the viewpoints of ten times as many men as I could have looked up at their individual offices.

In addition to my visits to the floor of the exchange, I had the advantage of a personally conducted tour of the harbor, with Mr. Lewis doing the conducting. His wide knowledge of chartering and bunkering brought out many interesting points about the conduct of the greatest coal-shipping port in the world.

I was anxious to get the railroad viewpoint, par-

ticularly with regard to car supply and distribution, and the effect on the coal industry of the consolidation into one system of all the lines of south Wales and southwestern England. This information was supplied by W. S. Horace Williams, assistant superintendent of the Great Western stationed at Swansea, and by officials of the road to whom Mr. Williams referred me.

Since the Northumberland and Durham fields present other aspects of the British situation, I journeyed to Newcastle-on-Tyne. Here again was that splendid facility, the exchange. There I was taken in tow by the Newcastle representatives of D. L. Flack & Son. Through the personal kindness of T. B. Charlton and H. E. Dodd I came in contact with the men most familiar with the various phases of the industry there.

Herbert Shaw is the secretary and mainspring of the Newcastle exchange. If I had my way about it, I would establish a coal exchange at Norfolk and import Herbert Shaw to manage it. If the industry will conduct a fair experiment with such an exchange here, the institution is certain to thrive and in my opinion yield 1,000 per cent dividend in service and convenience, to say nothing of the stabilizing effect on prices.

NEWCASTLE FORTUNATE TO POSSESS RIDLEY WARHAM

In Newcastle I met a man who impressed me as being a particularly great asset to the district. He is Ridley Warham, of the Ashington Coal Co., Ltd. His clear thinking and willingness to insist at all times that the industry be conducted on the highest possible plane has made him a great influence for good in the Northumberland and Durham fields. Many of the thoughts which he presented will appear in the articles to follow. I made note of every word he told me and while I promised not to quote him, every sentence that he uttered will find its way into these stories.

I did not call on Sir Richard Redmayne until I had completed my visits to the coal fields. I knew in advance that he could explain any point on which I was not clear, and then, too, I wanted to take advantage of his vision and his knowledge of the economics of coal when I would be in a position to ask more intelligent questions and when I would have the background to understand better what he would tell me.

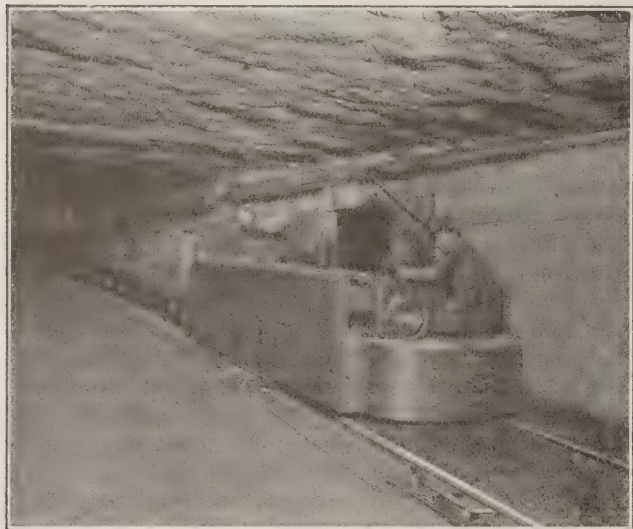
There again I met with the strict injunction that it would be better to use his thoughts rather than to attempt any quotations. By giving this promise, I am sure I obtained a great deal of information which would not have been forthcoming otherwise. In this particular, the contrast between the British desires and those of many of our men in prominent positions is particularly striking. On Capitol Hill, in Washington, most men feel aggrieved if they are not quoted.

[Next week Mr. Wooton writes of transportation and wage problems in Great Britain's coal industry.]

Automatic Track Switch

THE automatic switch thrower is a labor-saving device designed to do anything a switchman can do with a switch. The device consists of four distinct units, which operate in conjunction with each other to perform the particular work for which they are designed. A device called a traveler is attached to the most convenient place that may be found on the side of the locomotive, and is operated directly with the hand, or if out of reach of the hand, as it is most frequently installed, a rod is connected to the handle which is within reach of the motor runner. An operating device is installed alongside the outer edge of the track rail, attached securely to the rails and resting on the ties. A tripper is installed in the same manner as the operating device. A bell crank to which are attached rods connecting with the operating device is fastened to the track rail and controls the movement of the switch points.

If the switch is set normally for the straight track and the motor runner wishes to go into the parting through the switch he merely pulls the handle on the traveler, which causes the plunger to descend to a level with the bottom plate of the operating device, and as this plunger passes between the two guides on the operating device, it pushes a lever which actuates the bell crank at the switch points, thus opening the switch, which remains in that position until it is desired to close it. The motor runner releases the handle and a spring pulls the plunger back to the first position, so



AUTOMATIC TRACK SWITCH IN OPERATION

Safety, convenience and economy are the goals sought by the increased application of automatic equipment in the mines. This device makes a bid for a place in the long list of successful labor-saving appliances.

that it passes over the tripping device without disturbing the switch.

The tripping device may be located at several points, depending upon how it may be desired to close the switch. It can be set a distance beyond the switch points equivalent to the longest trip, so that it may be closed after the trip has passed through, or it may be set in advance of the operating device, so that other trips which follow may close the switch should they desire to proceed over the straight track. If the switch is closed after the trip has gone into the switch, it will pass out as a spring latch, or if it is opened and a trip wishes to come out on the main track, it likewise passes through as a spring latch.

When it is desired to install this switch thrower for making flying switches, the tripping device is installed at a point beyond the switch points, so that just as soon as the rear wheels of the locomotive pass through the switch, it will close, permitting the car or trip to take the other track, even if the first car is against the bumper of the locomotive.

The mechanism of the different units is so constructed that they can be adapted to any variation in the track or manner of switching which they may be called upon to care for. The traveler and operating device may be placed on the opposite side of the track if necessity requires and with a few modifications in the working parts it will operate equally as well.

When installed on a grade as a safety measure against runaway cars or trips, a back switch is installed if sufficient room can be found; otherwise, a short track will divert the cars from the main track leading them into the rib where they will be stopped before any great momentum is acquired. In cases of this kind the switch is always open against the descending trip, which has the tripping device installed just ahead of the switch points. The descending trip closes the switch with the tripping device. The switch thrower is installed at a point equal to the length of the longest trip, and after the last car has passed the switch points the switch is again opened.

While the switch thrower is primarily designed as a safety device, it possesses valuable economic features by way of power saving. By eliminating the necessity of stopping the trip to permit one of the trip crew to run ahead and throw the switch, it reduces the amount of power required to move the trip by eliminating unnecessary acceleration peaks.

The elimination of the stop also saves the wear on brake shoes, tires and rails; saves the tear on locomotive and cars from jerking and bumping.

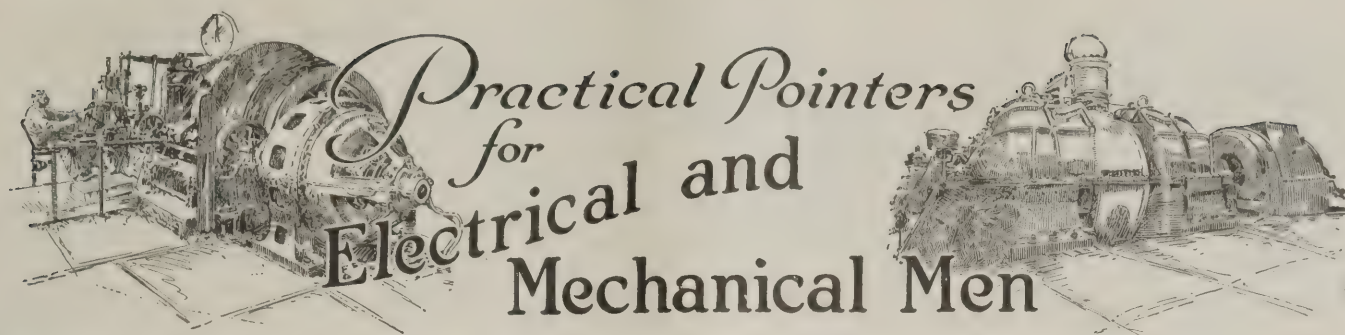
One of many of these automatic switch throwers has been installed by the American Mine Door Co. of Canton, Ohio, the manufacturers, at the Bureau of Mines Experimental Mine at Experiment, Pa.

Mining Machines in Use in the United States In 1905, 1914, 1920 and 1922

From Reports of Operators to the U. S. Geological Survey

	1905	1914	1920	1921
Alabama.....	213	362	427	310
Arkansas.....	28	28	23	26
Colorado.....	121	306	429	439
Illinois.....	882	1,812	2,516	2,769
Indiana.....	506	751	795	856
Iowa.....	32	46	100	98
Kansas.....	10	9	15	8
Kentucky.....	527	1,383	1,718	1,759
Maryland.....	42	10	29	35
Michigan.....	106	107	110	90
Missouri.....	30	88	140	134
Montana.....	58	99	119	126
New Mexico.....	9	45	96	99
North Dakota.....	9	14	16	17
Ohio.....	1,041	1,669	2,262	2,149
Oklahoma.....	29	116	209	224
Pennsylvania.....	4,254	6,326	5,823	6,332
Tennessee.....	89	194	211	176
Texas.....	8	13	6	6
Utah.....	35	68	154	182
Virginia.....	72	182	248	257
Washington.....	1,105	2,607	3,626	3,229
West Virginia.....	81	198	221	240
Wyoming.....	6	2	..	..
Other States.....	9,184	16,507	19,334	19,618

Here are a few figures that tell a big story—How the soft coal operator has kept costs as low as he has with mounting wages.—From U. S. Coal Commission Report on Engineering and Management.



Make Rolling Stock Carry Safety Message

W. C. HOLMAN, chief engineer of the Stag Canyon Branch of the Phelps Dodge Corporation, Dawson, N. M., sends the illustration accompanying this article informing us that posters are glued to the sides and ends of the mine cars and the sides of the locomotives and are covered with a coat of white shellac. He says: "Usually a poster is pasted on each car and motor. We term the posters 'Silent Foremen.' Some



USING MINE CARS AS SANDWICH MEN

The cars with their silent warning do not wait at a respectful distance from the drift mouth but on every trip each one singles out his man, enters his room and gives him the warning.

of the posters in use are: 'Be Careful of Your Eyes'; 'Look Out for Your Fingers and Toes'; 'Take Down That Loose Roof'; 'Set that Prop Now'; 'Is That Prop Too Close to Track?' 'Don't Let Machine Jack Slip'; 'Don't Get Squeezed.'"

What's the Trouble with Mine Power House? Why Not Modernize It?

I AM a new man to the coal industry, having been connected with it for only a short time, and naturally I have much to learn about it, but I should very much appreciate some enlightenment as to why there apparently is such a notorious lack of understanding of modern power-plant practice and such a waste of power about bituminous-coal mines as exists in certain fields.

In the last few months I have visited over twenty mines the daily output of which ranges from about two thousand to approximately six thousand tons and at many of these mines there was a shortage of steam-generating capacity or electric-generating capacity or both, this shortage of power being so acutely felt that the management was either putting in or figuring on putting in public-service power, using motor-generator sets to furnish direct current for mine work, while enormous quantities of exhaust steam was going to waste in the atmosphere.

The majority of the mines were generating d.-c.

electric power with automatic engines running non-condensing. In fact, not a single condensing engine was seen, although three turbines, two of which were mixed pressure, were found, and of course these were operating condensing. Plants with sufficient steam going to waste to generate from 500 to 1,500 kw. of current on low pressure steam were no uncommon sight. What is the reason for this? Is the mixed-pressure turbine a failure, is the mine management asleep, or can a public utility company sell power for less than it can be made at the mine?

Some mines were hoisting from deep shafts and were putting out over six tons of coal per boiler horsepower and had plenty of power, while others were putting out less than two tons per boiler horsepower and then were short of power.

The total boiler capacity of the mines was about evenly divided between fire-tube and water-tube boilers, the fire-tube boilers being hand-fired and the water-tube boilers being generally stoker-fired, chain grates being used, yet the modern boiler plant was often furnishing steam to ancient engines.

The caustic comments of some of the members of the U. S. Coal Commission can well be appreciated after visiting the mines, but how is the matter to be remedied? Talk about Rip Van Winkle being behind the times! Rip had nothing on these fellows when it comes to being asleep on power.

Think of carrying direct current a mile and a half to the face, generating it with automatic non-condensing engines, operating a fan on 24-hour service and running it with a plain slide-valve engine taking its steam through a line 300 to 500 ft. long, generating the steam at 125 lb. gage pressure or less, without superheat, in boilers that have brick settings without a sign of mastic cement or other coating to stop air leaks, and wasting 75,000 to 400,000 lb. of exhaust steam per working shift from a hoisting engine and using live steam to heat the wash water for the miners and then wonder what is the matter with the power plants of the mining industry! The average plant is a joke, for which the owner pays dearly.

Pittsburg, Kan.

IRA A. BUTCHER.

There is no doubting that many mining-power plants have become old and inefficient. Investigations by individuals and commissions have brought to light many instances of gross waste. Then again there are some mining properties where the saving in the power-house equipment is a big factor in placing the mine on the proper side of the ledger.

There is much to be done, however, in more efficient consumption of coal at the mines, in the industrial plant and in the home. Fortunately, the mine manager has many high-class central station plants and many highly developed mine-power plants, recently installed,

from which he can pattern his own plant. Big developments are sure to come along this line, rapid advancement in efficient combustion of fuel and a multiplicity of devices for generating steam and using it economically are already available and in successful operation.

It would be most interesting for our readers to discuss these points which lead the way to greater production of the mine with less worry and fewer shutdowns.

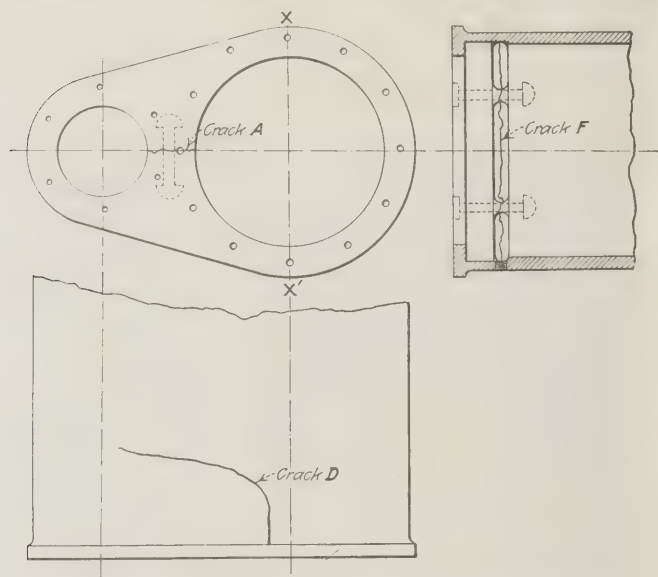
Repairing Badly Cracked Engine Cylinder

RECENTLY a cylinder of a 24x48-in. hoisting engine was badly wrecked by water entering the cylinder. It was impossible to obtain a new cylinder without considerable delay so it became necessary to make a hasty yet safe and efficient repair.

As shown in the figure the cylinder was cracked in three different places and it is interesting to note how each crack was repaired because each was a somewhat special job in itself.

Crack A, which will be noticed between the cylinder and valve chest, extended back 8 in. to the port chamber. In repairing this crack a steel link was shrunk in the surface of the metal to close the crack. This link was about 1½ in. long.

Crack F was 3 ft. long and extended from the center of the top of the cylinder to the drip tap at the bottom.



SHRINKING LINKS AND SPOT WELDING KEPT THIS CYLINDER IN OPERATION

The cracks were closed and a temporary repair effected with little loss of time.

It was closed by shrinking in links as shown by the dotted lines.

In both these repairs the links were spot welded and the outside of the cracks closed by the same process.

Crack D started at the front head and extended 18 in. through the top of the chamber which connects the valve chest and cylinder. This crack was chipped out into a V shape and closed by first inserting a row of ½-in. studs on both sides and then tying the studs and sides together by welding.

Because of the shape of the casting it was impossible to run studs from the front to the back head so the above method was used.

At present this engine is running with normal load and shows no sign of weakening.

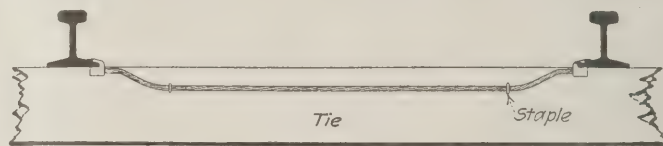
Cresson, Pa.

J. F. MACWILLIAMS,

Pennsylvania Coal & Coke Corporation.

An Efficient Method of Cross-Bonding

IT IS always difficult to explain the operation and the reason for certain things to men unacquainted with the theory of electricity. Every mine electrician knows the advantage of good bonding of the tracks wherever mine locomotives are used or other equipment is operated from the trolley circuit and the return made through the rail. However, this is one case where it is far from easy to explain the advantages of good bonding to the layman. To anyone familiar with resistances it is easy to show the high power losses which result from poor bonding. There are many other disadvan-



A CROSS-BOND THAT BONDS

The necessity of having cross-bonds increases with the number of turn-outs as usually it is here that open circuits occur in the track circuit.

tages of poor bonding, principal among them being loss of voltage. After a pair of rails have been well bonded, considerable attention should be given to cross-bonding.

Because of their particular location cross-bonds usually are likely to be cut or torn loose in the event of an accident. The accompanying sketch shows an application of the cross-bonds which we have been using to great advantage. It will be noticed that only the welded terminal is above the top of the tie, and owing to the fact that this weld usually is very strong it is practically impossible for it to be knocked loose. The particular advantage of this method of installing the bond is that all the cable is well protected from being cut. Care and consideration should be exercised in fastening the bond to the tie. If this is properly done it will rarely come loose, and, therefore, cause little trouble.

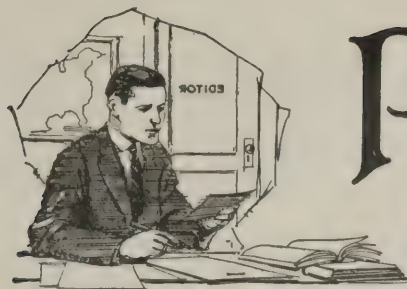
WEST VIRGINIAN.

Maximum Current-Carrying Capacity of Bare Copper Conductors Used in Mines

THE Standardization Division of the American Mining Congress has adopted the following table covering the maximum current carrying-capacity of bare copper conductors used in the mine:

Size of Conductor B. & S. Gage	Current Capacity Amperes	Size of Conductor Circular Mils	Current Capacity Amperes
10	80	250,000	690
8	105	300,000	790
6	145	350,000	880
4	210	400,000	965
2	280	450,000	1,050
1	320	500,000	1,140
0	375	550,000	1,215
00	435	600,000	1,285
000	525	650,000	1,370
0000	615	700,000	1,450
		750,000	1,520
		800,000	1,590
		900,000	1,730
		1,000,000	1,870

USE SEAWEED FOR BRIQUETTING BINDER.—Report declares that a factory is to be erected at Stromness, in the Orkney Islands to the north of Scotland, for the manufacture of briquets from the coal dust and the colliery waste of South Wales, the binding material being a special kind of seaweed found in enormous quantities near the islands. *The Engineer*, which contains the information, states that the report is unconfirmed.



Problems of Operating Men

Edited by
James T. Beard



Practical Notes on the Safety of Flame Safety Lamps

Low Flame Safer Than High Flame in Testing for Gas—Origin of the Idea—Protective Value of Burned Air at Top of Chimney

IN THE report of Inspector of Mines, Henry Devlin, made recently on the Wakesiah explosion of Nov. 24, 1922, Nanaimo, B. C., it is stated that, as a result of the disaster, the management have decided that all firebosses must carry two lamps, a Wolf safety lamp, having the flame set very low for use in testing for gas, and an electric headlight for illuminating purposes.

It will be remembered that this question of firebosses carrying an electric cap lamp was broadly discussed in *Coal Age*, recently. I think there can be no doubt but that the majority opinion favored the carrying of an electric cap lamp, in addition to the safety lamp needed for testing for gas. The principal argument against the cap lamp was the claim that the brightness of the light obscured the test for gas.

Incidentally, however, the ruling of the management has an important bearing on another point in controversy, regarding the use of safety lamps in making the test for gas. The requirement in the ruling that the lamp wick be "set very low" calls to mind the claim made by a previous writer, in *Coal Age*, that a high flame carried in a safety lamp was safer than a low flame, provided the lamp did not smoke.

TRACING ORIGIN OF LOW TESTING FLAME

Inasmuch as the advocacy of a low testing flame is not confined to mine officials in British Columbia, it is worth while to ascertain on what basis the claim is founded. Going back in the history of the safety lamp, we find that the practice of lowering the wick flame when about to make a test for gas, existed from the time the single-gauze Davy lamp first came into use.

The practice followed, as a sort of natural sequence, the common custom of the early firebosses, who made the test for gas with a bare candle, reducing the wick to a single thread, in order to give the least possible illumination and heat.

When safety lamps protected by wire gauze first made their appearance in the mine, the habit of lowering the flame continued, largely because the small non-luminous flame made the flame cap more visible. At that time, the luminosity of the flame could only be reduced by lowering the wick.

For many years, the general opinion prevailed that there was an element of danger in increasing the lighting value of a safety lamp flame above 0.26 of a standard sperm candle. Later experience has proved, however, the absolute necessity of providing the miner with a better light, as a means of reducing the number of

accidents from falls of roof and coal. On that account, the illuminating power of safety lamps has been gradually increased by various means, without impairing its safety value.

Today, it is possible for a miner to use a safety lamp of two standard candlepower, with greater safety than was formerly afforded by the use of a lamp of less than $\frac{1}{2}$ cp. Even allowing that the modern safety lamp is a hotter lamp to handle than one of the old construction, yet the heat is so disposed that the gauze cannot become dangerously heated when the lamp is properly handled.

IMPORTANT PRINCIPLE OF STEPHENSON LAMP

Before closing, allow me to draw the attention of those who think that the only safeguard of a bonneted Wolf safety lamp is the cooling action of the wire gauze, and remind them that the burnt air consisting chiefly of carbon dioxide and nitrogen has a strongly protective value confined in the top of the lamp.

This was the principle of the old Stephenson safety lamp and has not been forgotten in the construction of our modern lamps (*Mine Gases & Ventilation*, Beard, p. 268). So great is the importance of this principle that the possibility of a dangerous explosion within the chimney of an approved safety lamp is practically eliminated in its careful use.

My argument is that increasing the illuminating value of a lamp gives a larger percentage of carbon dioxide through the increased combustion of the wick flame and the safety value is increased at the same time. Barring the presence of coal dust, my conclusion is that it would be impossible to obtain a condition that would cause the intense heating of the upper portion of the gauzes in an approved safety lamp as, I believe, was claimed by a witness in the Wakesiah inquiry.

JAMES ASHWORTH,
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Cowley, Alta, Canada.

Faults of Erosion vs. Displacement

Finding the coal beyond a fault not always a simple matter—Faults of erosion very common in the mining of coal—Rules that apply to faults of dislocation are no help in such cases.

LOOKING through the columns of *Coal Age*, recently, I ran across the letter of M. C. Butler, discussing the question of "Normal vs. Reverse Faults in the Mining of Coal," in the issue, Oct. 4, p. 519. Apparently, Mr. Butler refers only to faults of dislocation.

Viewing the matter from a practical standpoint, namely, that of a miner running up against a fault that has cut out the coal, that writer says, "The solving of the problem, as it occurs in coal measures, does not require a technical education," adding, "As far as the practical miner is concerned, it is simply a matter of observation and the following of a simple rule."

In my experience, faults of displacement to which normal and reverse faults belong are by no means the commonest type of faults found in bituminous coal seams. The type most frequently encountered, in the mining of bituminous coal, is that in which the coal has been eroded by some natural agency, causing what is commonly known as a "fault of erosion."

FAULTS OF EROSION, SO TO SPEAK, DIFFER FROM FAULTS OF DISPLACEMENT

It is evident that no simple rule will apply to this type of fault, where the coal-forming material has been cut out either by a stream flowing through the partially decayed vegetable matter, before it was covered by subsequent deposits. Or, the topography of the land may have been such that a hill or roll, being elevated above the general level of the basin or swamp, interrupted the continuity of the coal bed.

In one instance to my knowledge, there were indications of the erosion of the coal-forming material, caused by a stream that had flowed through the basin. In its flow, the stream had cut out a strip a mile in width and 12 miles long, across the entire basin and later the cut had been filled with material that formed a sandstone.

Simple rules that apply to faults of displacement do not help one to locate the coal when the fault encountered is one of erosion such as I have described. In my opinion, too much emphasis is often placed on rules given in textbooks, which seem to convey the idea that it is a simple matter to find the coal if the rule is followed. Much to his disappointment, the young engineer is often misled and finds, too late, that it is not nearly as simple as the textbooks explain.

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Blasting Out Timbers Dangerous Practice

Fine dust lodged in timbers readily ignited by the high temperature and intensity of the flame of the dynamite charge. Instance cited of explosion caused by blasting timbers.

REFERRING to the letter of Oscar H. Jones, *Coal Age*, Sept. 20, p. 440, in which he comments on the practice of blasting out timbers, as mentioned by a previous writer, I heartily agree with him that the method is not safe and other means of removing timbers should be used.

Putting it a little stronger, I consider such practice extremely dangerous in a dry and dusty mine, as the high temperature of the flame and gases emitted by the explosion of the dynamite is liable to initiate a dust explosion with all its disastrous results. The mine timbers are always coated with dust, and moreover, the dust that adheres to the timbers is of the finest nature.

EXPLOSION OF DYNAMITE IGNITES DUST

By the force of the blast this dust is raised into suspension in the mine atmosphere and easily ignited by the high temperature of the gases and flame emitted by a charge of dynamite. Ignition of the dust invariably occurs when dynamite is exploded under these conditions in mine workings.

I recall a very disastrous explosion that took place some time ago in this state. (I have forgotten the

name of the mine.) Dynamite was used to blast out some timbers on a station at the foot of the shaft. The explosion wrecked the mine in that immediate vicinity and it was fortunate the blasting occurred when there were no men in the mine, or the loss of lives would have been truly appalling.

It was decided upon thorough investigation, as I recall, that the explosion was caused by the charge of dynamite emitting flames of sufficient intensity to ignite the fine dust that had lodged in and around the timbers and cribbing and lay on top of the same. As previously mentioned, this dust accumulated on the timbers, clinging to the roof and sides and lying on the floor is of the finest nature, and, by its absorption of the oxygen of the air it has been rendered highly inflammable.

CAUTION IN USE OF HIGH EXPLOSIVES

While in my past experience I have, at certain times, used high explosives to blast out timbers and induce a fall in pillarwork, I was always careful to see that the conditions were such as to eliminate the chances of an explosion and possibly a mine fire resulting from the ignition of the coal dust. I would warn anyone who attempted to use this method to be very careful and not, in any case, use dynamite. Instead use a permissible explosive, and see that the place is not dusty, in the section where the blast is to be fired.

The method suggested by Mr. Jones of using an 8-in. post suspended on a rope, which serves as a battering ram, appears to me as a very dangerous method. A person using an 8-in. post, swung on a rope attached to two convenient posts, must necessarily be very close to the post he is striving to discharge; and there is great danger that possibly, by discharging these posts, the unsupported roof behind is weighting and will draw back over the posts on which the battering ram is hanging and trap the man engaged in the work. Personally I favor the post-puller advised by the editor and illustrated on page 20, of the issue July 5, 1923, which is the Sylvester or Sylat type. It is important, however, to use sufficient rope to allow the operator to be in a place of absolute security.

Charleston, W. Va.

J. W. POWELL,
Shaft Contractor.

Retrograde of Mining Examinations

Recent examinations made easier than former tests—Reason for the change hard to understand—Effect of decline shown in various ways.

SOME references that have been recently made, in *Coal Age*, with respect to decreasing the number of mine accidents, have turned my thoughts toward one phase of the subject that I consider most important. In order to do effective work in keeping down accidents, we must strike at the root of the matter and do everything possible to secure capable and efficient mine officials.

It is with regret that I have observed a steady decline in the examination of candidates for the positions of mine foremen, assistant foremen and fire-bosses, in the bituminous field of Pennsylvania. It has been remarked by many that the examinations for the present year were not up to standard. The questions were much easier and required far less time to answer than questions asked in previous examinations.

Any one who considers the matter, naturally asks himself why it was the examination was made so much easier than heretofore. The purpose of the examina-

tion has not changed and yet, for some reason, the examining boards in the state appear to have lowered the standard. It might be assumed that the purpose in view was to obtain a larger number of men holding certificates, in order to reduce the number of uncertified men employed in an official capacity.

EASY EXAMINATIONS PRODUCE INCOMPETENT MEN

Again, a less plausible reason might be that the aim was to reduce the expenditure for the maintenance of examining boards. If that was the purpose, however, there is hardly a question but that the amount saved will be paid twice over in the increased cost of production and compensation for accidents, to say nothing of the coal lost beyond recovery by reason of poor management.

No one can consider for a moment that past examinations have been of too high a grade and that, in order to remedy the situation and secure a larger number of certificated men, it was necessary to make the examinations easier. We all know that would result in certifying incompetent men. Close observation of the coal mines of the bituminous field must serve to convince any one that the requirements of mine officials must be made more rigid than ever before if safety and economy are to be practiced.

The numerous recurring accidents in mines, together with the number of prosecutions for violations of the law and mining rules and regulations, and the increase in insurance ratings, which has been found necessary at some of the mines, all show the effect of incompetence and carelessness on the part of many mine officials.

NEED OF A HIGHER STANDARD

The recent report of the Coal Commission, regarding the amount of bituminous coal lost beyond recovery, is only another evidence of the need of raising the standard of examinations for mine officials.

If late examinations have been made easier for the purpose, as I suggested, of increasing the number of certified men, it must be admitted that the value of the certificate has fallen. We cannot expect to obtain something for nothing. If the certificate is to have any value, its possession must involve sacrifice on the part of the man who wins out. If gotten without sacrifice, the certificate means nothing.

Only a short time ago the majority opinion of writers who discussed the question of the certification of mine officials, in *Coal Age*, was strongly in favor of the certified man. Now, if the certified man is to be on the same level with the man who could not secure his papers under the old standard, I think the result would change the opinions of many of those writers.

It has been my fortune to attend three examinations in the bituminous field of Pennsylvania, from 1917 to 1922. In my opinion, none of those examinations was a bit too hard for a man seeking a real mining certificate. Far be it from me to find fault with any step taken for the betterment and welfare of the coal industry in our state and country.

The old saying comes to me: "As the teacher, so will be the scholar." I apply this rule to mine-official examinations. A poor examination is bound to turn out poor mine officials. My advice is to maintain the standard of mining examinations and make them more rigid, in the interest of safety and economy.

Mayport, Pa.

JAMES THOMPSON.

Inquiries Of General Interest

Exchanging a Four-Entry for a Two-Entry System

Four-Entry System Necessary in a Mine
Generating Gas—Roof Conditions Not Favorable
to Proposed Change Requiring Wide Entries

WE ARE working a very gassy mine that has been opened on the four-entry system. The seam of coal is about 42 in. in thickness and is overlaid with a very loose top of drawslate averaging about 3 ft. in thickness. Above that is a more solid layer of drawslate 12 ft. thick and over that again is solid sandstone. In working out this coal, the lower drawslate is first allowed to fall and loaded out of the mine. The upper drawslate, being more solid and making a fair roof, is then timbered with crossbars spaced 6 ft. apart. The four entries have all been driven 7x9 ft. in section, which makes the total sectional area of these entries $4(7 \times 9) = 252$ sq.ft.

With a view to reducing the cost of driving and maintaining these entries, it has been suggested to change the system and drive two entries instead of four, but making the entries of such size as will afford the same sectional area as the four original entries. This will require each entry to be 10x12.6 ft. in section. I want to ask if this change would be advisable under the prevailing conditions. Those who favor making the change claim that it will reduce the present cost of entry driving and the future cost of upkeep almost one-half what it is in the present four-entry system.

Trinidad, Colo.

SAMUEL BERKOVITZ.

The four-entry system is particularly adapted to the working of a gassy mine. It provides a separate return air-course for each side of the mine, while the two center entries are available for a haulage road and manway, respectively. Together, they furnish an ample intake area for the entire mine.

By changing this four-entry system to a double-entry plan, even allowing that the total sectional area for intake and return is not reduced, there are provided but single intake and return airways, which must also serve as main haulage road and manway. The plan calls for the building of the same number of overcasts and has no advantage in that respect over the four-entry system. The saving in cost of driving four main entries, instead of the two entries in the proposed plan, would probably be more than offset by the increased cost of upkeep in the double-entry system. The two entries will need to be wider and higher than in the old system and require the use of more timber at a greatly increased cost. Moreover, it is a question whether the roof conditions will permit of driving these wide entries. It is quite probable that the upper drawslate will be found far more difficult of support and give an increasing amount of trouble.

In any event, the question of furnishing adequate ventilation in this "very gassy mine" is the main consideration and of far greater importance than an

assumed saving in cost of driving two main headings instead of four. Regarding the advisability of making the proposed change, therefore, we fail to see any benefit to be derived therefrom; but, instead, foresee increased danger and cost of maintenance in the future operation of the mine.

Examination Questions Answered

Anthracite Foremen's Examination Districts 1 and 2, 1923

(Selected Questions)

QUESTION—*What are the requirements of the mine law when a workman is about to fire a blast? State fully.*

ANSWER—The General Rule 33 (Art. 11) requires that a workman about to fire a blast "shall be careful to notify all persons in danger therefrom, and shall give sufficient alarm before and after igniting the match, so that any person or persons who may be approaching shall be warned of the danger."

QUESTION—*If, on examining a mine map and measuring a place, on the map, driven from the gangway, you found its length to be $1\frac{3}{4}$ in., what would be the length of the place represented, the scale being 100 ft. to the inch and the place having an inclination of 50 deg.?*

ANSWER—A measurement of $1\frac{3}{4}$ in. on the map represents a horizontal length of $100 \times 1.75 = 175$ ft. The corresponding pitch distance is found by dividing the horizontal distance by the cosine of the angle of inclination. Thus $175 \div \cos 50 \text{ deg.} = 175 \div 0.64279 = 272.25$ ft.

QUESTION—*If the pillars in a mine are 8 yd. thick, at a depth of 300 ft., how thick should they be at a depth of 900 ft., under equal conditions?*

ANSWER—There are many conditions that affect and determine the size of room pillars, in mines, which make it impossible to give a reliable answer to this question. The physical conditions are, the character of the roof, floor and coal, as determining the ratio of pillar to opening. Other data concerned in the calculation are the depth of cover and the thickness and inclination of the seam. In a general way, the relative width of pillars may be taken as varying with the cube root of the square of the depth of the seam. In other words, the width-of-pillar ratio is equal to the cube root of the square of the depth ratio. In this case, the depth ratio is 300:900; or 1:3. Then, calling the required width of pillar x , at a depth of 900 ft., when the conditions call for pillars 8 yd. wide, at a depth of 300 ft., we have $x = 8\sqrt[3]{3} = 8 \times 2.08 = 16.64$ yd. This assumes that the thickness of the seam, the width of opening and the character of the roof, floor and coal and other data are the same in each case.

QUESTION—*What is the strain on a rope caused by a load of 6 tons on a slope pitching 25 degrees?*

ANSWER—Assuming that the given load of 6 tons is the load on the rope, the strain on the rope would be the same. The probable meaning of the question, however, is that the weight of the moving load is 6 tons and in that case the strain on the rope is the sum of

the grade and track resistances. Therefore, assuming a track resistance of, say 15 lb. per ton of moving load, the grade resistance being 20 lb. per ton, for each per cent of grade, or $20 \times 25 = 500$ lb. per ton of moving load, the total load on the rope is then $6(15 + 500) = 3,090$ lb., or 1.545 tons.

QUESTION—*How would you find the depth of a shaft having no chain or tape to measure it?*

ANSWER—The use of the aneroid barometer enables one to ascertain the depth of a shaft, with fairly close approximation, by taking a careful reading on the surface at the head of the shaft and another reading at the shaft bottom. These readings should be taken at the same time, or closely follow each other, to eliminate any possible atmospheric change that may occur in the interval between the readings. Also, it is necessary to shut down the fan while taking the reading in the mine, or make due allowance for the effect of the ventilating pressure to increase or decrease the aneroid reading, according as the fan is blowing or exhausting.

Under normal atmospheric conditions (temp. 60 deg. F., bar. 30 in.) 1 in. of barometric pressure, at sea level, in the difference in the two aneroid readings, corresponds to a depth of 923 ft. At an elevation of 1,000 ft. above sea level, under the same atmospheric conditions, 1 in. of barometric pressure corresponds to a depth of 960 ft. From these data, the depth of a shaft may be estimated by a simple proportion.

QUESTION—*A dam 10 ft. wide and 6 ft. high is filled with water to the top; what is the pressure at the top of the first square foot?*

ANSWER—The reading of the question is a little ambiguous; but, assuming what is wanted is the unit pressure (lb. per sq.ft., or per sq.in.), at a point 5 ft. below the top of the dam, or the pressure due to a 5-ft. head of water, this is $5 \times 62.5 = 312.5$ lb. per sq.ft.; or $5 \times 0.434 = 2.17$ lb. per sq.in.

QUESTION—*State in detail what, in your opinion, should be done to reduce the number of accidents due to falls of roof, coal and mine cars.*

ANSWER—Strict rules and regulations should be made and enforced by suitable penalties, in order to reduce the number of accidents due to the fall of roof and coal. Close supervision of all working places, while the men are at work, and careful instructions given to each man in regard to the safest manner of performing his work are necessary. It is important to adopt a systematic form of timbering suited to the particular conditions in the mine, and keep an ample supply of props and cap-pieces needed in each place. Every miner should be instructed to carefully examine the roof and coal in his place before starting to do any work.

The same careful supervision, rules, regulations and instructions are needed to avoid accidents from the movement of cars. No car must be left standing in the mouth of a room, or at the face of a chamber driven to the rise, unless the car is securely blocked to prevent its running out on the main road. Likewise, no cars must be left standing on sidetracks without they are securely blocked. Where drivers are hauling coal from different districts, a careful schedule must be prepared to avoid danger of collisions. On all roads used for haulage, where men must travel, shelter or refuge holes must be provided, except where rooms are turned off the entry. These holes must be kept free from all obstruction and should be whitewashed and not more than 20 yd. apart.

People's Right to Coal Paramount To Quarrels of Operators And Miners, Says G. O. Smith

All the fact-finding has not discovered any simple cure-all. This explains the absence of a clean-cut program as the final pronouncement of the Coal Commission.

The mine workers' method of giving a trouncing to their employers is, in fact, giving a clubbing to the public.

The practical problem we face is to find a substitute for force.

The Commission might well have hesitated to wholly abandon the idea of compulsory arbitration as a legal defense against those who declare industrial war against the whole people.

Compulsory arbitration and the coal industry as a public utility were discussed by George Otis Smith, former U. S. Coal Commissioner, in an address reviewing the recommendations of that defunct body, before the New York City Academy of Political Science on Nov. 20. He said that if the economic fact that coal mining is an indispensable service can be justly disputed or the legal right of the public to protect itself can reasonably be denied, coal is not a national issue and Congress might as well devote its thought to asparagus growing. Arbitration must be made compulsory, he said, if either party in the coal industry is unmoved by the moral pressure implicit in their joint obligation to furnish the public with coal.

"Plainly the Coal Commission needs an interpreter, yet no individual, however close he may have been to the now defunct Commission, can claim any exclusive warrant as authoritative interpreter; the field of constructive criticism to seek 'a wise and efficient policy' for the coal industry is open to all.

"The basic finding of the Commission was its statement of the economic fact that the mining of coal is a business clothed with a public interest, and this but repeats the underlying thought of Congress in providing for fact finding as a preliminary to legislation.

"The continued play of the spotlight has brought out many details," Dr. Smith said, "but all the fact finding has not discovered any simple cure-all. This explains the absence of a clean-cut program as the final pronouncement of the Coal Commission." The finding is: one of divided responsibility for things as they are and therefore of distributed obligation to make things different.

"The Commission's unequivocal declaration of belief that the union has been potent in bettering the workers' condition but that it can win public approval only as it in turn 'accepts in practice the principle that the public interest is superior to that of any monopolistic group, whether employers or employees,'" Dr. Smith says, "might have been condensed into the blunt statement that the union is needed to protect the miner, and the non-union fields are equally needed to protect the public. But this competition by the non-union fields, while affording the consumer a large measure of protection as to both price and supply, has cost dearly in other ways, especially in promoting overdevelopment and all the evil consequences that flow from it."

The Commission's recommendations, he said, are all well supported by findings of fact, yet "each and all of these reforms will fail to stabilize the industry and better the conditions for all concerned if periodic suspensions of mining are to continue.

"The people's right to a supply of coal at reasonable prices should be equally enforceable against a combination of operators raising the price or a combination of miners shutting down the mines. We have already outlawed combinations of capital attempting restraint of trade or even control of price; a country-wide combination of labor with the declared purpose of enforcing its own decrees by creating public distress would seem even less justified. When its half million or so members—a sixth of whom do not care to be American citizens—direct their united efforts against the whole people, the militant spirit of the mine workers' union takes on the ugly aspect of civil revolt.

"The open threat of tying up the commerce of a nation and shutting down its industries, the menace of economic chaos, is neither a just nor a legal method of obtaining higher wages for one class of workers in half a dozen states. Surely, the economic rights of the whole body of American workmen are greater than the rights of a small fraction of that body. The mine workers' method of giving a trouncing to their employers is in fact giving a clubbing to the public. This dangerous weapon, whether we term it strike or economic force, is one that does violence to the principles of popular government.

"The Commission interprets the public attitude as seeking from the union 'satisfactory guarantees of a fair and orderly adjustment of controversies in other ways than by the exercise of economic force,' and the practical problem we face is to find a substitute for force. The Commission has recommended voluntary arbitration for settling disputes and has also urged the fundamentally constructive method of building up the day-to-day relations between employees and employer, as well as the method of continuous investigation and timely publicity, yet full success of governmental action of this type, as the Commission realizes, would depend upon the recognition by operators and workers alike of the 'finality of the public insistence on continuous operation.'

ABUSE OF MONOPOLY POWER FORCES ISSUE

"If, however, either party to the controversy is unmoved by this 'irresistible moral pressure implicit in their joint obligation to furnish the public with coal,' it becomes all too obvious that arbitration must be compulsory. The outright rejection by the United Mine Workers at Atlantic City of any arbitration was most disheartening to many who wished the union well. Such use of monopoly power at once forces the issue, and the public's right to its coal supply demands protection from the strike. With that experience so fresh in mind and the threat of a bituminous strike next spring already heard, the Commission might well have hesitated to wholly abandon the idea of compulsory arbitration as the legal defense against those who declare industrial war against the whole people. Some of us believed that in default of a voluntary agreement compulsory arbitration would have afforded a more equitable adjustment of the recent anthracite controversy than the terms finally agreed upon. In the bituminous industry, however, compulsory arbitration of a wage-scale structure, to be fully successful as an agency of economic welfare, would need to have its awards enforceable throughout all coal fields, whether organized or unorganized.

"If coal mining, like transportation, is clothed with a public interest so great that its uninterrupted service requires public supervision of settlement of wage disputes, then those wage rates must be governed only by economic conditions, general and local, not by membership or non-membership in a union. The need of continuity of mine operation appears to involve mine worker and mine operator alike in a relation to the public quite different from that prevailing in less essential industries, and public safety and general welfare must soon force such legislation as will insure an uninterrupted supply of coal.

"The Coal Commission, moreover, sees other possibilities

for the mine workers' organization: in a transition from militancy to efficiency, the union thus becoming an active agency in improving the individual worker's status; in a program of education in mine safety, where joint action of operator and miner alone can fully protect their common interest; in a drive for Americanization and better citizenship, with the improvement of local living conditions; and above all, in building up the general realization that coal mining at its best is a co-operative enterprise that must be successful if it is to yield wages and profits. This common interest in continuous and successful operation is being stimulated in the British coal mines by the present adjustment of wages to results.

"Any turn-about-face in the policy and tactics of the union leaders, however, cannot be expected unless a similar reversal is made in the attitude of many of the operators—the employee in his period of dominance has copied all too much the earlier practices of the employer. Operators, like mine workers, have refused to arbitrate, and arrogance and tyranny were not invented by labor leaders.

"Throughout the investigation it was evident that everyone in the long line from householder to coal miner wishes someone else reformed and even regulated by law if need be. In fixing the place where something should be done the zeal appears to increase directly as the square of the distance of that place from home, and the average citizen's appraisal of the value of the work of the U. S. Coal Commission is likely to be affected by the direction in which its recommendations are aimed. Recommendations that involve all concerned plainly cannot be expected to win general acceptance."

Anthracite Operators Oppose Rate Cut Except on Steam Sizes

The hearings being conducted by the Interstate Commerce Commission on the question of a proposal for reduction of freight rates on anthracite coal was resumed at Philadelphia on Nov. 13. W. J. Thompson, secretary of the Anthracite Coal Operators' Association, chief witness for the day, said the operators are opposed to any reduction in freight rates on domestic sizes. If there is to be any reduction in freight rates, he said, it should be applied only to steam sizes, which are the only grades competing with bituminous coal. His reasons for advocating such reduction, he said, were predicated on the fact that one could not be produced without the other and that the domestic coals were consumed so much more rapidly than the steam coals accumulated rapidly and became a glut on the market. With a cut in freight rates on steam sizes, he said, the latter would move more freely to New England industries and elsewhere where soft coal is now used.

H. A. Taylor, general solicitor of the Erie R.R., for the carriers said that since the commission's last order to reduce rates the railroads, except for a brief period in 1923, had failed to yield the expected percentage of return on their property.

Harlan County Operators Decline To Meet Union Officials

"The United Mine Workers are trying to gain a little publicity or else stir up trouble, with their invitation to Harlan County operators to meet their officials. We will not meet them," declared R. C. Tway, head of the Tway Coal Co., of Louisville, Ky., and president of the Harlan County Coal Operators' Association, after he had received an invitation Nov. 11 asking the operators to meet union leaders at Harlan, Ky., Nov. 26, "for the purpose of negotiating a joint wage agreement for Harlan County." The invitation of the miners was signed by William Turnbaker, president, and E. L. Reed, secretary of the Southeast Kentucky-Tennessee union district. These officials said they "represented the miners of Harlan County." The operators point out that Harlan County is not unionized and they will not recognize the union as representing the miners there.

Nation's Lawmakers Await Pinchot Conference of State Executives

See Possible Influence on Coal Legislation—
Determination to Keep Up Non-Union
Wages Significant—Expect Demand for Laws

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

On Capitol Hill, where many lawmakers now are at their desks in preparation for the opening of Congress Dec. 3, those interested in coal are concerned principally in speculating on the possible effect on legislation of Governor Pinchot's meeting of state executives. Among the coal specialists, however, much more significance is attached to the apparent determination of all non-union operators to maintain wage scales on a reasonable parity with those being paid in union mines. They see in this a general realization of the unsettling influence of ill-advised and sporadic wage reductions.

While a generally held opinion among Senators and Representatives is that Governor Pinchot is making all the political capital he can out of the coal situation, sight is not lost of the fact that the meeting of Governors may have great significance. Such a meeting commands full publicity. The public will be acquainted with the details of the sessions. The action that will be taken will be of a character likely to influence and stimulate public opinion. It is expected to add to the demand that coal legislation of some sort be enacted.

It is generally admitted that Mr. Pinchot has not risen in the public esteem since he began taking a hand in coal questions. The disappointment felt because of his failure to make good on his promise that there would be no increase in retail prices, legislators point out, does not mean that the public is satisfied with the action of those directly interested in the production and distribution of anthracite.

Despite the tendency to speak rather lightly of Governor Pinchot's activities, it is apparent that the lawmakers recognize his ability to keep the anthracite question to the fore. In addition, he is in a position to require the anthracite companies to make full and detailed explanations as to the necessity for increasing the price.

The action of the non-union operators in giving a new stability to their wage scales is interpreted by some as a justification for the present level of wages in the industry. It will be recalled that the returns to the Coal Commission showed that the non-union scale was but little below that being paid in union mines. It tends to substantiate the position of those who contend that the pushing of non-union wage scales up and down has constituted one of the principal causes for the instability of the bituminous-coal industry.

The fact that the non-union operators are acting in groups on this question is held by some to indicate that they have discovered what the Central Competitive Field operators learned long ago—that the adjustment of wages by individual operators without reference to the rate of pay in the field as a whole has a demoralizing effect. When one operator is not entirely certain as to the wage scale being paid by his neighbor, frequent changes in the rate, with their unsettling tendencies, result. It also is noted that the recent action shows that the men in immediate charge of the mine are having the deciding voice in wage matters rather than leaving this important question to absentee boards of directors.

In this connection attention is called to the fact that southern West Virginia and eastern Kentucky must not forget that they may not be permanently rid of the United Mine Workers. Operators in the Kanawha district and in southeastern Kentucky, fields that were formerly union and now are running on an open-shop basis, must realize, it is believed, that a reduction in their wage scales at this time would be the worst thing that could happen if they desire to maintain open-shop operation. Nothing would furnish a better talking point for the union sympathizers.

Scientists and Politicians Discuss Coal In Two-Day Session

Symposium on "The Price of Coal" Elicits
Broadside from Pinchot Against Anthracite
Operators—Warriner Defends Producers—
Union Organizer Lauds Governor

Governor Pinchot, of Pennsylvania, S. D. Warriner, for the operators, and Thomas Kennedy, for the miners, were the speakers at the principal meeting of the first day's session of a symposium by the National Academy of Political Science on "The Price of Coal," in Philadelphia on Nov. 16 and 17. Governor Pinchot launched a broadside against the anthracite operators, charging them with maintaining a "hard-boiled monopoly" whose prime interest in the public was that it should consume their coal at their prices. He charged that it was a matter of common belief that the monopoly extends from the operators through the wholesalers to the retail dealers, implied that there is a conspiracy to keep prices at a high level and demanded that they clean house or have the public do it for them.

After quoting margins of retail dealers in anthracite in the larger cities of the East, which in some cases vary from 90c. to \$5.25, the Governor asked, "Is there a city anywhere whose range of prices at all corresponds with the range of margin? Just how does it happen that the retail price got to be so uniform? Have several somebodies been talking things over, or do the operators ration the coal to the retailers and so prevent price-cutting?"

"Mining costs of the operators vary from \$4.25 to \$10.25 per ton. Yet sales prices are within a few cents of each other. Have any persons talked these prices over?"

Mr. Warriner, speaking before Governor Pinchot, defended the operators, saying that the anthracite-producing industry had not averaged over the past ten years a 5 per cent return on book value, stating that the book value is even less than the present market value of the anthracite properties as determined by the engineers appointed by the Coal Commission. He said that the Governor's proposal that the operators refuse to sell to retail dealers who charged the public more than they had a year ago was asking the operators to violate the law in restraint of trade. He charged that although the law of Pennsylvania fixed the tax of 1½ per cent on the selling price of anthracite at the mines, the Pennsylvania state officials had assessed the operators in excess of the actual sales realizations on the ground that they had not realized the full market value for their product. This, he asserted, was strange in view of the contention that prices were too high.

The recent settlement of the anthracite strike, to accomplish which Governor Pinchot gave the miners a 10 per cent increase in wages, came in for its share of discussion.

"If the recent settlement be in accordance with economic law imposing fair treatment for all concerned, the result should be satisfying and no explanation or justification required," Mr. Warriner said. "If, on the other hand, it represents a dislocation of economic law by a resort to expedience, then those who are responsible must bear the consequences, economic and otherwise. The public criticizes the entire industry for the occasional malpractices of a few and denies that industry freedom to co-operate for their correction."

Governor Pinchot vigorously defended his settlement of the hard-coal strike. "The wage increase I suggested," he said, "was just and necessary to provide a decent American standard of living, to match the going wages in similar industries, and to compensate in part, but only in part, for the extra hazards of an industry in which 20,000 men are hurt each year. The 10-per cent increase was fully warranted not only because a supply of anthracite even at a small increase of cost was infinitely better than no anthracite at all but also because the eight-hour day and the 10-per cent increase on their merits were completely justified. The anthracite workers deserved and should

have had both of them, wholly without reference to the threatened strike."

In a subsequent session Van. A. Bittner, International organizer for the United Mine Workers, took occasion to laud Mr. Pinchot and to say that for his stand on the hard-coal settlement, wholly aside from the wage increase, he deserved to stand with the greatest statesmen of the country. Alba B. Johnson, president of the Philadelphia Chamber of Commerce, presiding officer at the Saturday afternoon session, remarked that, speaking as a Vermonter, he noted that Pennsylvanians have had a way of making a political question of anthracite and of bungling it in the past as at present. The state sales tax he characterized as contrary to American institutions and concluded that the coal industry is where the railroads were thirty years ago, with public opinion forcing them in a way contrary to good public policy.

Thomas Kennedy told why the miners are opposed to arbitration. He laid this attitude to the results of the 1920 arbitration before the Thompson commission, appointed by President Wilson. He said that the award of that commission was contrary to the facts presented and contrary to what they—the miners—had been led to expect. Without saying so, he gave the impression that the union considered that it had been double-crossed. Coal miners' wages are not responsible for the price of coal, he asserted. The United Mine Workers will stand firm, he said, for two things: a good and increasingly better standard of living, and independence of action as a union.

REVIEWS COAL COMMISSION'S WAGE STUDIES

The first session on Friday morning was devoted largely to wages and earnings of anthracite mine workers. Miss Anne Bezanson reviewed the studies made for the Coal Commission, Horace B. Drury compared earnings and wages of coal-mine workers with men in other industries, and John H. Libby, economist for the Bituminous Operators Special Committee, led the discussion.

The afternoon session was opened by Francis Walker with a historical review of the anthracite industry, followed by papers on costs of distribution and production by John W. Adams and David Wing. O. P. Hood, of the Bureau of Mines, talked on storage of coal, and E. W. Parker, Stephens Howarth, of the Coal Consumers Association of Philadelphia, and Roderick Stephens participated in the general discussion. Mr. Stephens said that to conquer the root of the trouble, cessation of production at the mines must be eliminated. "When an adequate supply of coal is mined it will be available at low and fair prices."

Willard E. Hotchkiss and J. H. Willits led the Saturday morning session on Labor Relations in Coal Mining. Mr. Hotchkiss said that the management must accept leadership in industrial relations and asked whether the coal operators had made industrial relations a major matter in their industry. He questioned whether management had mastered the job and whether it really knows the situation. Professor Willits reviewed the recommendations of the Coal Commission on labor relations, and Rice Miller, president of the Illinois Coal Operators Association, read a paper on labor relations in the Illinois coal fields. Francis J. Drumm, president of the miners' union of Maryland, told why the miners have a union. F. G. Tryon read a paper on "The Effects of Competitive Conditions on Labor Relations in Coal Mining."

The world's present fuel resources were discussed by Dean Holbrook, who demonstrated that water power and oil can never supplant coal. Hugh Archbald discussed

Efficiency of Mine Management. J. B. Neale, L. W. Wallace, H. S. Person and Van Bittner discussed Mr. Archbald's paper.

In the evening session E. E. Hunt read a paper summarizing the recommendations of the Coal Commission, and William Draper Lewis, professor of law, University of Pennsylvania, spoke on "Coal Price Regulation and the Constitution." He recommended a coal commission in line with the proposition Governor Pinchot is expected to suggest at his meeting of Governors next week. The final speaker was Judge Wm. S. Kenyon, of Iowa, who recommended more careful consideration of the code for industrial relations that while Senator he had proposed as a result of his investigations of the West Virginia situation.

Proposed Commission Legislation Analyzed

Recommendations Call for National, State and Municipal Enactments, National Coal Association Summary Shows

In view of the possibility of coal legislation coming before Congress next month, the following analysis of the Coal Commission's proposals for legislation, prepared by the National Coal Association, is interesting. This summary divides the recommendations into three groups; those requiring national legislation, state legislation, and municipal legislation. Summary follows:

A. Those Requiring National Legislation.—There are several recommendations which would require legislation in the nature of the formation of a permanent Coal Commission. The specific recommendations in connection with this are:

"1 (a) That Congress provide for the continuing co-operative study of and action against the problem of unemployment.

"(b) A continuing co-operative study of the principal jobs and of the existing rate differentials by the general government.

"(c) Continuous investigation and publicity by the federal government of the basic facts upon which industrial relations depend.

"(d) Special compulsory investigation when the prospect of failure to renew an agreement is imminent—specifically an investigation under authority of the President of the United States." (This latter part might require additional legislation other than that providing for a permanent commission.)

"(e) Continuous, compulsory publicity of rates and rate changes in the non-union fields by the general government."

2. They recommend that a division of the Interstate Commerce Commission should be established so that:

"(a) The powers of the federal government over interstate commerce may be used by an effective agency with sufficient funds, experience and powers for such regulation and supervision as may be necessary. This agency to be charged with direct responsibility for such activities." (They suggest that a special Division of the Interstate Commerce Commission be established and that the reports now received by the Geological Survey and Bureau of Mines be put on a permanent and co-ordinated basis.)

"(b) That the Interstate Commerce Commission be given authority through supervision to grant or withhold transportation service.

"(c) The long-haul to be no longer encouraged by favoring rates.

"(d) To readjust rates to cause economic zoning.

"(e) That in the future in determining the rating of a mine for the purpose of car distribution consideration be given to the commercial ability of the mine to sell its production as well as to its physical capacity to produce—that the commercial factor should be given a controlling influence in future mine ratings." (This may require a change in the Transportation Act.)

(f) It is recommended that: "Legislation provide for regular accounting reports to be rendered by all companies whose product moves in interstate commerce," and further recommended "that the agency to which the reports are

rendered shall have the power to prescribe the form of accounts." It is also recommended "that equal compulsory publicity of union accounts be required.

"3. The licensing of all who ship, buy or sell in interstate commerce.

"4. That under federal supervision natural limitation of markets by adjustment of rates, division of territory and consolidation and pooling of mines should be permitted.

"5. That operators should be exempted from the Sherman law for the purpose of collective bargaining.

"6. That the leasing law should be amended so as to give the Secretary of the Interior full discretion to make his approval of the opening of a new coal mine on the public domain contingent on a showing before the Interstate Commerce Commission that such a mine would serve the public interest.

"7. Levy a graded tax on royalties and differential profits." (This might be accomplished by national legislation or by state legislation.)

B. State Legislation.—1. (a) Safety service organizations should be compulsory in connection with compensation insurance.

2. State legislatures should provide for committees to revise the mining codes.

3. "That the practice of discounting 'script' be made illegal."

C. Municipal Legislation.—That each community license retail dealers' organizations, organize co-operative associations and establish municipal fuel yards.

Company Blamed for Glen Rogers Disaster

Responsibility for the mine disaster at Glen Rogers, Wyoming County, W. Va., on Nov. 8, when twenty-seven miners lost their lives in an explosion of gas, has been placed upon the Raleigh-Wyoming Coal Co. by a coroner's jury, according to an announcement just made by R. M. Lambie, chief of the Department of Mines of West Virginia, who conducted the inquest. The jury's verdict attributed the disaster to "Disregard of the vital requirements of the mining law on the part of the company's representatives in allowing the use of a dangerous electric drill, not approved by the mining department."

The explosion is said to have resulted from a spark from the electric drill in use at the time of the explosion, the spark, according to the head of the mine department, flying from the arcing of the brushes on the commutator of the drill. It is said that the head of the department had accepted such a theory at his first visit after the accident and upon his first examination after the bodies of the victims had been recovered. The drill in question was sent to the Pittsburgh electric laboratory of the U. S. Bureau of Mines and was in evidence at the coroner's inquest.

In all there were nineteen witnesses, among whom were Robert Stockdale, Clarence Rohig and Robert Lilly, mine inspectors; Charles Forbes, superintendent of the New River mine at Cranberry, a volunteer rescuer; William Steen, mine inspector for the New River company, also in a rescuing party, and several employees of the Raleigh-Wyoming Company. Just what action may be taken further in the matter is being considered.

THE U. S. SUPREME COURT granted a writ of certiorari Nov. 19 to review the decision of the Tennessee Supreme Court by which John D. Flanagan lost a suit for alleged breach of contract against the Federal Coal Corporation. Flanagan contracted with the coal company early in 1920 for delivery of 200 carloads of Tracy City coal that autumn at \$9 per ton, f.o.b. mine. The company accepted 73 cars and rejected 127 cars. Flanagan alleged the refusal to accept the coal was due to falling prices. He sued for \$28,000. The coal company's defense was that Flanagan had not paid the Tennessee State license fixed for wholesalers or brokers in coal, and hence the contract was invalid. The lower courts sustained this defense and the State Supreme Court concurred. Flanagan contended that the coal was for interstate shipment and hence the state license law did not apply.

Pinchot Calls Governors in Parley To Curb Anthracite Prices

Warriner Replies Sharply on "Housecleaning"
—Roderick Stephens Scores Governor's Plot
to Saddle Increased Price on Retailer

Gifford Pinchot, Governor of Pennsylvania, has invited the governors of twenty-eight anthracite-consuming states either in person or by representative to meet him in Harrisburg on Nov. 26 for the purpose of discussing the hard-coal situation, at which time he will outline a definite plan for national legislation and for state action. At the same time the Governor sent a letter to Joseph J. Walsh, Secretary of Mines of Pennsylvania, directing him to make an investigation of the quality of coal shipped and to make weekly reports of examinations.

In his letter to the various Governors, Mr. Pinchot refers to the conferences he has had with the committee headed by S. D. Warriner, representing the anthracite operators, concerning retail prices for coal, the last of which was held on Nov. 9, at the conclusion of which Mr. Warriner in a statement said that the Governor suggested that they should agree not to sell coal to retail dealers charging more for coal than last year, in reply to which Mr. Warriner pointed out the legal difficulty in such action and that it was the operators' understanding Governor Pinchot would obtain further advice and send him a definite plan operative within the law.

In his letter to the state executives, under date of Nov. 13, the Governor says:

"Since the coal strike was settled in September, I have taken up the question of price in a series of conferences with the members of a committee of the operators. On Friday last, this committee finally declined to recommend to the coal industry that it should clean its own house of extortion, as I have been urging it to do.

"We do not have to prove the existence of abuses in the anthracite industry or of crying injustice to the consumer in extortionate prices. They are matters of common knowledge. It would have been merely the most elementary common sense for the committee of operators to take these evils in hand. Being the producers of the coal, they have the power to do so most effectively. They could, if they would, not only give the consumer a square deal but at the same time free their industry of the public condemnation which now rests upon it. They have declined to do so. Then we must turn elsewhere.

"Since the settlement of the coal strike an investigation of anthracite prices has been in progress at Harrisburg and has resulted in the outline of a definite plan for national legislation and for state action.

"About 90 per cent of the anthracite mined in Pennsylvania is burned in other states. Therefore, justice to the great body of anthracite consumers must be reached mainly by national action. Such action can be secured most certainly and effectively if the governors of the anthracite-using states will unite in support of a single specific program.

"I am prepared to submit a suggestion for such a program, and I am asking the governors of the anthracite-consuming states to meet, either in person or by representative, in the Governor's office at Harrisburg on Monday, Nov. 26, at 2:30 p.m., to consider this program, and, if it is found practicable, to agree upon a definite plan of legislation to be laid before Congress at the opening session.

"To the extent that the State of . . . consumes anthracite your people are as deeply concerned in securing justice for the consumer as the people of Pennsylvania. For that reason I hope that it will be possible for you to be present in person at Harrisburg on Nov. 26, or in any case to be officially represented. May I have the pleasure of your company at a very informal dinner on that day at 7 o'clock."

The letter was sent to the Governors of Connecticut, Rhode Island, Vermont, New York, Maine, New Hampshire,

New Jersey, Maryland, Delaware, Virginia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Missouri, Nebraska, North Carolina, North Dakota, South Carolina, Tennessee, Texas, Wisconsin, Alabama, Massachusetts and West Virginia.

Samuel D. Warriner, president of the Lehigh Coal & Navigation Co., chief spokesman for the anthracite operators' policy committee, on Nov. 14 sent a letter to Governor Pinchot, in which he said he viewed "with indignation" the Governor's statement of Nov. 9 that the operators had refused to recommend to the industry that it clean its own house of abuses known to exist.

The letter said the Governor suggested that the operators agree not to sell coal to retailers who charged higher prices than last year, but that the operators feared such a plan would be a violation of the criminal laws of the United States, as it would mean an attempt on the part of the producers to fix retail prices in more than 25,000 communities. The letter also pointed out that the Governor had been assuring the operators for four weeks that he would endeavor to obtain the opinion of the State Attorney General on the point and that the opinion had not yet been received.

Governor Pinchot is charged with conspiring to force retail dealers to carry the increased cost of anthracite, in an open letter made public Nov. 15 by Roderick Stephens, chairman of the governmental relations committee of the National Retail Coal Merchants' Association.

Mr. Stephens wrote Mr. Pinchot that he hoped he would be guided by established facts in the coal situation, "rather than by prejudice, preconceived notions, political calculations or carelessly assumed obligations." The letter added:

"We submit that the retail coal dealer may very properly be held to account for any unwarranted addition to the cost of coal, over and above a fair margin to cover his costs of doing business, and to provide a fair return for capital invested, but in no sense can he be held responsible for ultimate prices to the consumer, which necessarily are based, not only upon the retail dealer's margin, but also upon the cost at the mines plus cost of transportation from the mines to the dealers' yards.

Coal-Price Agreement to Protect Public Not Illegal, Pinchot Is Told

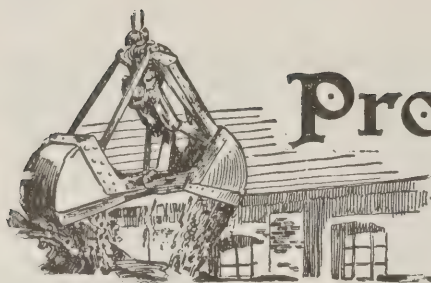
Producers of anthracite "can agree with each other to control prices for the benefit of the public without infringing on the common law," although they might be in danger of prosecution under the Sherman law if they agree to hold prices below a maximum, according to an opinion by state Attorney-General George W. Woodruff to Governor Pinchot made public, Nov. 17. The opinion added that "it is hard to find how they could be attacked unless the Federal Department of Justice were hostile to action in favor of the public interest."

"In my opinion," Attorney-General Woodruff said, "independent arrangements or promises, with or to the Governor by each operator separately, intended to hold prices at the mine and to the consumer within some maximum figures would not be a combination in restraint of trade or a conspiracy either under the common law or the Sherman law."

The opinion at the outset took up the common law rule, holding that this makes it criminal, "for two or more to combine to fix prices contrary to the public interest," the basis of which, the Attorney-General declared, "is not combination itself but the harming of the public welfare through the combination."

"Therefore," he said, "under the common law it is my opinion that a combination in effect and intent protecting the public interest by holding down the price of anthracite coal to the consumer would, as far as the common law is concerned, be the opposite of criminal."

A copy of the opinion has been sent to S. D. Warriner, spokesman for the Anthracite Operators Policy Committee, who has had several conferences with Mr. Pinchot at the Governor's request to work out a plan to keep prices this winter at the same level as those of last year.



Production and the Market



Weekly Review

Day by day buying of soft coal continues sufficiently strong to move the balance of the output not under contract, but there is no snap to the market. Better inquiry is reported from some sections and the decline in production during the past couple of weeks has enabled shippers to clean up much of the distress coal which was so prominent. Nothing has developed to indicate that consumers are looking forward any more distressfully to what might happen April 1 and the industry seems to have settled down to a state where minor changes are noticed.

Coal Age Index of soft-coal prices was 183 on Nov. 19, the same as on Nov. 5, after having gone up one point on Nov. 12. The average mine price last week was \$2.21.

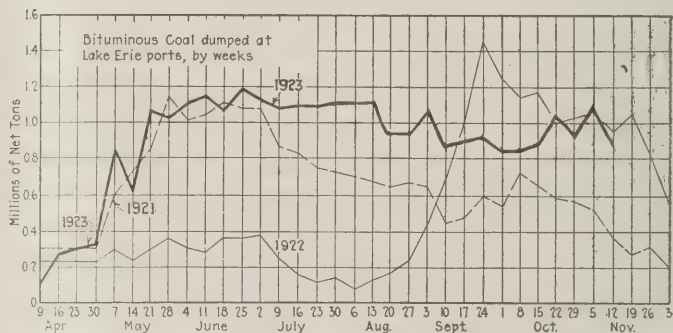
PRODUCTION RECOVERS QUICKLY

Output of both anthracite and soft coal recovered quickly from the interruption of election day. During the week ended Nov. 10 the soft coal produced is fixed at 10,737,000 net tons by the Geological Survey, while the anthracite output is estimated to have been 1,967,000 net tons. Soft coal produced during October amounted to 49,171,000 net tons, an increase of 2,955,000 tons over September, while the cumulative production to the end of the tenth month stood at 462,647,000 tons. During the past six weeks the average daily production of soft coal has been around 1,800,000 net tons.

There is no activity in the Middle West markets. Low production kept lump from Illinois and Indiana on a level, but other sizes drag heavily. Screenings are forced, although prices are down to what appears to be the bottom. There is no rush for anything in most sections. Kentucky operators are beginning to discuss the April 1 situation, at which time one contract expires, while another contract has a year longer to run. Reports from Ohio indicate dullness, except where distress coal can be gotten at low figures. There is no hope for better business held out in the Pittsburgh

market, which continues in bad shape. In New England there is no perceptible increase in demand and consumers show the same indifference they have maintained for several months.

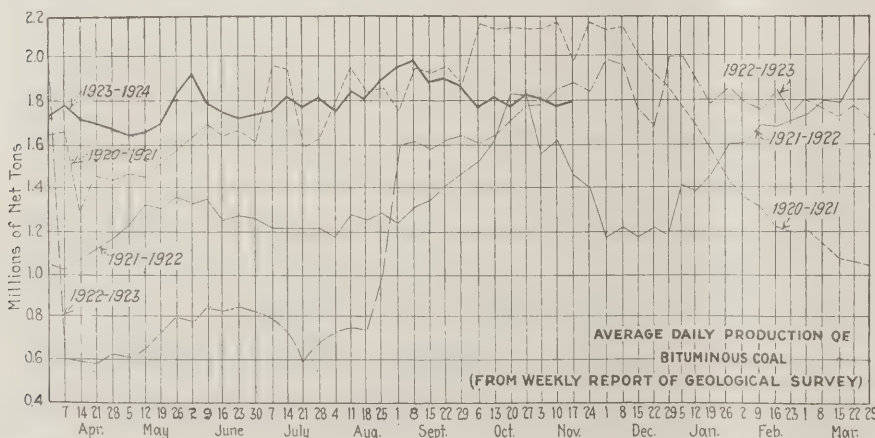
A better feeling exists in the anthracite industry. Although demand for stove and chestnut sizes exceeds the supply most shippers believe that the consumers' wants will be well in hand before Jan. 1 and that there will be plenty of all domestic coals to be had. Production during the week ended Nov. 10 was 594,000 tons greater than the previous week's total. October shipments amounted to 8,724,000 net tons, making cumulative output for the ten months of 1923, 79,998,000 net



	Week Ended Nov. 12	Season to Nov. 12
Cargo	864,870	27,400,046
Fuel	45,655	1,479,018
Totals	910,525	28,879,064

tons, exceeding the production for each of the nine preceding years except 1917 and 1918, when the war stimulated mining.

With but two or three weeks remaining in the present Lake season, the total shipments of soft coal for 1923 are estimated to be but 825,375 net tons less than the 1918 shipments, the year of record movement. Up to



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Oct. 27	10,683,000	10,919,000
Nov. 3 (a)	10,666,000	10,547,000
Nov. 10 (b)	10,147,000	10,737,000
Daily average	1,691,000	1,795,000
Calendar year	332,735,000	478,024,000
Daily av. cal. year	1,247,000	1,789,000

ANTHRACITE

Oct. 27	1,836,000	2,069,000
Nov. 3	1,872,000	1,373,000
Nov. 10	1,897,000	1,967,000

COKE

Nov. 3 (b)	213,000	266,000
Nov. 10 (a)	246,000	256,000

(a) Subject to revision. (b) Revised from last report.

Nov. 11 the shipments of anthracite through Buffalo and Erie amounted to 3,063,674 net tons.

Increased activity is reported in the export market, Italy figuring heavily in the news as well as increased demand from South America. Dumpings at Hampton Roads during the week ended Nov. 15 for all accounts amounted to 290,492 net tons, an increase of 64,865 tons over the previous week.

Midwest Market Still Low

Utter dullness prevails in the Midwest region in the trading of almost all coals. Illinois and Indiana lump are kept on a fairly even keel because of the low production, but all other sizes drag so heavily that southern Illinois egg, nut and mine-run circulars have frankly been cut. Egg drops 35c. to \$4, nut 70c. to \$3.65 and mine run 25c. to \$2.75, but even these prices do not move the coal. "No bills" in these sizes are still numerous. Screenings are moving only by force, although southern Illinois producers stick to their \$1.40@1.50 quotations. Central Illinois screenings are down to 70c. and Standard district remain at 50c.

Practically no coals from outside Illinois and Indiana are making any headway in the Midwest markets just now, although western Kentucky prices are alluring at \$2.75 for block coal and 60c. for screenings. Eastern smokeless continues to experience hard sledding around Chicago at a mine price of \$2.50 for mine-run with occasional shadings to \$2. Anthracite in moderate quantities moves steadily to regular trade, but there is no rush for anything. Scouts in the country south and west of Chicago bring in the news that although many retail yards have fair-sized stocks, the average retailer is doing little business and a small sudden demand for coal would exhaust the supply quickly.

Depression continues in the Carterville field and there has been added to the list a few more mines that have found it necessary to shut down. Even among the independents coal does not move. Cars are plentiful; service is a little slow, excepting on the M.P., on account of switching out "no bills." Similar conditions prevail in the DuQuoin and Mt. Olive fields. In the Standard field mines continue to suspend on account of no market.

There is no domestic business around St. Louis. The yards are full and everything is at a standstill. Similar

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Nov. 20 1922	Nov. 5 1923	Nov. 12 1923	Nov. 19 1923†
Smokeless lump.....	Columbus....		\$6.75	\$5.85	\$5.10	\$4.75@5.00
Smokeless mine run.....	Columbus....		6.10	2.30	2.35	2.00@2.35
Smokeless screenings.....	Columbus....		5.75	1.35	1.35	1.25@1.40
Smokeless lump.....	Chicago....		6.25	6.10	5.10	5.00@5.25
Smokeless mine run.....	Chicago....		5.60	2.50	2.25	2.00@2.50
Smokeless lump.....	Cincinnati....		6.00	5.75	5.50	4.75@6.00
Smokeless mine run.....	Cincinnati....		6.10	2.10	2.35	1.75@2.50
Smokeless screenings.....	Cincinnati....		6.25	1.60	1.50	1.00@1.75
*Smokeless mine run.....	Boston....		8.00	4.40	4.30	4.35@4.50
Clearfield mine run.....	Boston....		4.85	2.05	2.15	1.50@2.50
Cambria mine run.....	Boston....		4.35	2.50	2.55	2.25@3.00
Somerset mine run.....	Boston....		4.10	2.25	2.35	2.00@2.75
Pool 1 (Navy Standard).....	New York....		5.00	3.00	3.00	2.75@3.25
Pool 1 (Navy Standard).....	Philadelphia..		4.75	3.05	3.00	2.80@3.20
Pool 1 (Navy Standard).....	Baltimore....		4.60			
Pool 9 (Super. Low Vol.).....	New York....		4.25	2.30	2.25	2.00@2.50
Pool 9 (Super. Low Vol.).....	Philadelphia..		4.45	2.30	2.30	2.15@2.45
Pool 9 (Super. Low Vol.).....	Baltimore....		3.85	2.15	2.05	2.00@2.15
Pool 10 (H.Gr. Low Vol.).....	New York....		3.60	2.00	2.00	1.75@2.25
Pool 10 (H.Gr. Low Vol.).....	Philadelphia..		3.60	1.85	1.85	1.70@2.00
Pool 10 (H.Gr. Low Vol.).....	Baltimore....		3.35	2.10	1.90	1.85@2.00
Pool 11 (Low Vol.).....	New York....		3.05	1.65	1.75	1.50@2.00
Pool 11 (Low Vol.).....	Philadelphia..		3.15	1.55	1.60	1.60@1.70
Pool 11 (Low Vol.).....	Baltimore....		3.05	1.90	1.80	1.70@1.85
High-Volatile, Eastern		Market Quoted	Nov. 20 1922	Nov. 5 1923	Nov. 12 1923	Nov. 19 1923†
Pool 54-64 (Gas and St.).....	New York....		3.50	1.60	1.60	1.50@1.75
Pool 54-64 (Gas and St.).....	Philadelphia..		3.50	1.60	1.60	1.55@1.75
Pool 54-64 (Gas and St.).....	Baltimore....		3.30	1.75	1.70	1.70
Pittsburgh sc'd gas.....	Pittsburgh....		4.50	2.55	2.55	2.50@2.60
Pittsburgh gas mine run.....	Pittsburgh....			2.25	2.25	2.20@2.30
Pittsburgh mine run (St.).....	Pittsburgh....		3.35	1.90	1.90	1.85@2.00
Pittsburgh slack (Gas).....	Pittsburgh....		3.60	1.05	1.05	1.00@1.15
Kanawha lump.....	Columbus....		5.75	3.00	3.00	2.85@3.15
Kanawha mine run.....	Columbus....		3.60	1.85	1.85	1.75@2.00
Kanawha screenings.....	Columbus....		3.35	.80	.65	.70@.85
W. Va. lump.....	Cincinnati....		6.09	3.25	3.10	2.75@3.75
W. Va. Gas mine run.....	Cincinnati....		4.00	1.50	1.50	1.25@1.75
W. Va. Steam mine run.....	Cincinnati....		3.60	1.50	1.50	1.25@1.75
W. Va. screenings.....	Cincinnati....		3.35	.85	.80	.50@1.25
Hocking lump.....	Columbus....		5.05	2.95	2.90	2.85@3.00
Hocking mine run.....	Columbus....		3.50	1.85	1.85	1.75@2.00
Hocking screenings.....	Columbus....		3.00	.80	.70	.80@.95
Pitts. No. 8 lump.....	Cleveland....		4.15	2.55	2.55	2.10@3.00
Pitts. No. 8 mine run.....	Cleveland....		3.60	1.85	1.90	1.85@1.95
Pitts. No. 8 screenings.....	Cleveland....		3.31	.85	1.00	1.10@1.20
Midwest		Market Quoted	Nov. 20 1922	Nov. 5 1923	Nov. 12 1923	Nov. 19 1923†
Franklin, Ill. lump.....	Chicago....		\$5.25	\$4.10	\$4.10	\$3.90@4.35
Franklin, Ill. mine run.....	Chicago....		4.10	2.60	2.60	2.25@2.75
Franklin, Ill. screenings.....	Chicago....		2.60	1.45	1.45	1.40@1.50
Central, Ill. lump.....	Chicago....		4.50	3.10	3.10	3.00@3.25
Central, Ill. mine run.....	Chicago....		3.10	2.10	2.10	2.90@2.25
Central, Ill. screenings.....	Chicago....		1.80	1.05	1.05	.70@1.00
Ind. 4th Vein lump.....	Chicago....		5.10	3.35	3.35	3.25@3.50
Ind. 4th Vein mine run.....	Chicago....		3.85	2.60	2.60	2.50@2.75
Ind. 4th Vein screenings.....	Chicago....		2.05	1.20	1.20	1.15@1.30
Ind. 5th Vein lump.....	Chicago....		4.75	2.50	2.50	2.25@2.75
Ind. 5th Vein mine run.....	Chicago....		3.60	2.10	2.10	2.00@2.25
Ind. 5th Vein screenings.....	Chicago....		1.85	.80	.80	.75@.90
Mt. Olive lump.....	St. Louis....			3.10	3.10	3.00@3.25
Mt. Olive mine run.....	St. Louis....			2.25	2.25	2.20@2.30
Mt. Olive screenings.....	St. Louis....			1.00	1.00	1.25
Standard lump.....	St. Louis....		3.75	3.05	3.05	2.90@3.25
Standard mine run.....	St. Louis....		2.50	2.05	2.05	1.80@2.30
Standard screenings.....	St. Louis....		1.35	.55	.55	.50@.60
West Ky. lump.....	Louisville....		4.35	2.60	3.00	2.75@3.25
West Ky. mine run.....	Louisville....		2.50	1.65	1.65	1.50@1.85
West Ky. screenings.....	Louisville....		1.50	.65	.60	.50@.70
West Ky. lump.....	Chicago....		4.10	2.60	2.85	2.75@3.00
West Ky. mine run.....	Chicago....		2.85	1.75	1.75	1.50@2.00
South and Southwest		Market Quoted	Nov. 20 1922	Nov. 5 1923	Nov. 12 1923	Nov. 19 1923†
Big Seam lump.....	Birmingham..		3.95	3.85	3.85	3.75@4.00
Big Seam mine run.....	Birmingham..		2.35	1.95	1.95	1.75@2.15
Big Seam (washed).....	Birmingham..		2.60	2.35	2.35	2.25@2.50
S. E. Ky. lump.....	Chicago....		6.10	3.00	3.25	3.00@3.50
S. E. Ky. mine run.....	Chicago....		4.25	2.25	2.25	2.00@2.50
S. E. Ky. lump.....	Louisville....		6.50	3.00	3.50	3.25@3.75
S. E. Ky. mine run.....	Louisville....		4.00	1.85	1.85	1.50@2.25
S. E. Ky. screenings.....	Louisville....		4.00	.75	.75	.65@.85
S. E. Ky. lump.....	Cincinnati....		6.50	3.35	3.00	2.75@3.75
S. E. Ky. mine run.....	Cincinnati....		3.75	1.50	1.50	1.25@1.75
S. E. Ky. screenings.....	Cincinnati....		3.25	.85	.85	.50@1.25
Kansas lump.....	Kansas City..		5.75	5.00	5.10	5.00@5.25
Kansas mine run.....	Kansas City..		3.75	3.50	3.50	3.50
Kansas screenings.....	Kansas City..		2.50	2.25	2.25	2.00

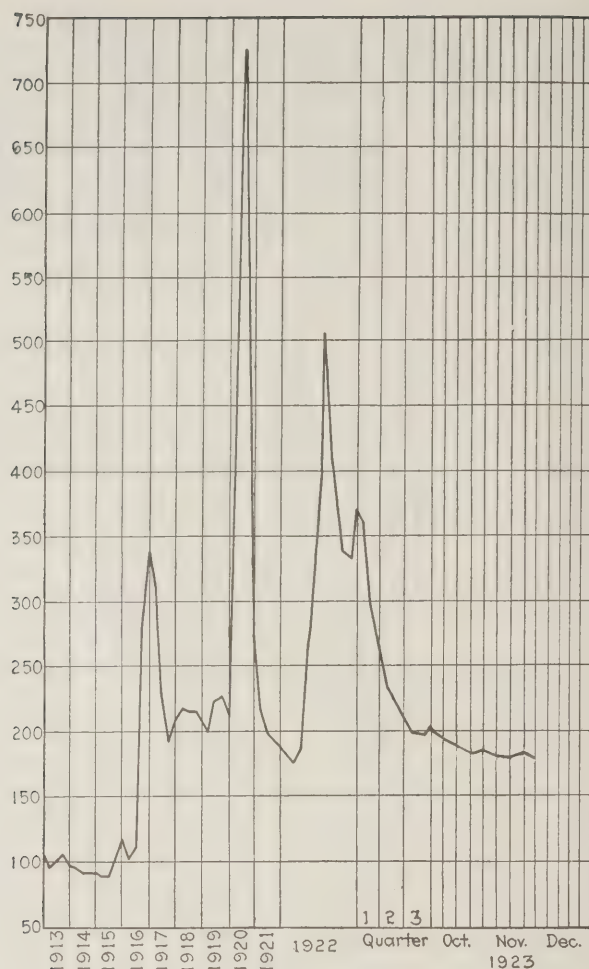
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Nov. 12, 1923		Nov. 19, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34	\$9.00	\$7.75@8.25	\$9.60@10.50	\$8.00@9.25	\$9.60@10.50	\$8.00@9.25
Broken.....	Philadelphia..	2.39		7.90@8.10				
Egg.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Egg.....	Philadelphia..	2.39	9.25@11.00	8.10@8.35	9.85@12.20	8.75@9.25	9.85@12.20	8.75@9.25
Egg.....	Chicago*	5.06	12.50@13.00	7.20@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Stove.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Stove.....	Philadelphia..	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Stove.....	Chicago*	5.06	12.50@13.00	7.35@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Chestnut.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Chestnut.....	Philadelphia..	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Chestnut.....	Chicago*	5.06	12.50@13.00	7.35@8.35	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Range.....	New York....	2.34		8.25		9.00		9.00
Pea.....	New York....	2.22	7.00@11.00	6.15@6.30	6.75@8.25	6.15@6.65	6.50@7.75	6.15@6.65
Pea.....	Philadelphia..	2.14	7.00@8.00	6.15@6.20	6.75@9.00	6.35@6.60	6.75@9.00	6.35@6.60
Pea.....	Chicago*	4.79	7.00@8.00	5.49@6.03	6.00@6.75	5.40@6.05	6.00@6.75	5.40@6.05
Buckwheat No. 1.....	New York....	2.22	4.00@5.00	4.00@4.10	2.00@3.00	3.50	2.00@2.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14	5.00	4.00	2.25@3.50	3.50	2.25@3.50	3.50
Rice.....	New York....	2.22	3.00@3.25	2.75@3.00	1.50@2.00	2.50	1.50@2.00	2.50
Rice.....	Philadelphia..	2.14	2.50@2.75	2.75@3.00	1.75@2.50	2.50	1.75@2.50	2.50
Barley.....	New York....	2.22	1.75@2.00	1.50@2.00	1.00@1.25	1.50	1.00@1.25	1.50
Barley.....	Philadelphia..	2.14	1.00@1.75	2.00	1.00@1.50	1.50	1.00@1.50	1.50
Birdseye.....	New York....	2.22		2.10	1.45	1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

Index	1923			1922
	Nov. 19	Nov. 12	Nov. 5	Nov. 20
Index	183	184	183	343
Weighted average price	\$2.21	\$2.23	\$2.21	\$4.15

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

conditions are reported from the country. Locally wagon-load steam is easing up and while there was a little demand a week ago for carload steam, it too has fallen off.

Kentucky Is in Distress

The western Kentucky situation is far from satisfactory, and a number of operators are planning to close down, if there is not an improvement in prices or demand. It is asserted that a considerable tonnage is being moved at a direct loss. The low-cost strip mines which have been coming into the field rapidly are hurting the shaft mines to some extent. Car supply is a full 100 per cent or more on all divisions in western Kentucky.

Kentucky brokers and sales agents are having trouble in disposing of coal at any price just now, as retailers have stocks in hand. Industries are buying only cheap screenings. Mine-run is quite dull, as it cannot compete with screenings on price. Egg and lump are fair only. Block coal has been moving on a fair basis, considering the amount produced. Even screenings are running so low that some are stored at mines.

Northwest Talks Shortage

Shortage of acceptable sizes of hard coal is becoming more acute at Duluth and docks and dealers are urging the

use of substitutes. Three docks have definitely refused further orders for stove and nut, and others are taking care of only customers of long standing. Only three cargoes of hard coal reached Duluth last week in a total of thirty-nine cargoes and but two are reported on the way from lower lake ports in a total of nineteen en route.

It is estimated that Duluth and the Northwest would need about 300,000 or 400,000 more tons of hard coal to carry comfortably through the winter, and it seems impossible to bring this up before the close of navigation.

Lack of action in bituminous and fear of fires on the docks has caused the prices of screenings to sag. Hocking screenings are off 25c., and it is reported that a quiet shading on Youghiogheny and other grades is taking place.

Prices of soft coal at the Head-of-the-Lakes on lump, mine run, and screenings are: Kentucky, \$7.50, \$7 and \$4.25; Youghiogheny, \$6.50, \$5.55 and \$4; Hocking, \$6.25, \$5.25 and \$3.50; Splint, \$7, \$6 and \$4; Pocahontas, \$10, \$6.50 and \$5.50. Coke remains at \$10.50, with little demand as yet and briquets at \$10.

Around the Twin Cities trade is exceedingly slow and marked by much snowbirding. There the talk of anthracite shortage gets only a little attention, although it is admitted that the most desirable sizes probably will run a little short toward the end of the winter.

Warm weather continues to check the demand at Milwaukee, and there is little doing either by jobbers or retailers. A steady inflow of coal by lake, mainly bituminous, continues. Shipments to the interior by rail are below normal, however, and stocks on the docks are piling up. The present situation is bound to continue until the first cold-wave signal is hoisted.

Cargo receipts of coal for the first half of November aggregate 55,700 tons of anthracite and 315,556 tons of soft coal, making the season's cargo receipts since the opening of navigation to date 840,024 tons of the former and 2,913,257 tons of the latter. Car-ferry and rail receipts will augment these figures considerably.

West Shows Little Change

Little change in Western markets was shown during the past week except that in the Kansas City region screenings were dropped another 25c. down to \$2 in order to keep mine tracks sufficiently cleared so that coal can be loaded out to meet the slowly improving demand for domestic sizes. Mines in Kansas are averaging about 60 per cent running time nowadays.

In Colorado the market continues on its slow way with only a trifling improvement in domestic demand. Mines are running about 2½ days a week. Car supply and transportation generally are good, although a slide on the Moffatt line blocked tunnel No. 17 and shut off Routt County practically all last week.

Utah producers find business none too good. But the market seems a little spotted. Most operators are bogged down in screenings while one or two are a little behind in screenings orders. Some report better demand for nut sizes while others still suffer from middle sized "no-bills." Lump demand is fairly good, however. There have been no price changes. State figures just issued show that during the first nine months of 1923 total Utah production was 3,237,657 tons as compared with 3,462,690 tons in the same period last year. September production was 489,220 tons compared with 403,536 last year.

Ohio Markets Dull

Market conditions in nearly all parts of Ohio are dull. Buying is practically at a standstill except when distress coal can be picked up cheaply. In the Cincinnati territory, due to the weakness in low-volatile domestic coals, sales have been reported as low as \$4.75@\$5 for New River coal, though the standard companies handling Pocahontas deny they have changed their price from the \$6 circular. Although there are many idle mines in parts of Kentucky and West Virginia and there has been a reduction in output in the smokeless fields, tonnage coming to the market is in excess of demand. Industrial concerns in Ohio, Michigan and Indiana are not buying and are reported to have supplies

sufficient for from sixty to ninety days. Retail prices, as well as buying, have been settling down, and cuts were made in the price list last week.

Demand is quiet at Cleveland and the market is unable to absorb the coal available since shipping to the Lakes has eased up. More mines are closing and production in the eastern Ohio district shows a reduction. There is less slack to be had and quotations on this grade of coal for the past week show a slight advance.

At Columbus buying is slow, reserves are large and consumers are not disposed to increase their present accumulations unless they can pick up distress coals at low prices. Retail prices are showing the effects of the draggy market and are declining in sympathy with mine prices. Pocahontas and other smokeless coals are in best demand while some Kentucky coals are being sold for domestic purposes. There is a better feeling in the slack market.

There is no particular hope for real improvement in the Pittsburgh market unless there should be an interruption to free movement on the railroads. The market continues in poor condition and consumers seems to be convinced that nothing can prevent them from obtaining all the coal they may want at approximately the prices ruling in the past few months. Some distress coal is to be had, going sometimes at very low prices. There is a feeling of optimism among the operators in central Pennsylvania, who feel that a change for the better is about due in the bituminous-coal industry. Buffalo conditions continue dull and inactive. There is a little new strength reported for slack.

New England Consumers Indifferent

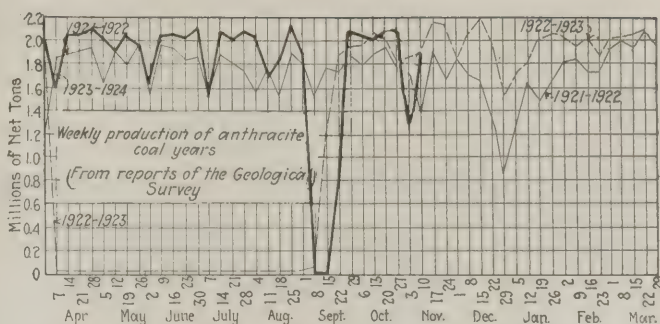
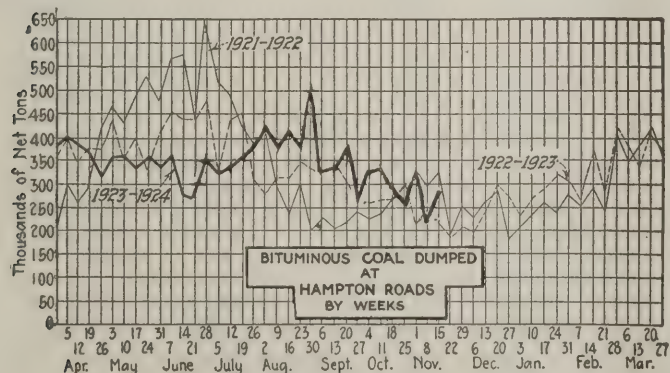
In New England on steam coal there has been no pronounced price movement the past week, although there have been slight indications of firmer prices. This is to be attributed largely to further curtailment of output and to the fact that small tonnages here and there of distress coal have been absorbed. There is no perceptible increase in demand, however, and consumers are maintaining the same indifferent attitude that has been characteristic now for some months. A few corporation buyers are quietly improving their opportunities of buying small lots that offer at attractive prices, but this affords practically the only market that can be seen anywhere at this writing.

On No. 1 Navy standard coals at Hampton Roads the price level advanced early in the week to \$4.75 per gross ton f.o.b. vessel, but two days later the market had again receded to \$4.35 and \$4.50. Second-grade coals are still being offered down to \$4.25, with liberal quantities of slack available at the lowest range of price yet named. On cars at Boston the market is practically unchanged at \$5 per gross ton, and almost none is sold except under pressure.

There is no change in the situation all-rail. Even the producers of quality grades find it extremely difficult to keep mines in operation and unless there is marked improvement in the next few weeks there will be more and more instances of complete shut-down.

Tidewater Market Shows Strength

The tidewater market at New York shows more strength, due to a cleaning up of most of the distress coal and lower shipments from the mines. Spot buying is not active and producers do not look for any great improvement soon,



although some houses report an increase in inquiries. The general situation at Philadelphia shows little if any improvement. Some houses claim to be making better shipments both on contracts and spot orders. Consumers continue to be conservative in their purchases and are slow to replace their consumed coals. Baltimore market conditions are not encouraging. As in other sections of the seaboard buying is dull and there is practically no activity.

Conditions in West Virginia have been affected by the strike on the Virginian Ry. and production of smokeless coal has been curtailed somewhat. There is an almost utter lack of demand for steam coal in the Birmingham field. Few orders are being received for spot coals and buyers are manifesting little interest. Bunker business is very dull, and unseasonable weather has slowed up domestic demand. The soft-coal market at Toronto, although somewhat improved, is by no means brisk.

Favorite Anthracite Sizes in Demand

Stove and chestnut sizes of anthracite are still in heavy demand by both dealers and consumers. There is considerable easiness in both egg and pea, as well as the steam coals, some retail dealers in the New York territory advertising in the daily papers that they have plenty of egg coal for sale. However, the chief call seems to be for stove and chestnut sizes. Improvement is looked for by most shippers as soon as lake shipments end and most dealers expect that there will be plenty of coal available before the first of the year. The steam sizes continue to increase in volume and are being stored in large quantities by those producers who have storage facilities. Baltimore dealers are short of coal, but there is no real emergency existing. Retail dealers in Toronto are receiving many orders for hard coal and supplies are fairly regular.

Production of beehive coke for the week ended Nov. 10 is estimated by the Geological Survey to have been 256,000 net tons, a decline of 10,000 tons from the previous week. The production of byproduct coke in October is reported at 3,099,000 net tons and of beehive coke at 1,290,000 tons, as compared with 3,112,000 tons of byproduct coke and 1,373,000 tons of beehive coke in September.

THE FIRST STEPS of the Reading Company to comply with the decree of the U. S. District Court in divorcing its coal business from its railroad business was taken last week, when an application for approval of a merger of all the railroad corporations of the company was filed with the Public Service Commission at Harrisburg. The Reading Company, as the holding company, controls the Philadelphia & Reading Railway Co. and twelve other underlying companies. The merged companies will be known as the Reading Company, and the commission will hear the application Dec. 5. The company contemplates forming another holding company for the coal and iron business, independent of the railway company.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Nov. 3, 1923.....	1,035,776	179,714
Previous week.....	1,073,965	195,535
Same week in 1922.....	979,851	191,083

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Nov. 7, 1923.....	31,955	12,567	7,099	1,120
Same date in 1922.....	4,406	2,046		
Oct. 31, 1923.....	24,477	7,205	12,336	3,068

Foreign Market And Export News

Foreign Demand for British Coal Heavy; Welsh Miners' Wages Cut

Quotations for the various grades of British coal for the week ended Nov. 17 show no change from the previous week while output, according to a cable to *Coal Age*, declined 80,000 tons during the week ended Nov. 3, when compared with the previous week's production, the figures showing a tonnage of 5,595,000 tons as against 5,675,000 tons during the week ended Oct. 27.

Conditions in the Welsh market remain very unsettled, though to some extent influenced by substantial contract sales over next year and a fairly heavy business awaiting early execution. The steam coal section shows a better undertone for backward loading, but for prompt positions conditions are unsettled and supplies are excessive.

Demands are heavy from France, Italy and Germany, while the South American business is brisk. Prices are varying widely because some operators are offering concessions to effect immediate clearances.

The Welsh miners' wages are reduced from Nov. 1 from 41.47 per cent over the standard of 1915 to 28.66 per cent, which is only 0.66 per cent above the minimum. It was a severe shock to the Welsh miners, and has greatly stimulated the demand of the extremists for the termination of the existing wages agreement.

The Newcastle market remains about the same. The intrinsic position is sound and buying and selling for current and forward delivery is active. Business with Europe is steady, especially from France, Italy and Scandinavia. The German situation is obscure. The Norwegian State Railways has taken 25,000 tons of steams at prices from 25s. 4½d. to 25s. 11d. f.o.b.

French Coal Market

No appreciable change is noticed in the French coal market. Demand for domestic and industrial coals is easy, owing to weather conditions, and dullness in business. It is believed that a change in prices will result due to the

increase in wages granted the miners. The market is taking much British coal, imports of industrial coals being heavy, while only sufficient British house coal to meet immediate needs is being called for.

Retail dealers have prepared a schedule of so-called "popular" coals as asked for by the authorities and are ready to dispose of them at about 200 fr. per ton, but the Paris Prefecture would like to have direct supervision of the sales to the public. This matter is now under discussion.

During the ten days ending Oct. 20 the Office des Houilleres Sinistrees supplied France and Luxemburg with 30,000 tons of coal; 61,100 tons of coke, and 4,900 tons of lignite, a total of 96,800 tons, as compared with 103,200 tons supplied during the preceding ten days.

France secured from the Ruhr during the first nine months of this year 1,091,290 tons of coal, 1,231,180 tons of coke and 78,160 tons of briquets, this representing a shortage in Germany's obligations to the Allies of between 12,000,000 and 13,000,000 tons, according to the stipulations of the Versailles treaty.

Great Britain Coal Exports

Great Britain exported 59,472,942 tons of coal in the first nine months of this year, according to the Bankers Trust Co. of New York. This was 13,996,369 tons greater than the exports during the corresponding period of 1922, and exceeded by 4,955,154 tons the exports in the same months of 1913. During the first nine months of this year France received 14,117,000 tons of coal from Great Britain; Germany, 11,604,000 tons and Italy 5,760,000 tons. Exports of coal to South American countries increased by more than 500,000 tons during that period when compared with 1922, but were below the tonnage exported to South America in 1913, 3,084,749 tons having been shipped, as against 2,506,113 tons in 1922, and 5,196,835 tons in 1913.

Hampton Roads Market Stronger

Conditions at Hampton Roads were strengthened last week as a result of the engineers' strike on the Virginian Railway, and the consequent depletion of supplies at the piers of that road at Sewalls Point. Shippers, however, reported buying to be unchanged.

With other roads rushing coal to tide-water to obviate any shortage, the Sewalls Point piers were operating on regular schedule but under some difficulties. Coastwise business was slowly improving, while bunker trade held its own. Foreign business was slower.

Domestic business was on the up-grade, with prices remaining firm. The tone of the market was somewhat stronger than recently and prices were higher.

Export Clearances, Week Ended Nov. 17, 1923

FROM BALTIMORE

	Tons
For France:	
Br. SS. Speaker	5,460
For Cuba:	
Nor. SS. Dea	4,053
For Italy:	
Br. SS. Dunstaffnage	5,211
For Argentina:	
Ital. SS. Ardito	6,909

FROM HAMPTON ROADS

	Tons
For Brazil:	
Br. SS. Coquetmede, for Rio de Janeiro	5,426
Br. SS. Burnholme, for Rio de Janeiro	5,091
For Belgium:	
Bel. SS. Gand, for Antwerp	7,190
For Cuba:	
Amer. SS. Barbara, for Havana	3,170
Nor. SS. Honduras, for Banes	1,022
For Virgin Islands:	
Br. SS. Berwindvale, for St. Thomas	9,064
For Peru:	
Amer. SS. Argosy, for Callao	3,877

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Nov. 8	Nov. 15
Cars on hand	2,297	2,480
Tons on hand	143,943	147,506
Tons dumped for week	86,761	106,219
Tonnage waiting	7,500	9,300

Virginian Ry. piers, Sewalls Pt.:	Nov. 8	Nov. 15
Cars on hand	1,739	1,044
Tons on hand	104,850	63,550
Tons dumped for week	79,971	84,840
Tonnage waiting	7,332	164,811

C. & O. piers, Newport News:	Nov. 8	Nov. 15
Cars on hand	1,437	1,661
Tons on hand	73,970	86,615
Tons dumped for week	34,721	68,309
Tonnage waiting		5,340

Pier and Bunker Prices, Gross Tons

PIERS	Nov. 10	Nov. 17†
Pool 9, New York	\$4.65@ \$5.00	\$4.75@ \$5.00
Pool 10, New York	4.10@ 4.50	4.40@ 4.75
Pool 11, New York	4.00@ 4.25	4.25@ 4.50
Pool 9, Philadelphia	5.00@ 5.20	4.90@ 5.05
Pool 10, Philadelphia	4.00@ 4.70	4.00@ 4.65
Pool 11, Philadelphia	3.95@ 4.15	3.95@ 4.00
Pool 1, Hamp. Roads	4.25@ 4.50	4.75@ 5.00
Pools 5-6-7 Hamp. Rds	4.00	4.15@ 4.35
Pool 2, Hamp. Roads	3.75@ 4.00	4.20@ 4.50

BUNKERS

	Nov. 10	Nov. 17†
Pool 9, New York	4.95@ 5.30	5.05@ 5.30
Pool 10, New York	4.40@ 4.85	4.70@ 5.05
Pool 11, New York	4.30@ 4.55	4.55@ 4.80
Pool 9, Philadelphia	5.20@ 5.55	5.10@ 5.45
Pool 10, Philadelphia	4.60@ 5.00	4.60@ 4.95
Pool 11, Philadelphia	4.25@ 4.50	4.25@ 4.50
Pool 1, Hamp. Roads	4.25@ 4.50	4.75@ 5.00
Pool 2, Hamp. Roads	3.75@ 4.00	4.20@ 4.50

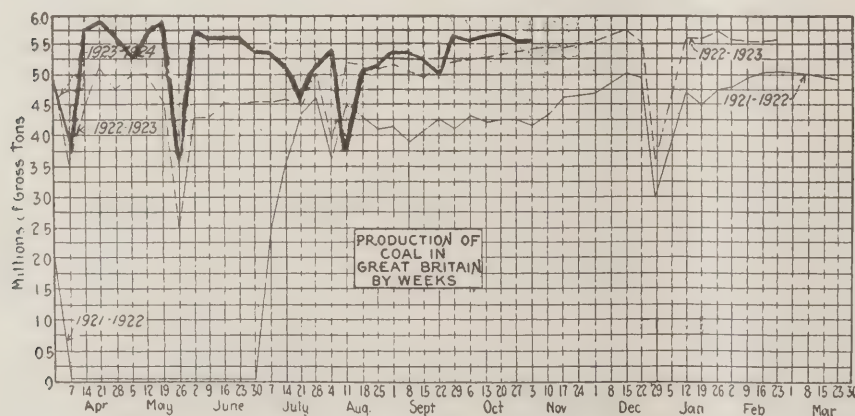
Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Nov. 10	Nov. 17†
Admiralty, large	27s. 6d. @ 28s.	27s. 6d. @ 28s.
Steam smalls		17s. @ 18s. 6d.

Newcastle:	Nov. 10	Nov. 17†
Best steams	25s. 6d. @ 26s.	25s. 6d. @ 26s.
Best gas	24s.	24s.
Best bunkers	22s. 6d. @ 24s.	22s. 6d. @ 24s.

† Advances over previous week shown in heavy type, declines in *italics*.



News Items From Field and Trade

ALABAMA

The Thomas-Weller Coal Mining Co. has entered into an agreement with the trustee of the bankrupt Montevallo Mining Co. for the operation of the Aldrich mines, which were closed down several weeks ago by order of the court. The new operators contracted with the state for the employment of 150 convicts on free labor basis and expected to resume the production of coal about Nov. 15. Montevallo coal is a high-grade domestic fuel.

Explosion of a gas pocket in the mines of the Moffat Coal Co., at Moffat Spur, Bibb County, Nov. 12, resulted in the death of one negro miner and the injury of eight white miners and one negro, some seriously. The explosion was a local one and only those men near by were affected. There were about 150 men in the workings at the time of the accident.

The Hercules Coal Mining Co., capital \$2,000, has filed articles of incorporation in Jefferson County. The incorporators are W. T. Simmons, J. J. Lee and F. G. Moore.

ILLINOIS

Nokomis Coal Co. mine No. 10 set a new hoisting record for central Illinois mines on Nov. 6 when 5,846 tons were hoisted in eight hours.

R. B. Miller, state forester of Illinois, has estimated that twenty million feet of timber is used each year in the coal mines of Illinois, which is one fourth cubic foot for every ton of coal produced.

What is said to be a new world's record for speed in sinking a coal-mine shaft was set at Mason, Nov. 12, when the Illinois Coal Corporation struck coal at a depth of 730 ft. Work on the shaft started on April 23 and it was driven most of the way through solid rock by three shifts working twenty-four hours a day, seven days a week.

Suit for \$100,000 damages against the Missouri-Illinois Railroad Co. has been filed in federal court in East St. Louis by George A. Wilson, coal mine operator of Chester, who alleges that the railroad company has "illegally obstructed the mining of coal on property owned by him for the last five years" in that it has maintained a nearby water reservoir. The Illinois authorities will not permit him to operate his property because this pond adjacent constitutes a hazard to mining.

P. H. Sauter, of St. Louis, Mo., in filing suit in the federal court at East St. Louis, Ill., for a receiver for the Kolb Coal Co. stated that certain financial interests in New York and Philadelphia had obtained possession of assets of the company worth \$1,400,000, with an expenditure of only \$100,000. He states that there are 12,000 shares of stock due him. Erwin G. Schaukegel, auditor for the company was appointed receiver but the receivership lasted but a brief time. The future of the company is much in doubt.

INDIANA

Judgment for \$21,236.89 has been entered in the Boone Circuit Court, Lebanon, in favor of Harry Booth, receiver for the Black Comet Coal Mining Co. of Indiana, against the Indianapolis Street Railway Co. on contract. The defendant appealed. The case involved the purchase and delivery of 6,042.2 tons of coal. The plaintiff asked judgment in the sum of \$25,000.

T. P. Tillman, of the Indiana board of tax commissioners, and H. B. Wenger, engineer for the board, have begun checking assessments on coal properties of Vigo County. It was said by Tillman that the work consisted of reaching an agreement with the coal operators and that the assessments would come before the tax board before figures would be available. Local boards of review last spring displayed a tendency to let the work of assessing coal properties fall to the state tax board, according to the board's representative.

By a vote of 60 to 9, coal miners in a mass meeting at Princeton, Ind., recently adopted a resolution requesting that a special convention of District 11, United Mine Workers of America, be called to consider

complaints that the legal department of the Indiana union organization has been lax in its work with compensation claims and other such duties for miners. Miners from more than 50 locals attended the meeting. It is said that if ten locals ratify the action of the meeting here, a special convention will be called to cost between \$35,000 and \$40,000.

IOWA

Nearly one million more tons of coal were mined in Madison County, the past year than in 1922. There are nineteen fair sized mines in the county and eight small ones. A total of 4,020,159 tons was produced by the 4,643 men engaged in this industry. One miner was killed for each 574,398 tons and one injured for each 18,873 tons. Coal is produced in nine townships of the county, Edwardsville, Collinsville and Oliver townships being the largest producers. Alton township is the smallest producer, a small mine operated in the yard of an industrial plant bringing up 1,520 tons of coal during the year. Electric power is used in all the mines excepting three. The majority of the mines worked from 150 to 212 days during 1923.

KANSAS

Southwestern Interstate Coal Operators' Association reports for the last four years give an idea of the extent to which business in this district has slumped. Lopping off odd figures, the reports for 1920 show a production of more than thirteen million tons; for 1921, eight and one-half million tons; for 1922, less than six million tons, and, at the present rate of production, the figure for 1923 will be under that for 1922.

KENTUCKY

With four locks and dams finished in the Ohio River this year, and four more to be finished next year, it is believed that by 1925 the Ohio River will have the long needed 9 ft. stage from Pittsburgh to Evansville, and that it will take only a year or two more to complete the deep-water stage to the Mississippi River, which will result in free movement of coal on the Ohio and increased transportation by water of general freight. River coal companies believe the day is coming back when coaling river steam boats will mean something to them.

The election of William H. Fields as Governor of Kentucky is supposed to mean the revival of the question of the coal tax in that state. Mr. Fields made his campaign upon the ground that this tax should apply.

MINNESOTA

W. W. Broughton, president of the Pittsburgh Coal Co. of Minnesota with offices at Minneapolis, has resigned his position and A. K. H. Roehl has been appointed in his place. Mr. Roehl has been with the company for twenty-five years.

Ray W. Thayer, district salesman of the Northwestern Fuel Co. at the Duluth office was drowned recently while hunting at Pelican Lake in northern Minnesota. Ice on the lake crushed Mr. Thayer's boat and he was caught beneath the ice. He leaves a wife and one child.

MISSOURI

Southwestern Interstate Coal Operators' Association, reporting for its members, who produce about 95 per cent of coal in Missouri, Kansas and Arkansas and about 40 per cent in Oklahoma, says that 722,303 tons was produced in September of this year as compared with 880,735 tons in the corresponding month of last year. Cumulative production for the first nine months of the year amounted to 5,650,149 tons as compared with 3,568,954 tons during the corresponding period of 1922. The 1922 tonnage representing only four months and six days' operation on account of the strike.

Gus Lester, 43 years old, employed at the Lester Coal Mine, near Moberly, Mo., was killed in October when he was caught under a large rock while at work in the shaft.

NEW YORK

W. S. Simms, formerly with the Cory Mann George Corporation, Ltd., New York and London, will hereafter represent the Ridge Hill Products Co., of Philadelphia, in New York City with offices at 50 Church street.

Joseph Kersten and Amand Andry, engineering representatives of the A. France-Focquet establishment at Lége, arrived in New York City Nov. 10 and expect to visit Pittsburgh, Scranton and other points for the purpose of interesting engineers in the Kheolaveur process.

The business conducted by Douglas Pugh, 44 Whitehall street, New York City, has been consolidated with that of the Lee Coal Co., Inc., at 17 Battery Place, and Mr. Pugh has become manager of bituminous sales with the latter company.

The Walter Engineering Corporation, 290 Broadway, New York, announces that C. L. Young has accepted the junior partnership of the firm. Mr. Young spent some time in the Winding Gulf District last summer making some special examinations for Chairman Hammond of the United States Coal Commission. The engineering firm are experts on financing, accounting valuation, income tax matters, transportation, marketing and all phases of mining operation.

J. P. Noonan will be the manager of the New York office opened by the Clark Coal & Coke Co., of Fairmont, Va. Mr. Noonan has been connected with the Farrell Fuel Co., the Koppers Company and the Carnegie Steel Co. The Clark Company, with several mines in the northern West Virginia field, produces about 650,000 tons annually, having mines near Clarksburg, at Erie, W. Va., and near Tunnelton.

George J. Mehan, sales manager of the Buffalo office of the Lake Erie Coal Co., has resigned and been succeeded by C. H. Crowder, who was assistant to him.

The Fuel Service Co., of New York City, formerly at 350 Madison Avenue, has moved to new and larger offices in the Whitehall Building, 17 Battery Place, Room 2643, and has new telephone numbers—Whitehall 8248-8249.

Charles F. Park, Jr., has been elected vice president of the Coal & Iron National Bank, New York City. He will be in charge of the bond department. Mr. Park was formerly a member of the firm of Hitt, Farwell & Park.

The Fair Price Coal Commission representing the state and New York City met for the first time on Nov. 14 and organized by electing Major General Charles Berry chairman. The other members are Health Commissioner Frank J. Monaghan, representing the city, and George J. Eitz, representing the coal dealers. Major General Berry was appointed by Governor Smith to represent the state. The committee announced that plans had been formulated for dividing the city into zones with a view to fixing fair zone prices for various kinds of fuel.

NORTH DAKOTA

Proposed increase in lignite freight charges in North Dakota will be vigorously opposed by lignite producers. The increase would apply on rates as far as Minneapolis. Lignite men see in the proposed change a move to protect coal interests of other districts, and claim that lignite has been cutting into the soft-coal business of other districts. The North Dakota Railroad Commission has suspended the proposed rates for four months, pending a hearing.

OHIO

Bids were opened Nov. 8 by the Board of Education of Columbus for furnishing and delivering 1,000 tons of nut, pea and slack to the Central High School as follows: Euga & Stinchcomb, \$2.91; Reliable Coal & Supply Co., \$2.98, and the J. C. McIntyre Coal Co., \$3. Contract will be awarded later.

The use of Ohio coal by citizens of the state is urged by Governor Donahey, who asserts that Ohio fuel is discriminated against. Unless something is done intense suffering will prevail in the Ohio coal fields this year, he declares. The state government uses only Ohio mined coal and the Governor urges city and county officials to follow the example thus set. Dealers also are asked to try to prevail upon their customers to use the Ohio product. The Governor said it is not a matter of charity but of justice. "The Ohio coal miner never has sought, nor does he seek now alms," he says. "Neither does he desire to become the object of public or private charity."

Oscar W. Gardner, for many years president of the Chesapeake & Virginia Coal Co., Lynchburg, Va., with offices at Cincinnati,

has sold his stock in the company and retired from the organization. He has been succeeded as president by Clinton DeWitt. W. W. Ruby has been made general sales manager.

Coal operators in Ohio are well pleased with the result of the election Nov. 6 as it applied to certain amendments to the constitution. One amendment, taking away from an employee the right to sue the employer after the award of the Industrial commission of workmen's compensation insurance is made, provides for additional compensation for employees where accidents and diseases result from failure to comply with specific requirements for the protection of lives, health and safety of employees, and provides a fund for the investigation and prevention of industrial accidents. This amendment was adopted by a heavy vote and will soon become a part of the organic law of the state. Operators of coal mines will now be relieved from the danger of being sued even after compensation for the injury has been made.

Jay C. Lathrop, Cincinnati district representative of the Conveyors Corporation of America, Chicago, has removed his office to 503 Neave Building.

PENNSYLVANIA

The Pocahontas-Sewanee Coal & Iron Co., of Pittsburgh, which started about a year ago to develop 2,000 acres of a 12,000-acre tract of virgin coal land in Tennessee, about sixteen miles from Dayton, has had to suspend operations on account of lack of funds to continue, after driving 1,000 ft. of rock tunnel to within 50 ft. of the coal. The company is now endeavoring to raise money to continue, having a seam of coal between 8 and 9 ft. thick.

Operators say that higher pay received by men employed in and about the anthracite mines, under the new wage contract is attracting a number of former residents from other sections of the state to the towns where they lived years ago. Several men who left the collieries to seek fortune elsewhere say they can do better in the coal regions than in the large cities, where, they say, the cost of living is higher than in the coal regions.

The unusual construction of the Scotch Valley Mine of the Beaver Valley Coal Co., near Bloomsburg, prevented entombment and possible death of fifty miners Oct. 16, when a large section of the roof of the main gangway caved in. The mine is constructed on a slope, with an opening at the foot of the mountain lower than the remainder of the mine, affording natural drainage. Natural ventilation also has been obtained through the digging of holes from the top of the mountain to the workings. Several of these holes have been dug at intervals toward the top of the mountain, and it was through these holes that the miners crawled to safety when their exit was cut off by the rock fall. Several hours' work failed to make any headway in clearing away the debris, as other rock fell almost as rapidly as portions of the first fall were removed, making the work extremely dangerous.

Eighteen properties in Throon were damaged by a subsidence of the surface over the workings of the Olyphant colliery of the Hudson Coal Co. recently. Danger of further settling is not past, owners of property in the vicinity of the cave fear, and occupants of homes in the affected region are prepared to vacate their residences at any moment that announcement of danger is made by coal company officials.

Officials of the United Mine Workers at Pottsville report they have abolished the last of the town locals and set up colliery locals in their place, in spite of persistent opposition. Former Representative Reiley, representing John L. Lewis, international president, brought legal proceedings against several locals and forced them to hand over their charters. They had been operating independently ever since the order to change from town to colliery locals was given out following the district convention. These locals have now given up their charters and are joining the colliery locals, thus ending one of the bitterest fights ever staged in the ranks of the union.

Directors of the Glen Alden Coal Co., have declared a dividend of \$250 a share, payable Dec. 20, to shareholders of record Dec. 1. Since its formation the company has declared two other dividends, one of \$1.50 a share in November, 1922, and one of \$2 a share last May.

The United Mine Workers at the tri-district convention held at Wilkes-Barre on Nov. 13 decided to send protests to Washington against the proposed consolidation of the New York Central, and the Central Railroad of New Jersey and the Philadelphia & Reading Ry. The miners assert that if the roads are merged the anthracite fields

will work only three days each week, because of a shortage of cars. Members of the board reported that the Pinchot agreement by which peace was declared for another two years in the anthracite field, is working out satisfactorily.

Another big colliery will be put into operation in the Hazleton district next spring, the Candelmas Coal Co. has announced, and its output will go south over the lines of the Jersey Central R.R. The announcement came soon after borehole tests south of the Old Silver Brook breaker, which showed two seams, one said to be almost 100 ft. thick and the other about 30 ft. thick.

A 300-acre tract of coal land near Pottsville has been obtained on a long-term lease by the newly organized Jordan Coal Co. The price of the lease is said to be \$50,000. The coal tract is on a mountainside only 150 yards from the Lehigh Valley R.R. The new company contemplates the erection of a \$200,000 breaker in the spring. P. R. Jordan, of Scranton, who has developed numerous mining tracts, has been elected president of the new company.

Officials and miners with their ladies numbering one thousand attended the sixth annual banquet of District 17, held in Pittsburgh, Nov. 10. The district always speaks of the event as the John I. Pratt banquet, for it is the state mine inspector who manages it. William H. Pratt, son of the inspector, acting as toastmaster. Addresses were made by Thomas S. Baker, president of the Carnegie Institute of Technology; Crawford Wilson, who came from the mines; P. T. Fagan, president of District No. 5 of the United Mine Workers, and Dean Holbrook, of Pennsylvania State College.

Coal companies recently incorporated at the State Department, Harrisburg, are: Park Hill Coal Co., of Scranton; capital \$30,000; Herbert L. Williams, 302 South Main Avenue, Scranton; purpose, mining and preparing for market and selling anthracite; incorporators, David Lloyd, Herbert L. Williams and John Allen, Jr., all of Scranton. The Big Bend Coal Mining Co., Philadelphia, capital, \$35,000; Howard E. Foulkrod, 5144 Keyser street, Philadelphia, treasurer; purpose, mining, buying and selling coal; incorporators, Howard E. Foulkrod, Charles B. Redgate, Philadelphia, and George C. McIntyre, Colwyn. Harvey C. Stineman Coal Co., South Fork; capital \$10,000; Harvey C. Stineman, Westmont, Johnstown, treasurer, and one of the incorporators, the others being J. C. Davies, Johnstown and L. G. Venn, New York City. The purpose of the company is owning, operating and developing coal lands.

The Orient plant of the American Coke Corporation was offered for sale Nov. 8, as advertised by the receivers. No bid was received, but all the supplies were purchased by the Hillman Coal & Coke Co., of Pittsburgh, which has a number of operations in the vicinity of Orient. J. H. Hillman, Jr., chairman of the board of the Hillman Company, holds a large mortgage on the Orient plant which he is foreclosing, and the plant will be sold Dec. 1 to the highest bidder at Uniontown, by the Sheriff of Fayette County.

Contests for election of delegates to the international convention of the United Mine Workers of America, to be held in Indianapolis next January, are expected to be lively in the hard-coal fields. These elections are to be held next month and the three anthracite districts are entitled to about 100 representatives, in addition to the district officers, board members and secretaries.

A dynamite explosion on the evening of Nov. 13 destroyed the tippie of the Goshen Coal Co., at Surveyor, Clearfield County, causing a loss of \$18,000. During the past four or five months there has been a reign of terror in the little town owing to the adoption of I. W. W. tactics by a certain element among the miners. The Goshen company operates an open-shop mine and normally employs 50 to 60 men. Since June only about half this number have been at work, the remainder contending for recognition of the union. A series of explosions have occurred from time to time. Once a store fell and only two weeks earlier two charges of dynamite were set off in front of the residence of mine Superintendent Langford. A determined effort is now being made to run down the perpetrators.

It is reported that Rinaldo Cappellini, of Scranton president of District No. 1, United Mine Workers is mentioned as a candidate for state Senator for the Twenty-first district, which is now represented by P. F. Joyce, of Pittston. Reports also have been current concerning the possibility of Thomas Kennedy, of Hazleton, president of the United Mine Workers, of District 7, run-

ning for Congress. This report is also left unverified.

The Lillibridge breaker, located at Blakely, was destroyed by fire on Nov. 13. The damage, according to the owners of the structure, will reach \$5,000. The breaker was built about eleven years ago by S. S. Spruks, who operated it successfully until three years ago, when it was sold to Levi Lillibridge and associates. When erected the structure was valued at \$13,500, but two weeks ago it was offered for sale at \$2,000.

Valuation of coal lands in the city of Scranton for purposes of tax assessment in 1924, has been fixed at \$800 per foot acre. The new figure represents an increase of \$480 over the present figure, which has stood for the past two or three years, or since counsel for the city and the coal companies agreed upon \$320 as a fair valuation on an 80-per cent basis. It is understood that the \$800 valuation set by the city officials is on a 100-per cent basis.

Shipments of anthracite during October, 1923, amounted to 6,564,526 gross tons as reported to the Anthracite Bureau of Information, Philadelphia. These figures are not comparable with the previous month of September on account of the suspension of mining during negotiations between operators and miners, operation not being resumed until Sept. 19. The average daily shipment in September after operation was resumed amounted to 219,490 gross tons, while the average daily shipment during October amounted to 262,581 tons, an increase of about 43,000 tons. Comparing last month's shipments with October, 1922, there is a decrease of only a little over 3,000 tons, but an increase of 691,743 tons when compared with October, 1921. Shipments by originating carriers were as follows:

	October 1923	Sept. 1923
Phila. & Reading.....	1,205,425	420,859
Lehigh Valley.....	1,174,768	372,997
Jersey Central.....	564,471	154,200
Del., Lack. & Western..	1,017,231	318,182
Delaware & Hudson....	861,705	298,775
Pennsylvania	576,345	196,839
Erie	707,076	251,277
N. Y., Ont. & Western..	174,707	61,229
Lehigh & New Eng.....	282,798	120,582
Totals	6,564,526	2,194,940

The semi-bituminous mines located at Dutch Mountain, Forkston Township, after being idle for the past twenty years have been reopened under the ownership of William Booth and Ralph Peters, both of Wyoming, Pa. New buildings have been constructed and the new owners plan to erect a breaker on the site within a short time. Construction of a railroad from the mines six miles to Mehoopany is now contemplated.

W. W. Inglis, president of the Glen Alden Coal Co. is this year heading the anthracite mines division in Scranton and Dunmore in the annual Community Chest drive.

The State Water and Power Resources Board is endeavoring through representatives of the anthracite coal companies to devise means of keeping the Schuylkill River at Port Carbon free from culm and coal dirt. Complaints about the condition of the river at that point have been filed with the board.

An opinion by J. W. Brown, Deputy Attorney General, just given to William B. McGrady, chief of the Bureau of Standard Weights and Measures, states that coal in Pennsylvania must be sold by weight, but that there is no law that compels a dealer to install scales. The inference of the Attorney General's department is that the local sealers of weights and measures must see to it that the dealers weigh their coal on public or other scales before delivery.

Patton, Cambria County, Local Union No. 842, United Mine Workers, at a meeting on Nov. 1 adopted a resolution requesting the Cambria County commissioners to lower the miners' occupation tax valuation from \$300 to \$200. The resolution stated that the miners' occupation tax is higher in Cambria County than in any of the neighboring counties and that working conditions of mining throughout the county are poor.

W. S. Ayres, consulting mining engineer, of Hazleton, who has been a member of the American Institute of Mining and Metallurgical Engineers since 1873, was unanimously elected by the board of directors at its recent meeting to the honor roll of senior members.

Over thirteen hundred miners attended the annual banquet of the Hazleton Mining Institute held at the Hotel Dupian, Hazleton, on Nov. 8. Dr. Charles Aubrey Eaton, of New York, was the speaker of the evening.

UTAH

The U. S. Land Office at Salt Lake City will offer for lease 1,120 acres of public coal land in Carbon County tributary to the north fork of Gordon Creek. The coal of this area is bituminous and is a high-grade domestic and steaming fuel. Lease for this tract will be at a Government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of \$40,000 during the first three years of the lease, and a minimum production of 20,000 tons of coal a year beginning with the fourth year of the lease.

VIRGINIA

A charter has been issued to the Clinch River Coal Corporation, Colburn, with a capital stock of \$100,000, to mine and deal in coal and other minerals. Incorporators: William J. Jegen, president, North Glenside, Pa.; Mortimer B. Kelly, secretary, New York, and Jeremiah J. Kelly, New York.

The Clinchfield Coal Corporation has contracted for a complete Roberts & Schaefer steel tippie at its No. 52 mine at Dante.

E. M. Robinson has become local manager for the Eastern Coal & Export Co., Norfolk, to succeed C. L. Massei, resigned.

WEST VIRGINIA

The La-Go Pocahontas Coal Co. has just been organized with a view to operating on a fairly large scale in the Tug River field in McDowell County, the new enterprise being capitalized at \$100,000. The company will have its plant in the vicinity of Iaeger. Active in organizing this company were T. B. Lane, Carmie B. Lane, of Iaeger; C. L. Gaujot, of Glen Allen, and M. H. Leggett and A. F. Meyer of Cincinnati, Ohio.

When William Blizzard, president of sub district 2 of District 17, United Mine Workers, was placed on trial for the fourth time at Lewisburg on Nov. 12, charged with being an accessory to the murder of a Logan County deputy sheriff during the armed march of 1921, his counsel made a motion for a change of venue on the ground that Blizzard could not obtain a fair trial in Greenbrier County and at the same time asked for a continuance because of the illness of H. W. Houston, senior counsel in the case. The defense counsel submitted a large number of affidavits in support of the motion for a change of venue, stating that they had heard rumors of propaganda intended to prejudice the county against the defendant. It also was alleged that in view of the conviction of Howard Harrah, foreman of the jury which disagreed when Blizzard was tried last summer, and the conviction of G. C. Hickey, a defense witness on the charge of bribery, jurors would be afraid to vote "not guilty." The state in its answer replied that the petition dealt with an alleged situation which the defendants or those interested with them brought about and that they were thus endeavoring to take advantage of their own misdeeds. On Nov. 16 Judge Sharp denied the motion for a change of venue.

It is reported at Bluefield that the Pocahontas Fuel Co. had purchased the last thirty thousand acres of undeveloped coal of the original Pocahontas seam located in Tazewell County, Virginia and McDowell County, West Virginia, and known as the Faraday tract, owned by the heirs of the late H. C. Frick. It was reported the deal had been closed in New York and that \$500 per acre had been paid. The Faraday tract is the only undeveloped property of the original Pocahontas coal; not even the timber rights have been touched. In some places on the property the seam is over 10 ft. in thickness. Under certain provisions of the will of the late H. C. Frick, a certain sum of the money to be derived from the sale of this property was bequeathed to Princeton University, it was said.

The Federal Power Commission announced Oct. 30 that it had issued a preliminary permit to the West Virginia Power Co., of Charleston, for a power plant to be located about 5½ miles south of Hinton, with a transmission line about 22 miles in length, extending to Beckley.

A dividend will be paid before Jan. 1, 1924, by the Coal River Collieries Co., owned by the members of the Brotherhood of Locomotive Engineers, Warren S. Stone, president of the organization, announced at Huntington on Nov. 13, following a conference with officers of the concern. The amount of the dividend will be determined at a later date. The Coal River Collieries Co. was organized several years ago with a capital stock of \$2,000,000. It owns and operates extensive holdings in Boone County.

WISCONSIN

The Valley Coal & Dock Co., of Milwaukee, against which an involuntary petition of bankruptcy was filed in the Federal Court two months ago, has submitted a schedule of assets and liabilities. The liabilities total \$187,039, and the assets \$321,819.

The small steamer Wotan, which delivered a cargo of anthracite at DePere, a Green Bay port, is in the hands of the authorities pending inquiry as to the source and destination of a quantity of whiskey alleged to have been found on board.

The steamers Alex B. Uhrig and Jos. W. Simpson have been sold by the Milwaukee-Western Steamship Co., an auxiliary of the Milwaukee-Western Fuel Co., to the Reiss Steamship Co., a connection of the C. Reiss Coal Company of Sheboygan.

A voluntary petition in bankruptcy was filed in the Federal Court at Milwaukee Oct. 27 by the Standard Harlan Coal Co., a corporation engaged in wholesaling the product of Kentucky mines. Liabilities are listed at \$126,380 and assets at \$93,469.

WASHINGTON, D. C.

The Federal Trade Commission has announced that the hearing scheduled for Nov. 19 to take testimony in the complaints filed against Madeira-Hill & Co., of Philadelphia, and other wholesale coal dealers, has been postponed until Dec. 3. No reason was assigned for the postponement of the hearing, but it was understood that conflicting engagements for Nov. 19, between the commission and the respondents was responsible for delaying the hearing.

The National Retail Coal Merchant Association's headquarters have been established in the recently completed Transportation Building, in Washington, following removal from Philadelphia. Joseph E. O'Toole remains in charge as resident vice-president and Major Walter D. Rogers has assumed the duties of executive secretary. Major Rogers was a member of the staff of the Coal Commission during the life of that body, and previously had had wide experience in the retail phase of the coal industry.

Coal merchants of Washington soon will submit bids to Secretary of the Interior Work which officers of the National Retail Coal Merchants Association hope will lead to elimination of the Government Fuel Yard in the capital city. The dealers will bid only on delivery of coal to the government steam plants in the District of Columbia, without attempting to take over or interfere with contracts for purchase of coal at the mines by the government. The dealers expect to be able to establish by these bids that they can deliver coal to the government plants from various yards more cheaply than the government is now delivering in its own trucks from the central fuel yard.

Paul S. Black, who has been serving the War Minerals Relief Commissioner in a legal capacity, has been recalled to the service of the Bureau of Mines to undertake a study of state and federal coal-mining codes and workmen's compensation acts and laws dealing with safety in mining. This work is being undertaken in an effort to carry out one of the recommendations of the Harding Coal Commission. Dean Holbrook, of Pennsylvania State College, will co-operate with Mr. Black in this work.

Arthur P. Davis, past president of the American Society of Civil Engineers, who was summarily dismissed as Director of the Reclamation Service by Secretary Work, has been elected to honorary membership by the Washington Society of Engineers. This honor has been conferred on only four others. They are Commerce Secretary Hoover, Admiral H. T. Endicott, Admiral D. W. Taylor and Dr. F. H. Newell. Mr. Davis now is in England representing the Department of State on engineering matters coming before the Pecuniary Claims Commission.

Decisions of the lower federal courts by which the Diamond Fuel Co. was declared a bankrupt have been upheld by a decision rendered for the U. S. Supreme Court by Associate Justice Sanford. An involuntary bankruptcy petition was filed against the Diamond Fuel Co. by the Pittsburgh & West Virginia Coal Co. and two other coal companies. Before final action other creditors joined in the petition. The Canute Steamship Co. and others filed an intervening petition in opposition, claiming liens. They alleged the Pittsburgh & West Virginia Coal Co. was not a creditor of the fuel company, and hence that the petition had not had the necessary three creditors joined in the filing. The lower courts held, and the Supreme Court agreed, that intervention of other creditors validated the

petition under the bankruptcy laws and that it was unnecessary to pass on the standing of the Pittsburgh & West Virginia Co. The case had been appealed by the Canute Steamship Co. and associates.

CANADA

The capital stock of the Milnes Coal Co., Toronto, has been increased by Letters Patents from \$250,000 to \$500,000.

The Crow's Nest Coal Co. has declared a dividend of 1½ per cent payable Dec. 1 to shareholders of record Nov. 13, 1923.

The United Mine Workers local at No. 21 colliery at Birch Grove, near Glace Bay, and the Thorburn, Pictou County local have had their charters cancelled by the provisional officers of District 26, acting on instructions from International President Lewis due to the fact that neither of the two locals has paid its per capita tax into the International treasury for some months past. Officers of the Thorburn local have expressed their willingness to pay the back per capita taxes, to have their local restored to good standing. They have also extended the courtesy of the local to the provisional officers with a request that they pay a visit at an early date. The Thorburn local was informed that the provisional officers were not in a position to restore their charter, as President Lewis was the official who had the authority to do that. As a result of the revoking of the two charters, each and every member of the two locals must pay an initiation fee of \$10 before they can again become members in good standing.

The Mining Safety Device Co., of Bow-erston, Ohio, is furnishing part of the equipment for the new mine of the Dominion Coal Co., Ltd., at Glace Bay, N. S. They are installing Nolan automatic cagers at both top and bottom, Nolan automatic cushioned horn stops on the cages, and Nolan automatic retarders. All this material has been shipped and work is being rushed on the mine.

A comparison of the production of the different coal fields of the Province of British Columbia for the first ten months of 1923 compared with the same period last year shows that on Vancouver Island there has been a decrease of 166,005 tons; in the Nicola-Princeton Field a falling off of 35,343 tons; while in the Crow's Nest Pass there has been an increased output of 161,980 tons. The improvement indicated by the latter figures is accounted for by the fact that in 1922 there was a three-months strike in the Crow's Nest Pass while this year no labor trouble has interfered with the activity of the mines.

Frank Cherry, of Prince Albert, Saskatchewan, has filed a claim on coal lands near that city on the Little Red River, and has taken out a small trial shipment. The coal is said to be a fair grade of bituminous and improves in quality as distance is gained from the surface.

It is estimated that the coal production of Nova Scotia this year will amount to at least 6,200,000 tons. As the total production last year was 3,642,196 tons, the increase this year will be more than two and a half million tons. According to Hon. H. E. Armstrong, Premier and Minister of Mines, the collieries are in good condition and preparations are in progress for the opening of new mines.

JAPAN

The Government of Japan has conferred the second degree order of the Sacred Treasurer upon General Guy E. Tripp, chairman of the Board of the Westinghouse Electric & Mfg. Co. This is the highest decoration that can be awarded a civilian foreigner by the Japanese government. General Tripp is in Japan in connection with reconstruction work following the recent earthquake, and his decoration was in recognition of his activities in assisting the Japanese officials in rebuilding the devastated area.

Obituary

Thomas Thedford, former president of the New York Coal Exchange, died in his home in Allenhurst, N. J., Nov. 13 at the age of 82. He retired from his New York City coal business about fifteen years ago and moved to Allenhurst.

John Perry, 73 years old, one of the founders of the Central Coal & Coke Co. of Kansas City, died Nov. 7 at his home in Sandon, Chelmsford, England. For almost twenty-five years he had made his home in England, the place of his birth.

Publications Received

A new Department of Commerce publication to be known as the "Year Book," an annual review of the industrial developments of the country, having for its general purpose the presentation to business men of the country an analytical review of progress as a guide to trends of trade and economic forces, is now in course of preparation by Secretary Hoover. A feature of the book will be a chapter by F. R. Wadleigh, chief of the Department's Coal Division, dealing with the coal problem.

The Bituminous Operators' Special Committee has just issued for distribution a 32-page pamphlet entitled "Violence in the Coal Fields," embodying a series of news releases summarizing briefs filed with the U. S. Coal Commission by counsel for the Special Committee or co-operating organizations. The following is a list of subjects, by title, covered in the pamphlet: Brief of the General Policy of the United Mine Workers; Violence in Ohio; Union Activities in Northeastern Kentucky; Absentee Leadership Gives Advice (the Hermin Massacre); Stimulated Strikes in Central Pennsylvania; The Verdict of the Southwest (the War Against Labor-Saving Devices); Making the Public Pay Through Violence (the Campaign in Utah); Organized Intimidation in Alabama; The Unsuccessful Campaign in Somerset County; Kanawha (the Belgium of the Coal Fields); Periodic and Systematic Violence in West Virginia; Warlike Labor Monopoly in Indiana; Use of the War Chest in Georges Creek and Upper Potomac Coal Fields; Check-Off Abuses; Comparative Efficiency in Union and Non-Union Fields; The Company Town.

Traffic News

The Interstate Commerce Commission has decided that bituminous coal rates in carloads from mines on the Chicago & Alton and Wabash roads in the Springfield (Ill.) district, to St. Joseph, Mo., are unduly prejudicial to the extent that they exceed by more than 40c. a net ton the rates contemporaneously maintained by the carriers from the same points of origin to Kansas City.

The Interstate Commerce Commission has set Finance Docket 3131 for oral argument at 10:30 A.M., Dec. 29, before the full commission at Washington. This docket relates to the application of the Atlantic Coast Line and Louisville & Nashville R.R. for authority to acquire control, by lease, of the C. C. & O., C. C. & O. of South Carolina, and the Clinchfield Northern Ry. of Kentucky.

The defense of dock operators to the action brought by the Federal Trade Commission declares that the rate on coal from the docks to the Twin Cities of \$1.82 is at least 32c. too high and should be reduced to \$1.50. They assert that the high rate discriminates in favor of the Illinois all-rail operators.

Questions involved in the case of Burns Brothers, of New York, vs. the Pennsylvania Railroad Co., will be considered at an Interstate Commerce Commission hearing in New York Dec. 17. Examiner J. E. Smith will preside. On Dec. 20 Examiner McChord will hear at Big Stone Gap, Va., a discussion of the claims of the United Collieries, Inc., against the Southern Railway Co.

All records for shipment of coal over the New York Central R.R. from Ashtabula, Ohio, have been broken this year. To and including Nov. 8, 60,330 carloads, or 3,318,189 tons, of coal had been transferred from car to vessel over the New York Central docks at Ashtabula, as compared with 45,958 cars, or 2,099,001 tons, on the corresponding date in 1916, hitherto the record. The 1923 coal was forwarded in 800 vessels to Northwestern ports. This represents an increase of 58 per cent over the previous record. Eighty-five per cent of the total coal shipments for the year had been forwarded on Nov. 8, 1916. If the same proportion holds good this year the total for 1923 will be 3,903,700 tons. The grand total of coal shipments from all lake ports to Nov. 8 was 27,412,901 tons, New York Central shipments from Ashtabula amounting to 11.6 per cent of the total.

The Louisville & Nashville R.R. Co. has taken exception to the tentative report in the matter of divisions of rate with the Cumberland & Manchester R.R. and requests that oral argument be allowed. The

L. & N. contends that the examiner erred in assuming that because it has been the custom in the divisions of rates on coal to allow the Northern lines certain proportions under circumstances and conditions differing entirely from those involved in this case, the custom should warrant a dismissal of the present case. It is contended that the examiner was wrong in his failure to find that the present proportions are unjust. It also is argued that the examiner erred in ignoring the fact that the divisions of rates on coal from Cumberland and Manchester stations to all Southern destinations are involved in the proceeding.

Two indictments, each containing 100 counts, were returned against the Buffalo, Rochester & Pittsburgh Railway Co. and the Buffalo & Pittsburgh Coal & Iron Co. by a federal Grand Jury at Buffalo, N. Y., Nov. 12. The indictments charge that the two companies entered into an agreement when the coal mining suspension of last year was impending, whereby coal was to be held in cars of the railway company for its own use and for the coal company's customers. The indictments also allege that the railway agreed not to collect demurrage charges, that discrimination was shown against other coal shippers and that concessions were granted in freight rates previous to the actual mining suspension. The last charge is that the railway failed to collect reconignment charges on shipments made after the period of the emergency was ended.

In the case of the Victor American Fuel Co., the Bear River Coal Co. and the Routt Pinnacle Coal Co. vs. the Denver & Salt Lake R.R. Co., the Moffat Coal Co. and the Colorado-Utah Coal Co., two novel questions are presented. One is: Can a shipper, in a complaint case before the Interstate Commerce Commission, join as defendants, with the carriers complained of and obtain against defendant shippers, as well as against the defendant carrier, an order for reparation or other relief? The other question is: Can the complainant shipper in such a case obtain reparation in kind, that is, in cars, instead of in money, to an amount measured by the actual damage suffered? In reply to the first question, the attorneys for the Moffat Coal Co. contend that "neither the Commission itself nor any party complaining to the commission, in any of the almost numberless cases which have arisen and have been dealt with in that long period, has attempted to join as defendant any party other than a common carrier subject to the Interstate Commerce Act." They also contend that the commission is without power to award reparation in cars. One of the requests of the complainants was for an order requiring the carrier in future periods of car shortage to make up to the complainant coal companies the deficiency in cars resulting from the past acts complained of and that such shortage in car distribution to the complainants' mines be made up at approximately the same daily rate at which the shortage accrued from Aug. 1, 1922.

Due almost entirely to reductions in freight rates, made both voluntarily and by order of the Interstate Commerce Commission, the freight bill of the people of this country was approximately \$431,000,000 less during the first eight months this year than it would have been if the rates existing during the corresponding period in 1921 had remained in effect. Compared with the rates in effect during the first eight months of 1922, the freight bill this year represents a reduction of approximately \$282,750,000 due to the voluntary reduction on agricultural products that became effective on Jan. 1, 1922, to the general rate reduction of 10 per cent effective on July 1, 1922, and to a number of individual readjustments in freight rates. These estimates, which are made by the Bureau of Railway Economics from reports filed by the carriers with the Interstate Commerce Commission, are based on the freight traffic transported by the carriers from Jan. 1 this year to Sept. 1, which has been the heaviest in history.

Interstate Commerce Commission Examiner Paul Carter in a tentative report to the commission, states that there is no evidence that the rates on bituminous coal from mines adjacent to the line of the Chicago, Burlington & Quincy R.R. in the vicinity of Canton, Ill., were discriminatory against interstate commerce between Jan. 11, 1921, and April 18, 1922. The complaint in this case was brought by the International Harvester Co. and the Canton Gas & Electric Co. The complaint raised the question of the jurisdiction of the Interstate Commerce Commission. He recommends, however, that the commission modify its former order to the extent of permitting these rates to be reduced to a 60c. basis for the period mentioned.

The rules, regulations and practices relating to the weighing and reweighing

of anthracite and bituminous coal and coke are not unreasonable, the Interstate Commerce Commission has ruled in a formal opinion in the case brought by the National Retail Coal Merchants' Association against the sixteen railroad companies operating in trunk line and New England territories. The association asked the commission to prescribe rules which would provide that a shipper may be required to pay freight only upon the actual, accurate weight of the shipment; that he is entitled to a reweight upon request; and is entitled to show by reweighing, or by some other means, that the weight sought to be used is erroneous; that where a shipper requests the reweight of a shipment, and the reweighing shows error beyond the limit of tolerance fixed, (a) no charge shall be made for the reweighing service; and (b) freight charges shall be collected on the corrected weight, only, and that the total tolerance, for all purposes, should not exceed 1 per cent of the original weight, minimum 500 lb. In dismissing the complaint, the commission rather rebuked the association for not having introduced evidence to support its contentions. "As a basis for the entry of an order directing changes in the tariffs and practices of carriers," says the opinion, "we must have some reasonable ground upon which we can be satisfied that the law is being violated." The commission picks up language quoted in a previous opinion as follows: "The case seems to have been thrown together as if the commission needed only to have the opportunity presented to it in order to take favorable action. But we are administering this law upon no such basis. We are authorized under the act to order a reduction in rates only when it is made to appear that they are unjust, or unreasonable, or unjustly discriminatory, or unduly preferential. Complainants must therefore prove the issues that they raise by competent testimony or make out a prima facie case sufficiently clear and strong to require the commission in the public interest to enter upon an investigation of its own to ascertain the merits of the complaint."

Cameron Coal Co., Carbon Fuel Co., Independent Coal & Coke Co., Spring Canyon Coal Co., Peerless Coal Co. and Standard Coal Co., all of Utah, have appealed to the Interstate Commerce Commission for a rehearing in the Western Coal Rates case, in so far as they affect rates from Utah and southern Wyoming mines. The operators desire to present further evidence with respect to the disposition and distribution of coal from Utah and southern Wyoming mines and with respect to the relative operating conditions encountered by railroads in the movement of coal from their mines. They point out that these companies have an aggregate investment in coal properties of \$12,200,000. These investments, it is contended, were made dependent, to a considerable extent, upon the 25c. differential fixed by the commission, with the expectation that the differential would be reduced, if not removed entirely. A differential of 50c. against Utah coal in favor of Rock Spring coal on traffic destined to points beyond Pocatello will have the effect of decreasing the movement of Utah coal to that destination territory, it is argued, thereby greatly depreciating the investments of the Utah operators. The slack content of Utah coal is from 33 to 35 per cent, it is pointed out. Utah slack in considerable quantities has moved to points north and west of McCammon, Idaho, under a differential of 25c. A 50c. differential will make it utterly impossible to ship Utah slack to that territory. Since decreased production results in increased operating costs, the establishment of the 50c. differential, it is contended, will inevitably result in increased prices of coal to the Western consuming public. The increasing of the differentials against Utah mines is held to be unwarranted and unjustifiable.

Coming Meetings

Illinois Mining Institute. Annual meeting Nov. 24, Springfield, Ill. Secretary, Martin Bolt, Springfield, Ill.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

West Virginia Coal Mining Institute. Annual meeting Dec. 4 and 5, 1923, Huntington, West Va. Secretary, R. E. Sherwood, Charleston, West Va.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, NOVEMBER 29, 1923

Number 22

The Virginian Case

THE Interstate Commerce Commission is expected to reverse itself in the matter of the application of the Virginian Railway for authority to extend trackage to one of the new mines of the Pocahontas Fuel Co. Even those who want to see overdevelopment halted by denying trackage extensions will admit that the Commission could not have selected a more unfortunate instance in which to test the theory. In normal years the Virginian is able to supply practically all of the cars that can be utilized. The period in 1922 cited by the Commission during which the mines on that line had an inadequate car supply was abnormal because of the coal strike and shopmen's strike then in progress. The railroad company has been making an effort to meet the requirements of the mines on its line. More than \$13,000,000 will be expended on the electrification of 134 miles of its line, while more than \$3,000,000 is being expended in increasing its coal-handling facilities. These expenditures would not be justified were there to be uncertainty as to the rate at which coal-mining expansion would be allowed.

The whole question of throttling coal-mine development by denial of transportation is before the government now. The U. S. Coal Commission declared in one report that the distribution of coal "must be free and untrammelled," that there should be no discrimination, such as by assigned cars. The Transportation Act clearly places on the Interstate Commerce Commission the responsibility of holding railroad expansion within certain limits. What is in controversy here is not the authority but its application. That, it appears, is in a fair way of correction in this instance. The unsettling aspect, however, is the readiness, the unseemly haste, with which the Commerce Commission resorted to the exercise of this power in controlling the coal mines. Fired with the zeal of a crusader, eager to grapple with this giant of overdevelopment, the Commission assumed a position that it will be forced to abandon.

The Real Cloud

THE officers of the United Mine Workers would doubtless be happy indeed if they could today sign up a two-year renewal of the soft-coal contract that expires next April 1. Likewise the union operators, no matter how hard pressed they are now for orders to keep their mines running, would prefer such an arrangement, since the alternative is a strike. Now when both parties are of mind what is to prevent the happy consummation?

In the first place, John L. Lewis and his lieutenants must sell to the bituminous-coal workers the idea that two more years at the present scale is the best thing for them. He must sell it to men who have seen how easily the anthracite workers got their 10-per cent

increase in wages by playing into Pinchot's political campaign.

The soft-coal operators, being unorganized, are drifting into two camps: Those whose mines are idle or soon will be and who therefore would expect to profit by a prolonged strike, and those who, convinced that a wage reduction is out of the question next year, desire nothing more than to have uninterrupted operation. The large companies are all in this class. They can hold the others in line, barring outside interference.

The real cloud on the horizon is not a disagreement between union mine labor and operators; it is the warfare between the non-union operators and the union. To keep the union out of West Virginia the operators there have been aggressive in campaigns against the organization. They have led the fight against the check-off. Now the Lewis men fear that the hoped-for peace and tranquillity of their coming joint sessions will be disrupted by demands for abolition of the check-off. They are blaming the generation of this feeling on the non-union influence in the National Coal Association. Union operators also are saying that the persistent propaganda of the past year on "violence" has been driving a wedge between them and the organized workers.

One wonders then at the outburst of Frank Keeney, union organizer and local president, this week. Speaking as the captain of a loyal but decreasing band of union mine workers in West Virginia, he sounds his battle cry: The United Mine Workers has money and will assault the West Virginia stronghold this coming year. West Virginia operators always rally to such a challenge and the trouble starts anew. Mr. Lewis is the big boss; does he desire peace? Is this the way to promote harmony?

Selling Ford Coal

HENRY FORD is now a regular coal operator. He has a string of mines and is grappling with the production and marketing problems that beset the ordinary mortal who engages in this fascinating business. He has found that his mine capacity is greater than his immediate plant requirements and he is seeking to get rid of his surplus, for he, as have others, learns that part-time mine operation adds to cost.

Mr. Ford would eliminate fluctuations in coal prices and irregularities in production—for his friends and his mines. There are said to be around 300 concerns manufacturing parts for his car and he is taking a paternal interest in their coal supply. Not so long ago he sent to each of these 300 a questionnaire concerning their coal supply and their fuel requirements. If he can contract to furnish them all with coal as he in turn buys their products, he can make his coal-mining ventures successful and at the same time help these sundry manufacturers to have a steady fuel sup-

ply. As a coal operator Mr. Ford is animated by the same motives that govern every well-managed coal operation.

The difficulty he finds is that common to the trade—the coal consumers are not all far seeing, for some have indicated to him that his all-the-year-around price is much above what coal is now selling for on the spot market and that they are buying at the lowest price. He has the advantage, however, that falls to any consumer-operator of dictating, to some extent at least, to those who burn coal and sell to him. For instance, this fall one large concern that sells to the Ford plant a large part of its requirements in a certain line found, one morning, several hundred cars of coal at the gate. Mr. Ford had shipped them, invoice to follow. What had been a competitive market for the commercial operator became a forced outlet for surplus Ford coal.

As a coal producer, Henry Ford has yet to make his mark, but as a coal seller he has mastered the fundamentals.

Let the Railroads Pay the Bill

ONE of the principal duties of a chief executive in this nation of ours is to satisfy the voters—the most numerous class of voters, of course. In politics we are no longer concerned with minorities. In this country we should do as was customary at the hustings in England years ago. Dickens records Mr. Pickwick as going to a political gathering and advising his little band of followers, "Shout with the mob." Mr. Snodgrass replied, "But where there are two mobs?" Whereupon Mr. Pickwick said, "Shout with the largest." Our chief executive follows the advice of Mr. Pickwick. He also shouts with the crowd, for the voice of the President always is heard whether raised or lowered.

On Oct. 16 the President urged the chief executive of the Pennsylvania Railroad, Mr. Rea, and through him sought to influence the presidents of the coal-carrying railroads, to lower the freight rates on anthracite, not so much because domestic-coal rates are too high but because they are higher than export rates to Canada. It is hardly necessary to say that if domestic freights are too high they should be lowered and that it is an excusable point of view to hold that our own citizens should not have to pay a higher freight rate than Canadians. All this is obvious.

But at the same conference, and as it were in the same breath, the President asked the railroads to let American wheat be delivered to foreigners at a lower rate than to citizens of the United States. How is it that it is all wrong to let foreigners have a lower freight rate when coal is concerned and all right when wheat is to be shipped?

Let us suppose the railroads concede a lower rate on wheat to foreigners. What is to protect the roads when the consumer discovers that he is paying a higher rate? Will he not argue with wheat as the President is now arguing with coal, that the domestic freight rate should be the same as the export, and leave the railroads with a lower rate on wheat all around?

The railroad executives have made dignified and sufficient answer. They have advised the President that they cannot offhand concede the lower rates on grain, and that furthermore they doubt the efficacy of such a remedy, inasmuch as foreign farmers would meet their cut. The matter is to be investigated by the Interstate Commerce Commission. As to anthracite the answer

is obvious; the Coal Commission asked, and the Commerce Commission has initiated an investigation covering these rates. It is now in progress. We do not know what will happen to the grain rates but we are willing to venture the surmise that as to hard coal the final decision will parallel that of 1915. Some, possibly many, individual rates will be adjusted, but the rate level will be undisturbed.

The railroads are not yet in position to reduce freight rates generally, though they are making progress in that direction. That the Interstate Commerce Commission has just refused to open its grain case to all basic commodities is evidence of the situation.

But the President is right; it is good diplomacy to side with the larger number of voters—with the consumer as to coal, with the farmer as to wheat.

The Four-a-week Mind May Change

THERE is constant proof that coal miners' wages need no increase provided there are few enough mines and miners to justify regular operation. Only last month two loaders in an Indiana mine drew \$500 apiece. And in one particularly propitious day this pair loaded out 38 tons per man. In another mine in that state it is not uncommon for loaders to make more than \$400 a month.

This sort of thing occurs in these days of flat markets only in mines fortunately situated as to disposition of output. In most union regions such performance of miners is known to be invariably broken by layoffs and petty strikes, as at the Brewerton Coal Co. mine at Lincoln, Ill. There, because of an excellent railroad contract for engine fuel, the mine operated continuously all summer while many neighboring operations were lucky to get two days a week. Four months of this produced the inevitable result—the men, yearning for a vacation, struck because the check weighman objected one morning to a new housing around the beam of an automatic recording scale. It is an old, old story to union field operators. When a mine exceeds four days a week regularly—look out.

Harassing to mine owners though this four-days-a-week psychology of miners may be at times, it at least has the virtue of hastening the day of complete machine mining and loading. When that day arrives the \$500 a month that is excessive pay to an underground laborer now will be a good payroll investment if it goes to a machine operator who gets maximum service out of his machine. Loader operation should naturally gravitate into the hands of men of an intelligence superior to the four-a-week mental process. It is thus easy to be optimistic for the future even in the face of present discouragement.

THAT BRIGHT SCHEME for pumping screenings direct from the tipples 15 miles into St. Louis would be fine for Standard district producers except for one trifling obstacle: They have freight ills and coal mines and power and pipe lines, but yes, they have no water.

ORIGINAL CENSUS RETURNS analyzed by the Coal Commission showed coal-mine operatives in every state Jan. 1, 1920. Florida had 24, but no coal mines, so they must have been at Palm Beach. But how did New York register 299 coal miners, unless they were Greenwich Village miners?



Tipple of Mines Nos. 1 and 2, Phelps Dodge Corporation at Dawson, N. M.

Run Mines on Batteries? Every Wire May Be Removed At Dawson to Prevent Explosions

Phelps Dodge Corporation Tries Out Big 80-Cell Units for Haulage and Cutting—Adobe Dust, Water and Education Do Their Parts in Redoubled Safety Campaign at Stag Canyon Operations

WHEN a single electric arc in a coal mine kills 122 miners in one fatal burst of unbridled energy it is time to eliminate arcs, even at the cost of heroic methods. The Phelps Dodge Corporation, which operates six mines at Dawson, in the Stag Canyon region of New Mexico, is hunting for such methods. For one thing it has practically decided to remove every wire from every mine. This means operating the mines on storage batteries from slope mouths to room faces, with consequent engineering problems galore. But possibly it can be done. The company proposes to find out.

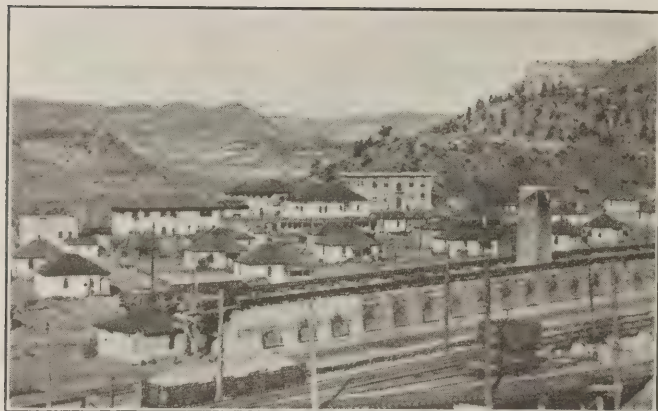
Also, it is applying every other method it can devise or discover to increase the factor of safety in its mines, even though they already have been provided for years with safeguards of the most rigorous kind. The precautions it had taken did not serve to prevent the explosion of Feb. 8, 1923, which killed the 122 men. A runaway load on the main slope knocked down haulageway timbers. This dropped a feeder power line onto the steel car, forming an arc which ignited coal dust. The aftershock of the explosion was felt almost as keenly by the company as by the bereft relatives. So "Safety—whatever the cost" is now the company's motto.

Eliminating wires from the Stag Canyon mines means putting all haulage and cutting on storage batteries. If mechanical loaders are installed, they too, of course, must operate on batteries. Storage-battery locomotives already have been used for some of the

gathering in the mines of the Stag Canyon group. The first move now is to install battery locomotives on main haulageways. This experiment is to be made first in No. 6 mine, where there is a 6,000-ft. main haul. Later it is to be introduced into the other mines, until the system is perfected for the whole group.

The preliminary order is for two 15-ton locomotives to be run singly or in tandem. The standard battery unit will be of 80 cells mounted on a four-wheel truck. When operated in tandem, two of these will constitute a locomotive 16 ft. 6 in. long, 57 in. high and 68 in. wide, which are approximately the dimensions of the heavy locomotives now being used for main haulage. The charge in each unit will be freshened each time the locomotive reaches the outside, which on an average will be once every hour. Complete charging can be done at nights.

To operate cutting machines, standard battery units can be assembled close to each machine in whatever numbers are necessary, though it is possible that one will serve each cutter. Most cutters now require about 50 hp. for efficient operation. As the battery units are large and as it is proposed to discharge them at nine times and to charge them at six times their rating, it is hoped that the standard units will deliver enough power to run the underground machinery successfully and that the time consumed in charging and moving batteries will not seriously reduce their efficiency. The life of batteries under such strenuous usage remains to be proved—a reason for proceeding with caution.



GENERAL OFFICES, HOSPITAL AND DISPENSARY

W. D. Brennan, the general manager, has much confidence in storage batteries and has already done some pioneering with them for coal-mine use. He thinks it is possible for a mine to operate its underground works entirely on batteries and to charge at night when the load at a central station is light, buying electricity for night charging accordingly at a most favorable rate and being enabled to reduce by 75 per cent the capacity of its own power plant. In consequence the generally prophesied increase in power costs by the use of batteries may be largely counterbalanced at the Dawson mines by economies, not only in the plant but in transmission, mine accidents being reduced at the same time.

Other steps have already been taken in the Phelps Dodge mines to raise the safety factor. Adobe-dust barriers of the trough type have been installed at intervals in main and side entries. Also the practice of spreading adobe on floors along particularly dusty 1,000-ft. stretches of haulageway has been adopted. Non-inflammable dirt of this character can be obtained at the surface for the cost and trouble of loading it into cars, running it into the mine and distributing it.

The roadway to be treated is first cleaned of loose coal. Then about 3 in. of adobe ranging from coarse to 100-mesh is shoveled over the exposed surface. Once a month men with rakes go over it, working the inflammable coal dust safely down into it. Eventually the percentage of coal in the floor dust becomes so high that it is thought well to clean the roadway of the mingled coal and adobe, and another layer of the non-inflammable dust is spread. This is considered good protection against dust explosions in mines such as these, where dust is a real and constant menace.

Water always has been liberally used in the Dawson mines. It is piped to every room and used to wash

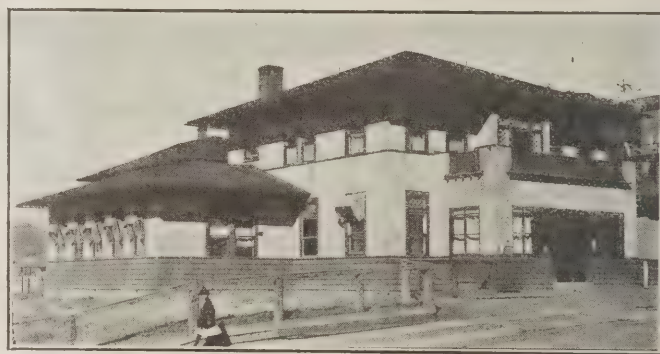


PHELPS DODGE CORPORATION'S STORE AND HOTEL

down entries. But since the explosion additional use is made of water. All outgoing coal is wetted thoroughly with it. Sprinklers have been installed at both the first and last partings so that whereas coal used to be moistened only on its way out it now is drenched, not once but twice.

For years the company has worked hard at promoting safety, believing that the safety spirit, if it is to be effective, must be actively shown by everyone from the highest official all the way down to the least important employee. W. F. Murray, safety engineer for the company, told the Rocky Mountain Coal Mining Institute something about the safety work at the Dawson mines in an address at a recent meeting. A part of his paper follows:

"Under the system in operation at the Dawson mines a safety engineer is provided to insist on compliance with the rules established to promote safety and to see that all safety equipment is kept in efficient working order. At least once a month the safety engineer, in company with a safety committee consisting of a miner, a company man and the mine foreman, makes an inspection of the working parts of all the mines to ascertain whether conditions are such as to assure safety



HOSPITAL OF PHELPS DODGE CORPORATION

He makes a formal report as to his findings to the manager.

"As is usually the case, men on these safety committees after having gone through the mines to examine other men's places are careful to keep their own working places in such good condition that the men following them will not find that they themselves have neglected to make their places safe.

"It is indispensable that the mine foreman believe in the value of these committees and that he realize that the committee is not there to criticize his work but rather for the purpose of assisting him in presenting to the uninstructed or careless workman by practical suggestions the manner in which the greatest degree of safety can be attained.

"As is the case in this day and age, the majority of workmen in the mines are composed of those whose education has been neglected and whose experience in the mines is limited, and in a great many cases accidents which have occurred to these men may be traced to the fact that they were not fully instructed as to the proper method of performing certain of their duties or that the instructions were not understood. It is to this class of workmen that the safety committees pay special attention. The proper methods of erecting timbers, placing cap pieces, drilling shotholes, spragging coal, blocking cars, etc., are explained. As the majority of people are susceptible to criticism, much efficient

work can be accomplished if care is taken to show the workman that his work is not being criticized for any other purpose than to reduce his liability to injury.

"At the Dawson mines, for the information and guidance of the new employee, the company gives him a set of published rules, printed in the various languages used by the several nationalities employed at the mines. These describe the safety rules in effect at that operation. They not only cover the duties which the miner must observe under given conditions but they describe also the special duties of the mine foreman, fireboss, shotfirer, timberman, trackman, drivers, motorman, nippers, fan attendants, and tippelmen. Each man entering employment for the first time also is given a copy of the state mining laws.

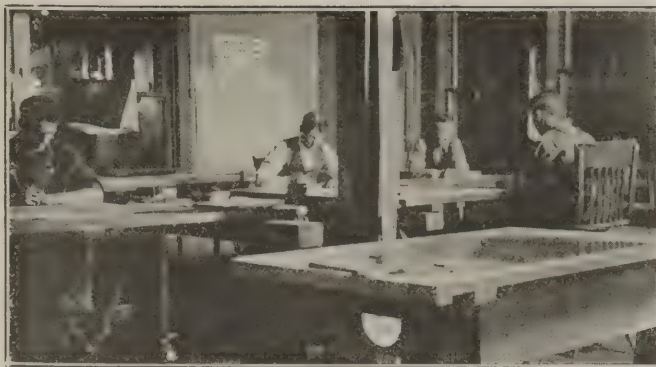
"Free picture shows, at which are displayed the safety films furnished by the Bureau of Mines, are employed to portray through the effective medium of the eye those safety truths that might otherwise never reach the heedless or illiterate miner. Throughout the mines safety signs and slogans are posted in conspicuous places to recall to the miner his constant exposure to danger and to keep him alert to its presence.

"Somewhat of an innovation has been made in teaching the lessons of safety by introducing them into an annual Community Night program. Community night is an evening set apart for the social enjoyment of the miner and his family. The program for last year was presented in the form of a vaudeville show, the five members of the safety department who took part in an act being starred as the 'Black Diamond Quintet.'

"In this act, a rescue team with complete equipment entered the darkened stage and demonstrated the rescue of a miner overcome with gas. Immediately following this demonstration a short talk was made relative to the use of the apparatus, its method of operation, and other points of interest. In this manner the interest of the miners' wives and families in the safety movement was aroused.

"Posted in a conspicuous place under glass cover at each check cabin of the mines is a large blueprint showing a graphic representation of nine 'thermometers,' representing the nine Dawson mines, upon which are designated by means of a graduated scale the number of serious accidents occurring at each mine during each month of the year. Beginning with the month of January, the red line which simulates mercury climbs one degree for each serious accident. At the end of the year the total record for each mine for the twelve months is graphically shown, month by month.

"For the purpose of registration and comparison, a serious accident is considered to be one which prevents resumption of work in less than 14 days. Fatal



FEDERAL VOCATIONAL COURSES—MECHANICAL DRAWING

accidents are included in this class. The period of disablement starts the moment the accident occurs and ceases the moment the workman is released by the doctor for return to work.

"The story told by the thermometers is visual and readily understood, provoking at least some reflection on the part of the miner who studies it. Twice daily as the miner calls for and returns his check, that constant reminder stares him in the face and draws to his attention the fact that the price of his safety is constant vigilance.

"Undoubtedly, the greatest value of this device as an incentive to safety is the opportunity it affords the miner and mine foreman for making a ready comparison between the number of accidents happening in his own mine and those occurring in the other eight. It stimulates in them both, an instant and natural desire that the mine in which they work shall have the reputation of recording the smallest number of accidents.

"Believing education to be an important asset to the welfare of a mining community, classes in mining science have been conducted under the supervision of the Federal Board for Vocational Education. These were started in September, 1919. Classes were also organized in mechanical, architectural and electrical drawing.

"In conformity with the vocational-board ruling, classes in mining are limited to underground men. These restrictions do not apply to the drawing classes. Anyone working in and around the mines is eligible to receive instruction in this training.

"As the instruction is free, men from all classes and drawn from all countries are enrolled. During the past year the nationalities represented were: American, Scotch, Welsh, Mexican, Italian, and Slavish and consisted of miners, drivers, motormen, nippers, track-



CLASS IN COAL MINING IN PUBLIC SCHOOL



WHERE MEN ARE TRAINED IN RESCUE WORK

layers, shotfirers and firebosses. Classes are held in the afternoon for the men working at night and in the evening for the men on the day shift. The ages of those enrolled range from twenty to forty-two years.

"The subjects taught consist of the following: Mining arithmetic, mine gases, mine ventilation, safety lamps, timbering, and shotfiring. Safety ideas are incorporated in the teaching of the various subjects, and the state mining laws are discussed.

"These classes are held for a term of nine months, at the end of which examinations to determine the students' proficiency are held, and the successful candidates are given a certificate issued by the state board for vocational education. During the past term fifty-three men were enrolled in these classes.

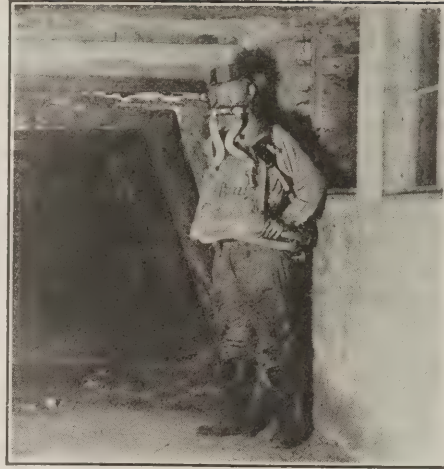
"The work of instruction is encouraged by the management in every way, the training station and its conveniences being freely offered for its use, books and periodicals being supplied and opportunities offered for practical demonstration.

"Realizing that the workman born in a foreign country, in order to become more efficient in his work and follow the ordinary rules of safety, as well as become a good American citizen, must know and understand the English language, the Phelps Dodge Corporation has for the past three years conducted night schools in all four of the Dawson school buildings. From a safety point of view the work is helpful, because the men learn to read well enough to understand the different safety and danger signs. They acquire enough English in a short time to enable them to understand and appreciate lectures on first-aid and safety precautions.

"A well-equipped training station, unique in some of its features, has been built and maintained solely for the use of the safety department. This two-story cement-block building was completed in 1910 and accommodates on its second floor a commodious first-aid and class room, the safety engineer's office and a reading room. The lower floor contains a storeroom, apparatus room, furnace and training gallery. Leading from the back of the training station into the side of the mountain, against which the training station is built, a training gallery has been driven. This gallery duplicates in construction a double entry underground and contains the features found in an ordinary mine.

"Classes in the use and care of oxygen breathing apparatus are conducted twice a week. One class meets during the day for the benefit of those working at night and another class meets in the evening for those who work during the day.

"The candidate for mine-rescue work must undergo



SMOKE CHAMBER, TRAINING STATION

a thorough physical examination. Before he is permitted to wear a machine he must familiarize himself with the apparatus, be able to designate the different parts, assemble them and test the machine. He is then required to wear the apparatus in normal air for a time, after which he is ready to enter the training

gallery, with its formaldehyde fumes. Here he is compelled to crawl over and under imposed obstructions, arranged as in a wrecked mine, and to work with various tools, setting timbers, etc. In this training, emphasis is placed on work such as would have to be done during a mine fire or explosion.

"After completing fifty hours' training with the use of the apparatus and having completed a satisfactory examination, the student is then considered thoroughly adjusted to the use of the apparatus and is given a certificate from the company, indicating that he is a trained man qualified to use and care for mine-rescue equipment."

Washery Water Improves Farm Lands

THREATENED with a suit by farmers and others for having destroyed the quality of the land, the Galloway Coal Co., of Holly Grove, Ala., induced the Department of Agronomy of the Alabama Agricultural Experiment Station at Auburn, Ala., to test the effect of the mine and washer water on the soil thus alleged to have been destroyed.

This was done by growing corn and velvet beans in it and supplying them with distilled water, water from the Auburn mains, water from the "contaminated" Lost Creek and from the Galloway washer. Five samples each of 300 lb. of soil from five different farms were used and several gallons of the different kinds of water. A fifth test was made by adding acid phosphate as a fertilizer to the various waters. Better growth was obtained with the creek and coal-washer water than with the distilled and Auburn water, and still better success with water containing acid phosphate.

The department offers to make a test next spring on a farm along Lost Creek to show that if the soil is fed with fertilizer supplied by the department much can be done with it and that the coal-washer water will aid in the stimulation of the ground. The conclusions of the Auburn Experimental Station were: That water from Lost Creek or from the coal washer at Mine No. 15 of the Galloway Coal Co. is not toxic to corn in sand or water cultures, nor to velvet beans in water cultures; that neither contains anything that would injure the growth of corn on lands flooded by Lost Creek and that these waters contain a small quantity of plant food in solution but not enough to be of benefit to the growth of corn in land thus flooded.



RESCUE MEN READY FOR UNDERGROUND TRAINING

Illumination by Light Projectors at Coal Mines

Need for Greater Application of Advanced Principles
in Correct Illumination—Hazards of Poor Lighting—
Function of the Reflector—Focusing the Headlight

BY EDGAR GEALY

Electrical Engineer; Associate Editor, *Coal Age*

BECAUSE of the very nature, location and processes through which its product must pass before being placed on the market a coal mine always suggests a black, dark place. Therefore it is natural to conclude that the coal mine is a field where the theory and ideas of illumination and light projection have been carefully applied. However, this is not the case; in fact, generally speaking, the coal field is a region not so well illuminated as one would expect.

Much has been done of late in the way of proper illumination in stores, factories and homes. It has been conclusively proved that improper illumination produces eyestrain, fatigue, cuts down production and increases accidents.

Then again, large savings in lamp costs, labor charges and power consumption are possible by the use of proper reflectors. In many mines and around mine properties it is an uncommon sight to see large candle-power lamps hanging without reflectors. In hoist rooms much can be done to decrease the liability of accident by the use of angle-type reflectors.

Perhaps the most necessary place for proper illumination is at the foot of the shaft or at a caging level. Here it is highly desirable to have efficient lighting units because it is the heart of the transportation system and delay here due to loss of light, insufficient light, or accident cuts down the output. For these reasons lights should be carefully located and provided with reflectors to direct the light not onto the top of the car, where it is useless, but between the double tracks, where used, and on the sides where the wheels can be seen so that the cars may be properly handled and controlled.

In the main haulage roads, gangways and entries lights should have reflectors so as to properly illuminate the roads and track and not the roof, where most of the light usually is wasted.

Light projection by means of reflectors also finds its place on the outside property of the mines for protection purposes and inside the mines on the locomotives of the haulage system. It is this phase of illumination which most interests us at this time.

Much of the efficiency of a light source is frequently lost because of a lack of understanding of the proper focusing of lights. This is not only true of mine locomotive headlights but also of automobile headlights and light projectors used for property protection and other special purposes. The result is that lamps of much larger size than is necessary are used for certain desired effects.

Light projection, as the term is commonly employed, covers the redirection of light flux emanating from an artificial source by means of suitable optical systems so that it may be utilized within solid angles which are small as compared with those encountered in equipment for general illumination purposes.

Two general classes of apparatus are used to direct the flux from a source into the desired small angle: Opaque reflector systems controlling the light by the principle of specular reflection, and lens systems depending upon the refractive properties of glass. It is the first of these classes which is involved in headlight reflection.

All light sources may logically be broadly classed under three heads: Point sources, line sources, and large sources, i.e., sources having length and breadth, or length, breadth and thickness.

Polished metal and mirrored surfaces reflect light rays in such a way that the angle of incidence is equal to the angle of reflection. The shape of a parabolic reflecting surface is such that all light rays which are parallel to the principal axis and which strike the surface are reflected to a common point on the principal axis, called a focus. If a point light source is located

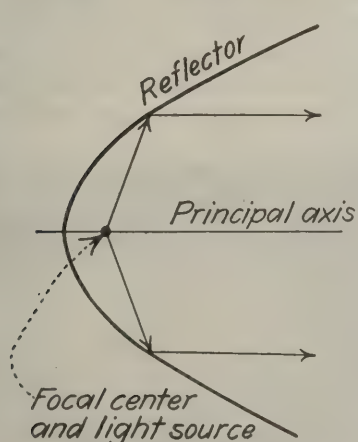


FIG. 1—LIGHT SOURCE AT FOCAL CENTER

The light rays are parallel to the principal axis and produce a long, narrow beam.

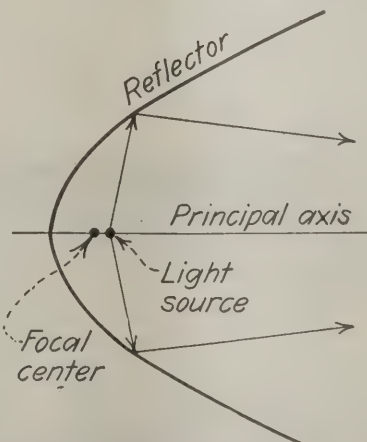


FIG. 2—LIGHT SOURCE AHEAD OF FOCAL CENTER

The light rays converge to the principal axis, then diverge and produce a broad cone of light.

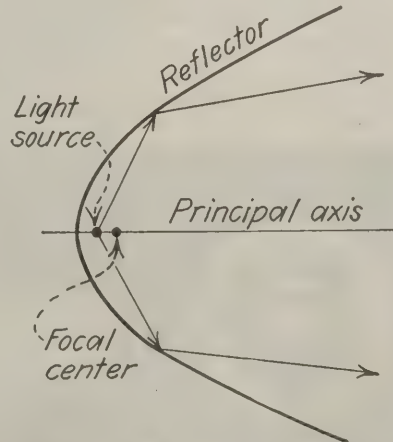


FIG. 3—LIGHT SOURCE BEHIND FOCAL CENTER

The rays diverge and produce a broad cone with a dark spot around the principal axis.

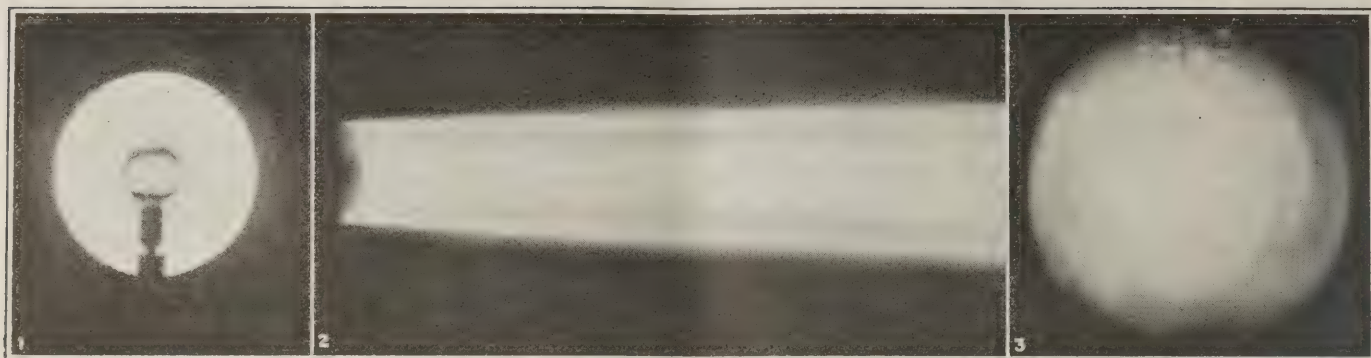


FIG. 4—LIGHT SOURCE AT FOCAL CENTER

Courtesy Crouse-Hinds Co.

The reflector is completely illuminated, the beam is intense and narrow, the light spot is uniform.

at the focus of a parabolic reflector, the converse holds true—that is, all the rays from the focus which strike the surface are reflected forward, parallel to the principal axis in a uniform beam.

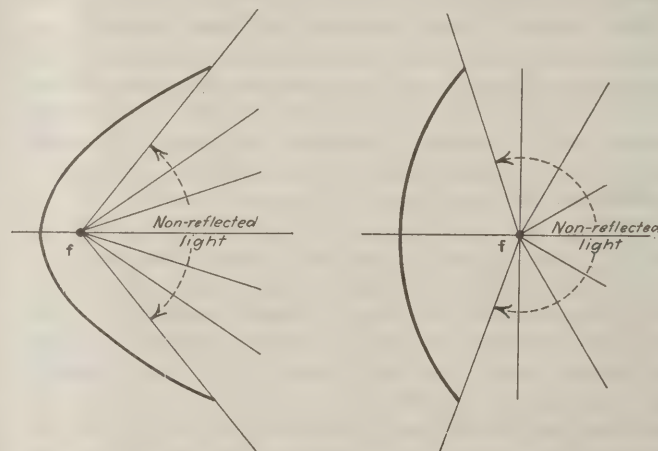
The effects produced by a point light source in these positions along the principal axis of a parabolic reflector are shown in Figs. 1, 2 and 3. It will be seen in Fig. 1 that the source at the focal center results in a parallel beam, and the source in front of the focal point, Fig. 2, causes the light rays to converge, cross and later diverge; Fig. 3 shows that the source between the surface and the focal center results in a divergent beam. A line source lying in the principal axis and extending behind and in front of the focal point would produce these three conditions together, with the result that a very irregular light distribution would result.

It should be borne in mind, of course, that no matter where the source is located, the light emitted within the solid angle determined by the rim of the reflector and the source does not strike the reflecting surface at all and is therefore distributed as a broad cone, useful for illuminating nearby objects outside the path of the beam, but contributing only very slightly to the intensity of the beam itself. Referring to Figs. 5 and 6 it will be seen that of two reflectors of the same diameter, the one with the shorter focal length will reflect the greater volume of light.

From the foregoing it is apparent that a light source for projection work in general should be of small dimension. Other features to be considered are high intensity, convenience, interchangeability, dependability, steadiness of the light, economy, and safety.

Two sources of light for projection purposes are in extended use: arc lamps and mazda concentrated-filament lamps. Arc lamps emit their light from a very small source of extremely high intensity. Direct-cur-

rent arcs are more efficient than alternating-current arcs because most of their light is emitted from the permanent crater which is formed in the end of the positive carbon, and a considerable part of the light from the crater may be directly utilized. Arc lights usually are supplied with a resistance or reactance to give stability of operation. Mazda-lamps admirably meet the requirements of projection sources and because



FIGS. 5 AND 6—PROPORTION OF REFLECTED LIGHT

These two reflectors are of the same diameter yet the one on the left reflects a greater proportion of the light because it has a shorter focal center.

of their simplicity, convenience, and the fact that they may be obtained with filaments either condensed or well spread out, they are particularly adapted for projectors such as locomotive headlights, spotlights, etc.

In mining service nearly all types of equipment must withstand severe conditions and this is especially true with headlight equipment. Mining service is divided into two main classes, gathering service and main haulage. As gathering service usually is slow and fre-

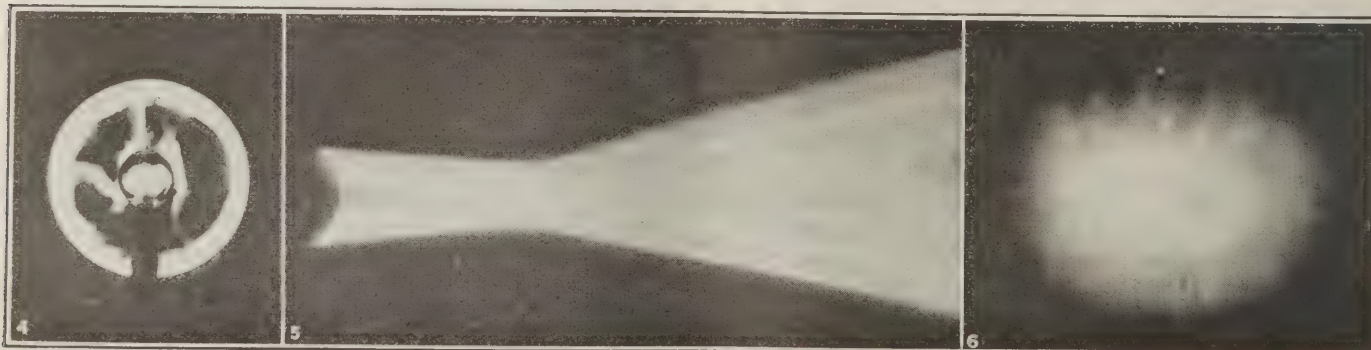


FIG. 7—LIGHT SOURCE AHEAD OF FOCAL CENTER

Courtesy Crouse-Hinds Co.

The reflector is dark behind the rim, the beam is broad and the light spot is irregular.

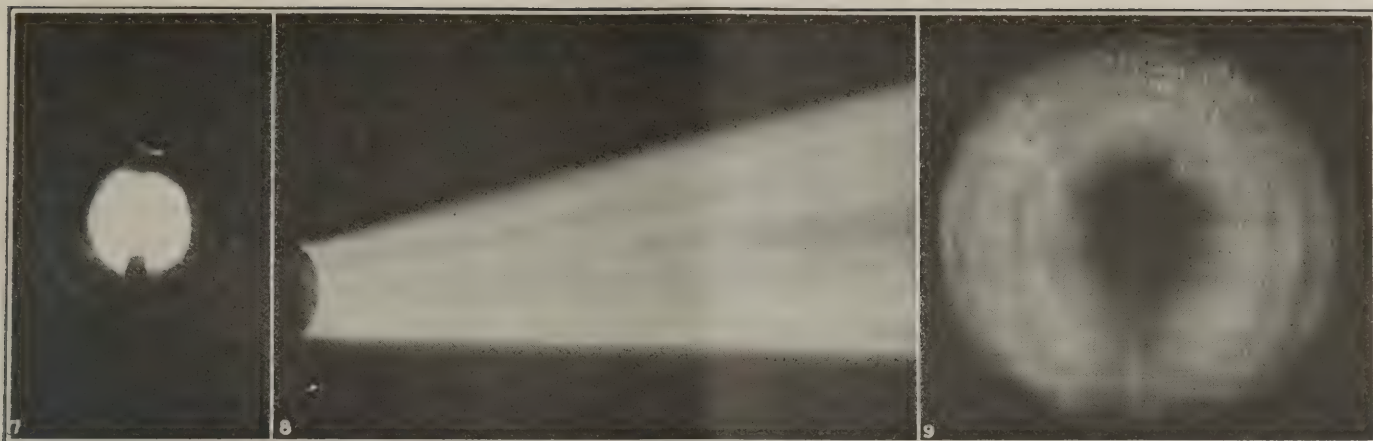


FIG. 8—LIGHT SOURCE BEHIND FOCAL CENTER

Courtesy Crouse-Hinds Co.

The reflector is dark at the rim, the beam is broad and the light spot is dark at the center.

quently on very irregular and curved track, too strong a light is objectionable on account of its dazzling the eye. A long projected light beam is seldom required either, yet there should be sufficient light cast over a broad area for coupling and switching. Main haulage service is at greater speed and usually on straight road, therefore the light beam should be long and more intense so as to sufficiently illuminate the haulageway well in advance of the locomotive.

Where the trolley voltage varies over wide ranges the arc headlight will be found to operate much better than incandescent lamps, which as a class are very susceptible to fluctuations of voltage. Under-voltage materially reduces the illumination while over-voltage generally reduces the life of incandescent lamps.

The selection of a headlight lamp for mining incandescent headlights is therefore one requiring much consideration if the best results in illumination, efficiency, and economy are to be realized. From the very nature

of the work of the gathering locomotive regular filament lamps may be used with success because the light source is not concentrated and the result is that a broader cone of light is obtained. On main haulage motors it is desirable to use a concentrated filament or focus type lamp.

An important consideration in connection with the selection of any incandescent lamp is that the lower voltage lamps give best results. High-voltage lamps are not nearly as reliable nor as efficient as 110 to 125-volt lamps, because the filaments of the higher voltage lamps are made of a longer, finer wire than the lower voltage lamps and therefore cannot be wound in as small a space. Lamps of low voltage are wound with a short, heavy wire, which can be concentrated in a smaller space and which will withstand vibration better than the higher voltage lamps. As a matter of economy it is desirable to adopt a lamp of low yet popular voltage. For this reason some com-



FIG. 11

Main-Haulage Road Illumination

Obstructions and switch locations must be spotted well in advance of a fast moving main-haulage locomotive. For these reasons the headlight beam should be narrow and more intense than on the gathering locomotive.

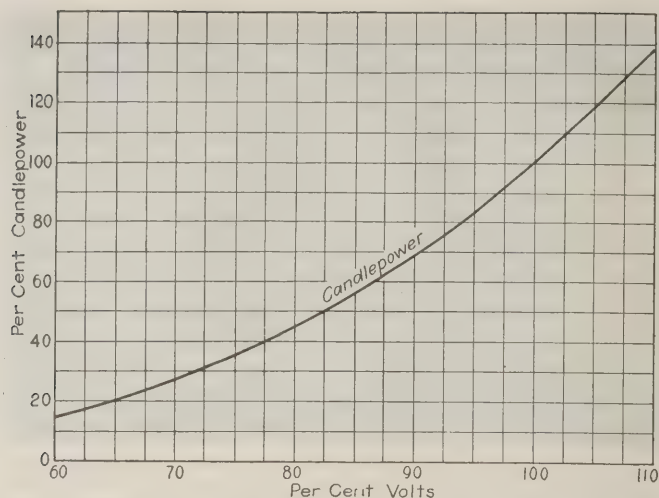


FIG. 9—CURVE SHOWING LOSS OF CANDLE-POWER WITH DECREASE OF APPLIED VOLTAGE

A 10-per cent drop in voltage results in 15-per cent drop in candlepower. A 20-per cent drop in voltage cuts the candlepower to less than half normal. To get a certain quantity of light where overrated lamps are supplied the user, he is forced to adopt larger lamps. This is very uneconomic owing to the extra cost of the lamp which is larger than would be necessary if it were of the proper voltage.

panies have adopted the mill type 115-volt lamp which is also used in buildings having considerable vibration and also for extension lights. This selection minimizes the numbers of different types required for stock.

The most important consideration in the effectiveness of a headlight or other type of projector beam is to have the light source located at the focal point of the reflector. Incandescent lamps are likely to vary in the length of their light centers, and for perfect adjustment it is necessary that the receptacle be adjustable so that the filament may be located at the focal point of the parabolic reflector.

To properly focus a headlight it should be located in a place as free as possible from other illumination and

then adjusted until the best light beam is obtained. Another method is to throw the beam of light on a wall and move the lamp within the reflector until the smallest illuminated spot is obtained. A little practice will enable one to focus the lamp quickly and accurately.

Fig. 4 shows the conditions which result when the lamp is in proper focus—1 shows the reflector evenly illuminated; 2 shows the resulting narrow light beam, and 3, the spot of light produced on a screen. Fig. 7 shows the conditions resulting when the light source is ahead of the focal center. Here 4 shows the rim of the reflector illuminated, resulting in the divergent then convergent beam, 5; and the result obtained on the screen is shown at 6.

When the light source is behind the focal center the results are as shown in Fig. 8. The reflector appears as shown in 7, the beam is divergent as shown in 8, and the spot on the screen has a dark region as shown in 9.

From these photographs it becomes obvious just what adjustment should be made to a headlight to put the light center in proper focus. The adjustment may therefore be made by observing the reflector, the light beam or the spot of light resulting on a screen or wall.

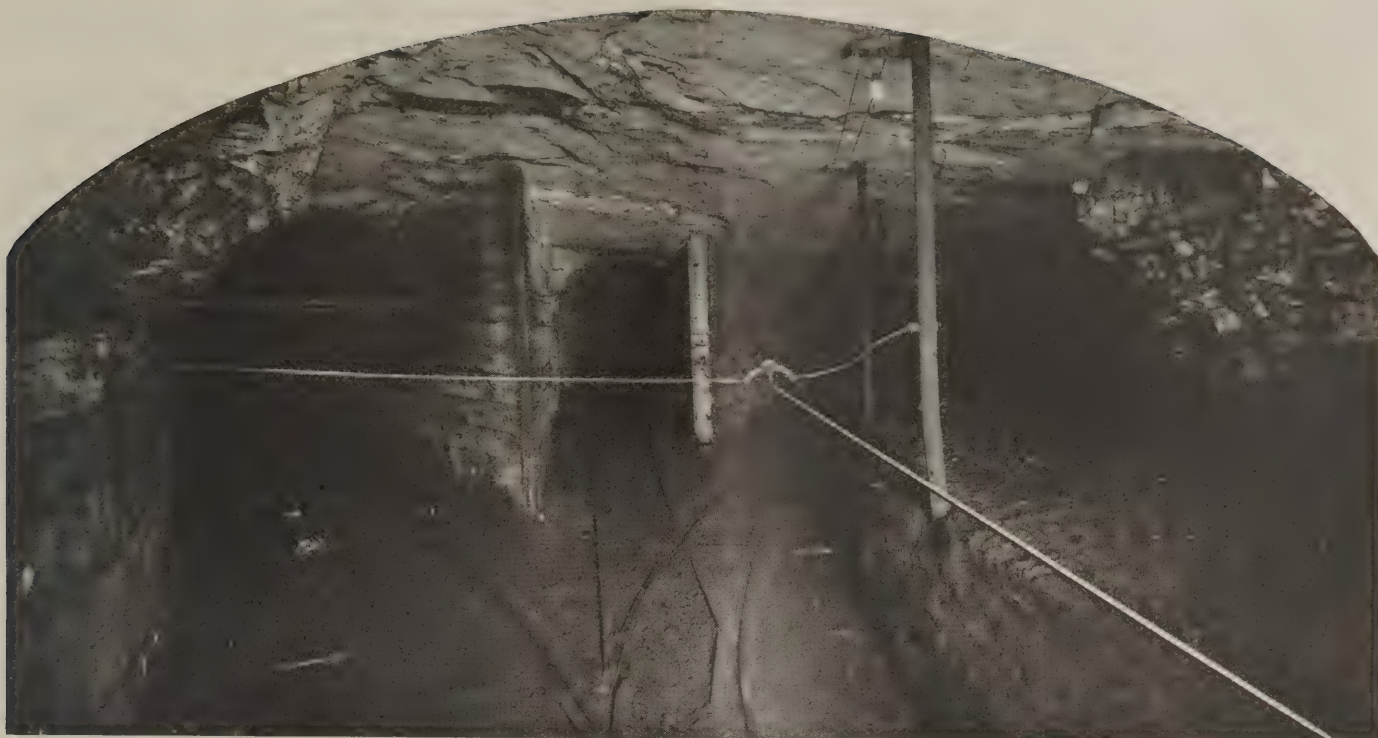
BIG BUILDINGS LOWERED BY SUBSIDENCE.—Interesting developments in the problem of surface subsidence resulting from mining operations were observed in Great Britain and France, according to George S. Rice, of the U. S. Bureau of Mines. At St. Etienne, France, mines have passed under important buildings which have been lowered as much as 20 ft. without material damage, because of the careful packing methods employed. The mine subsidence problem is one of growing seriousness in various European countries. The English Parliament has recently established a commission to study the situation, with a view to recommending special remedial legislation.



FIG. 10

Headlight on a Gathering Locomotive

Short turns, switching, coupling and door opening require a headlight with a broad beam for general illumination.



Wherever Roads Meet, Time Is Likely to Be Lost

When Loaders, Locomotives and Tipplesmen Stand Idle Can Haulage Control Afford Them Steady Work? *

Lack of System Results in Loaders Being Idle One-Fourth, Main-Line Locomotives One-Third and Gathering Units One-Tenth of Duration of Shift—Haulage Control Would Save Time

THE effect of an irregularity in the supply of empties upon the work of the individual loader is shown in Fig. 1 for eight separate days in six different mines. The chart shows not only the time the loader lost waiting for cars but the irregularity in the time in which they were delivered to him. In general it will be noted that this irregularity becomes more pronounced during the latter part of the day. The time lost by each of these loaders, due solely to the fact that he did not receive cars, is shown in heavy black. The maximum time lost by any of the loaders noted was two hours and forty-five minutes in an eight-hour day and the minimum time seventeen minutes. The average time lost was one hour and fifty minutes, representing 23 per cent of an eight-hour day.

The upper jagged line for each mine shows by its three horizontal levels whether a car was being loaded (highest level); was loaded and waiting to be drawn out (level 70 per cent above base); or whether there was no pit car at the loader's place of work (40 per cent above the base line.) If the loader left his working place before the completion of eight hours (in addition to his lunch period) the rest of the eight hours is drawn with the upper line sloping downward, the reason for his quitting being indicated by the kind of

shading. Detail information regarding physical conditions and equipment in these mines may be found in subsequent tables in this report by reference to mine designations.

Referring to the mine *DS* at the top of the diagram we see from the downward verticals that the man loaded five cars. During the first four hours, though there were periods after each load was completed when he had no cars at the face, as shown by the lowest horizontal lines, he was busy on other work. After loading his fourth car he had to wait about twenty minutes for the next car and on loading the fifth car he waited about one-half hour, then learned from the driver that he would not be given another car on that day, and so quit work.

The driver gave as his reason for not giving this loader another car that he had had his turn and that he must give what other cars came in that afternoon to other loaders. At this particular mine the management claimed they had a sufficiency of mine cars to furnish the men at their places all the cars they needed for loading coal. The chart shows, therefore, that either this was an exceptional condition, that the management was misinformed as to the condition, or else did not use the right method in determining the number of cars necessary to provide the men all they needed.

It is believed that the conditions shown in the chart are not exceptional, especially as the natural tendency on the part of officials during a special test is to pro-

*Fourth Installment of Report on "Underground Management in Bituminous Mines" made by Stanford E. Thompson and associates to the U. S. Coal Commission. The three earlier installments appeared Nov. 8, page 691; Nov. 15, page 733 and Nov. 22, page 773. Other installments will follow later.

vide at least as good as average conditions. Furthermore, other working places in the same mine were visited and other loaders found waiting for cars.

It will be further noted that the time in which the miner loaded each car was fairly uniform, but that the time between delivery of the cars to him increased steadily from the first to the last. There was no particular plan or schedule of delivery of these cars, and the miner never knew in advance whether he would get an empty car in ten minutes or in two hours after his loaded car had been pulled.

The next three sections of the diagram show three consecutive days of the same miner in the same mine designated as *RM*. This record was taken to show a complete cycle of work from clean-up to clean-up. Note that for the first forty-seven minutes of his first day's work he had no car at his place, but at this stage of the cycle he had plenty to do and the failure to deliver him a car did not cause him to lose any time. During the balance of the first five hours of the day he was kept well supplied with cars, followed by a lapse of two hours and eight minutes during which he received no cars.

That only forty-seven minutes of this time was actually lost waiting for cars is due largely to the fact that it was still fairly early in the man's cycle and much other work remained to be done besides the loading of coal. Toward the end of the second day his periods of waiting for cars became more numerous, as he had more nearly completed the work of his cycle other than loading, and on the morning of the third day the greater part of the time during which no car was in his place was lost time to him.

On this last day we see that the loader quit after five hours' work because his place was cleaned up and there was no cutting machine available. At this mine also will be noted great irregularity in the time of the delivery of the cars and also a big variation in the time the miner took to load them.

In mine *TS*, where two miners loaded at one working place, is seen a great irregularity in time of delivery and a total of two hours and four minutes loss per miner during the day waiting for cars.

Mine *SP* represents on the whole probably the best conditions of management seen at any of the mines. This is borne out by the chart which shows no time was lost waiting for cars until after six and one-half

hours of the working day had passed, the delay in this case being due to a break in the power line which affected the whole mine.

Mine *AS* also shows comparatively little time lost waiting for cars, the haulage at this mine also being much above the average of those observed. In this case, the miner, who was an exceptionally skillful man, quit after loading five cars and earning \$8.60 because he was satisfied with his day's work. The ordinary rate of loading of this particular man, as shown by the payroll, was six cars per day.

Mine *OW* shows fairly regular delivery of cars, which came in pairs, but they never were delivered with such frequency that the miner could fill up his time in other work, and the miner, therefore, lost an hour and two minutes in the day for lack of cars.

Variations in haulage details at individual partings studied in various mines are shown in Table I with average maximum and minimum figures. Note the great variations in the number of miners cared for by each mule or locomotive at any particular parting as well as in the number of cars gathered per day. These variations, barring certain conditions in length of haul and grade, are due almost entirely to the lack of supervision or order or any studied planning or dispatching of the haulage system. A few figures also are given in this table showing the actual labor cost per ton for gathering coal at these partings and total time lost at these partings due to various causes.

Table II shows the operating time lost by four locomotives in a large mine in a day observed. Note that total waiting time is 34 per cent of the day.

Averages in Table III, made up from the material detailed in preceding pages show the average losses of total available operating time, due to the failure of the haulage system to function properly, which always occur in such work, especially under scant supervision.

General Principles of Haulage Control.—To bring out the faults of any scheme is of little constructive value unless one can reach down and determine the basic principles at fault and indicate the general lines along which improvements may be accomplished. A side light is thrown on mining by comparison with manufacturing industries. Not long ago a past president of the American Society of Mechanical Engineers speaking on

TABLE I—VARIATIONS IN HAULAGE DETAILS IN DIFFERENT MINES AT INDIVIDUAL PARTINGS

Mine	AS			OW			DS			RZ			GH			TS			RM		
	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.
Number of cars per trip main line.....	10.8	18	5	21.9	22	20	26.0	31	18	19.0*	26*	13*	18.5	25	10	no record			(see note)		
Average weight of coal per car, lb.....	5,200			4,420			2,650			8,450			5,720			3,760			3,700		
Number of locomotives or mules from parting	1 five-ton loco.						4 mules			7 eight-ton locos.			3 six-ton locos.			2 mules			1 six-ton battery loco.		
Number of loaders per mile or locomotive	11.6	13	10	8.5	10	7	16	23	12	20	36	5	18	23	16	16	650	650	20		
Gathering distance,...							2,440	2,800	1,950	1,190	1,600	1,100	1,600	1,850	1,200	650	650	650	1,100	different partings	
																			900	(see note)	
Cars per day per mule or locomotive.....				88	107	69	39 $\frac{1}{2}$ day 49 31			57	78	20	66	82	57	48	51	46	30	different partings	
																			19	(see note)	
Tons gathered to parting.....	280.8			889	652	236	206			1,680		570	570			182			126		
Labor cost per ton, gathering.....							7.3c.			6.6c.			8.4c.			8.2c.			12.0c.		
Time lost in a day awaiting empties at parting.....	91 min.						72 min. total for one man			283 min.			108 min.			201 min.			10 min.		
* Single locomotive	† Two locomotives.																				

NOTE.—At mine *RM* one battery locomotive gathered the mine cars to three separate partings, from which they were hauled by the haulage locomotives. The gathering locomotives, besides gathering the cars to the three partings from the three different groups of miners, had also to travel back and forth on the main-

line tracks a total distance of 2,300 feet between the partings. The number of cars per trip taken by the main-line locomotive was not recorded as it gathered from many different partings besides the three to which this battery locomotive gathered.

TABLE II—OPERATING TIME LOST BY MAIN-LINE LOCOMOTIVES IN A LARGE MINE

Average of four locomotives		Per Cent of Total Time	
Running time, main line.....	43		
Switching time, bottom.....	13		
Switching time, parting.....	8		
Total useful time.....		64	
Held up by loaded cars.....	17		
Awaiting empties.....	5		
Awaiting loads.....	12		
Total waiting time.....		34	
Total time lost in making repairs.....	2	2	
		100	

the "Science of Engineering," and leading up to the recent developments in the science of operating management, stated that he could "remember distinctly the time when an educated scientific mechanical engineer was looked upon with profound suspicion by practically the whole manufacturing community."

The mining operator appreciates the engineer in so far as his work relates to design and layout. But our studies show that with a few exceptions, the mine below ground is in the same stage of development as was the manufacturing industry before it arose to an appreciation of the place of science in management.

The conditions in underground haulage which have been illustrated exist because fundamentally mine officials still fail to appreciate the need for keen analysis in each individual mine of all of the different variables and fail to see the need for the installation and the operating maintenance of routine plans which may involve the employment of a clerk and a little paper work, a thing abhorrent to the old-fashioned mining official.

Care must be used to see that any plan adopted is not merely left to run itself, as is so often the case in all industries where such work is the result of somebody's "hunch" instead of being based on definite principles. In one mine visited, for example, the management pointed with pride to a blackboard at the parting, on which were a number of figures.

Quoting from the report of our industrial mining engineer: "The general superintendent directed the trapper who kept it to explain it to us. The trapper replied that he kept a record of the number of cars that each gathering locomotive pulled by jotting down how many it brought out in each of its trips. The general superintendent then said 'Tell them how you kept your record of the number of the men each locomotive is pulling from.' The reply was, that was obtained by asking the driver, the figures being put at the top of the board, but that the driver hadn't reported yet that morning.

"We went on further into the mine, and as we went the superintendent explained that by getting such records every night a close supervision of the haulage system was kept at the office. Later when the superintendent had left me, I went back and questioned the trapper who kept that particular board. I noticed that still no figures appeared of the number of loaders that were being supplied with cars in the course of that day and I asked him if the driver had not reported yet. The reply was 'Oh, I don't keep that any more. They started this ——— system a few months ago and I kept it for a week, but one morning the driver didn't tell me the number of men in and I forgot to ask him, and I never kept it after that.'

"I watched him for a while, and within an hour he made three mistakes in putting down on the board the figures of cars hauled, one in the actual number of cars

brought in and two in making his additions. In the mine office the following day I examined the report made from the figures kept on the blackboards at the partings. For some of the locomotives, figures were given as to the number of loaders from whom they were hauling. In other cases the spaces were blank, but after each appeared the number of cars hauled the previous day.

"Disregarding any special cases of locomotives pulling from gangs on development work, the figures showed one locomotive pulling from anywhere between thirteen and thirty-five men and from forty-six to one hundred and twenty-six cars. Such a report had been going to the superintendent's desk daily for several months, and apparently the manager believed that thereby he was exercising close haulage supervision, yet underground, as a matter of fact, haulage locomotives were running without schedule, blocked by cars, and pulling greatly varying loads. Gathering locomotives and their drivers were waiting for empties and operating with widely different efficiencies. Miners, meantime, were waiting for cars!"

The plan failed because of the disregard of fundamental principles in management, for in the first place planning was not differentiated from operating, and in the second place the plan was simply an accumulation of the records of what had been done, instead of a conspectus of what it was advisable to do.

EACH MINE MUST HAVE PLAN TO SUIT ITS NEEDS

No method of procedure to be followed for the installation of a scientifically planned and dispatched haulage system applicable to all mines can be outlined in a report of this nature, nor can methods be laid down for a particular case that might not have to be modified as the work proceeded. Furthermore, in practice, as is discussed later in this division of the report, any plan should be tied in with, and form a part of, a comprehensive scheme which includes with the co-operation of the miners the analysis and planning of the work of all the men in the mine for the purpose of bringing more clearly before the operators and miners the general principles involved in planned and dispatched haulage from an engineering standpoint.

TABLE III—TIME LOST IN A DAY THROUGH LACK OF SYSTEM IN HAULAGE

	Hours	Minutes	Per Cent
By the miner at the face.....	1	50	23
By the gathering locomotives and drivers.....	0	44	9
By the main-line locomotives and drivers.....	2	43	34

That the problem is no simple one is indicated by the principal factors that must be considered: Capacity of the hoist or main haulage equipment; capacity at bottom; empty-car track capacity at same point; capacity of partings; location of working places with reference to each other and to the partings; location of partings; grades on haulage roads; number and location of miners in rooms and entries; number and size of locomotives and cars; weight and condition of tracks and length of hauls; distance of main partings from shaft or drift mouth; size of room; mining conditions as affecting rate of mining and such local rules and practices as affect the foregoing conditions.

It should be noted at the start that of these major factors affecting the haulage problem all are susceptible to modification by the operator, with the exception of the major grades on the haulage roads, mining condi-

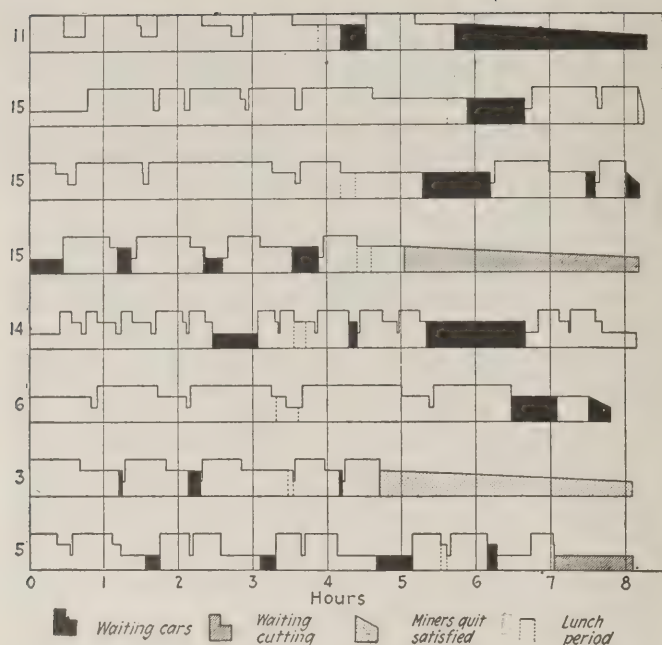


FIG. 1—ANALYSIS OF SOME MINERS' WORKING DAYS
Only peaks show loading times, loaded and waiting is the level below the peak and no car in place the lowest level of all. The sloping lines show time in which miner has left his place satisfied with his day's work.

tions as affected by law or the physical and geological characteristics of the coal seam.

The problem in every mine resolves itself in its primary aims into the necessity of providing the required number of empty cars to each miner at the time he needs them and hauling the full cars to the parting, and thence to the bottom or to the tippie and returning the empties into the mine without permitting congestion at any point, the number of miners to be regulated by the production desired. In each case the problem can be solved by a thorough analysis that will determine the facts. In this analysis not the costs but the actual time should be ascertained. Thus equipped a good working plan can be devised.

In a few mines are to be found the rudiments of transportation control. Reference has been made to the mine *SP*, Fig. 1, where the supply of cars is exceptionally uniform. This is not mere chance, for this mine employs a traffic foreman underground. Many mines have their haulage practice so definite that the management knows early in the morning what working places are available and the expected tonnage for the shift. They also know the number of men in each section, and where excess, if any, can be used, so that they have at least a part of the information needed for the dispatching of cars.

In other mines which we found to be the best organized and lowest in operating costs for given physical conditions, these various elements had been studied and a traffic man designated to supervise in a general way the running of the trips. With an extension of these duties, in accordance with recognized practice in manufacturing, naturally comes the noting each day* of the location of active working places and of the men working; the allocating of drivers and locomotives with the formulation of definite schedules of trips and number of cars to the trip; co-ordination of the work by telephone communication to supplement these plans

*Perhaps by pins on a mine map as is done in one or two instances, or by further utilizing the check system.

just as in a factory. There the production man—that is, the planning official—keeps in touch with the production and changes details as needed, while maintaining always his general scheme.

While details may be left to local treatment, such general principles as these apply to all mines. They are in accord with the policies of control that are being followed by the best industrial organizations in all industries. The adoption of these will go far toward relieving one of the most potent sources of friction between the miner and the manager by furnishing an equitable delivery of mine cars to the loaders.

Tendency to Minimize Importance of Haulage Control.—That the mine manager gives too little attention to the problems of efficient underground haulage is due in part naturally to the fact that when a loader waits for cars, or consumes—by reason of the management's demand that the cars be excessively topped—additional time over that required for straight loading, he alone stands the primary loss because he is on a tonnage or piece-work basis, and when he is idle he presumably is not costing the company anything.

On the other hand, the larger the load per car, the lower the apparent haulage costs per ton. In this neglect of the management to insure the maximum production desired by the miner, the fact is overlooked that any lost time of the miner, such as that caused by lack of cars or excess topping, is eventually reflected in demands for increased rates of pay.

A rather common viewpoint of the operator is expressed in the following communication from an executive of a large Western mine. Although this is written in connection with a statement on machine loading, an interesting feature is the reference to the haulage problem:

"The outstanding difficulties suffered are those occasioned by the persistent resistance to the use of power shovels made by the mine workers, backed by the force of their organization. A continuous controversy rages regarding the distribution of empty cars as between the hand loaders and the shovels, the men demanding that cars be placed when and as they want them, the speed used in loading out cars in individual rooms varying 200 per cent or more, the hand loaders demanding that such preferential service be given them as will admit of their loading out what they consider their daily quota in less than eight hours (never more than 6½ hours), failure to meet this demand resulting in the shovel operators so handling their work as to cause delays of one or two hours per day to the shovel and its crew, including the room driver engaged in placing empty and loaded cars."

Without in any way condoning this antipathy to the power shovel it may well be questioned, judging from the way it has been found possible to handle similar irregular conditions in other industries, whether the operator on his part should not manage the haulage problem so that the miners will receive such cars as they require notwithstanding a variation in demand.

Savings in the productivity of labor not only reduce overhead but tend eventually to lower unit labor cost. In fields where both tonnage rates and the day pay of company men are fixed regardless of physical conditions, the results become effective more slowly than where there is greater freedom to reward a man for conscientious effort, but in both cases the eventual result will be the same.

Why the Coal Industry Of Great Britain Functions Smoothly



Car Shortage Unknown—Few Mines
Work One Shift—Priority in Use of
Cars Would Cause Riot—Storage and
Profit-Sharing Stabilizing Factors

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

THE reason why Sir Richard Redmayne was selected to serve as chairman of the coal-mining organization committee of the United Kingdom during the war is apparent before you talk with him long. Like most of the other busy men I met in Europe, he was willing to make any sacrifice of time if he could contribute to a constructive effort. Nowhere did I meet a coal man in the United Kingdom who was not willing to lay his cards on the table once you had established the fact that the material was to be used in an effort to benefit the coal industry.

I was apprehensive before I went that they might be inclined to have little to say on the ground that it would be giving a competitor the advantage of their experience. This was not the case, however, despite the fact that American competition is being felt much more keenly than our export tonnage warrants. It is quite evident that they fear our potentialities in that direction. During my stay in Cardiff, sales of American coal were made in France, in direct competition with Welsh interests, and while I was in Newcastle, American bidders were successful in Holland—a market that has been almost exclusively Newcastle's for a generation. They were somewhat chagrined at our success in those markets and they were at a loss to understand how we could quote the prices we did.

I encountered many readers of *Coal Age*. In several offices the well-thumbed copies indicated that they were read by the entire staff. Sir Richard keeps the more recent copies on his desk for ready reference. Judging from the influx of subscriptions from British sources since my return I assume that my visit suggested that now is a good time to begin the exchange of helpful information and that they want to be sure that the Americans are not the only ones to profit from it.

AMERICAN COAL MEN COULD EMULATE BRITISH

In most particulars the coal industry of England and Wales functions better than does the bituminous industry in the United States. While it is true that the production and distribution of coal there are not entirely comparable to those activities in the United States, it is apparent that there are many leaves we could take from the book of British practice and experience with great advantage to ourselves. This does not mean that the industry there does not have grave troubles, but some of the difficulties from which we suffer have been ironed out.

Car shortages practically are unknown. Mines never have to suspend operation for lack of cars. The longest period of idle time during the year is three days and that is to allow the workers their Easter holiday. There are few mines which work only one shift. It is true that the average haul in the British Isles is short, but there is careful co-operation of all concerned to

obtain a quick turn-over for the coal-carrying equipment. This keeps available a sufficient surplus of cars which can be used for storage purposes when ships are overdue or other delays develop. In addition, provision is made for some storage at the mine. There are instances where several days' output can be put on the ground near the pit mouth. This storage is arranged so that the cost of handling is kept at a minimum.

For a railroad to be given priority in the use of cars for hauling its own fuel is entirely unheard of. If there were stringency in car supply and were a railroad company to attempt to give a disproportionate number of cars to a mine with which it had contracts, it would cause a riot, to quote the words of M. W. Magee, an operator in the Newcastle region. No such attempt ever has been made and would not be brooked.

CONSIDER RESORT TO PRIORITY INEXCUSABLE

The railroads, a number of British operators told me, least of all should have to resort to such priority. They can conceive of a small enterprise, not in a position to hire engineers and skilled purchasing agents, failing to make adequate provision for an unexpected stoppage in its coal supplies. There would be some patience with a proposal that it be allowed some preference in obtaining an emergency delivery, but for a large concern like a railroad, methodically conducted and with staffs of engineers and technical men, to fail to have adequate storage at strategic points would be inexcusable. For a common carrier, on which the prosperity and even the health and comfort of the public depend, to be without large storage and to have to depend on priority and car supply is more than the British can understand.

Next to the adequate supply of railroad cars and motive power, the general practice on the part of consumers in storing coal is the most important factor contributing to the enviable stability of the British industry. It is an inherent trait in the British engineer and commercial administrator to provide very liberal margins of safety. Large stocks of coal are maintained by the railroads and most other consumers. Even the householder is less inclined to buy from hand to mouth or to wait until the last minute to lay in his fuel.

On a railroad, for instance, when stocks begin to decrease somewhat, the line comes into the market regardless of any prospect for lower prices. A certain reserve always is maintained. This varies with the locality, but no matter how unfavorable the market situation may be, stocks are not allowed to go below a definitely established point. The same policy is followed at gas works—consumers using a much larger portion of the output than in the United States. The British gas industry represents an investment of \$750,000,000. Other public utilities and manufacturing plants generally stock heavily. The same tendency ex-

ists among retailers. Large stocks are maintained throughout the year. This practice is regarded as being largely responsible for spreading the demand on the mines more or less evenly over the twelve months. There are certain peaks but the peak is much more likely to be caused by influences other than such seasonal demand as exists.

The profit-sharing wage unquestionably is another stabilizing factor. Much criticism of it is heard, but it emanates from an assertive minority. Labor is inclined to be critical of it, but it is noticeable at show-downs that it is amendment rather than abolition that the union wants. Some of the union leaders—leaders of the agitator class—see in the profit-sharing plan some menace to organization. They fear that some years hence the relationship will have become so standardized and will work so well that the principal benefit received from the union—periodic boosts of wage—will not be required. The more substantial of the labor leaders, however, recognize that there always will be impelling reasons for the men to maintain their organization.

In South Wales the operators, after more than thirty years of rather successful use of a sliding scale, based on the selling price of coal, were not inclined to give it up. Many of them still are outspoken in opposition to the new agreement. Nevertheless the opposition is passive and the real truth doubtless is that they are fairly well satisfied with the principle underlying the present arrangement.

In Northumberland and Durham, on the other hand, sentiment among the operators for the profit-sharing agreement is very strong. The mine worker no longer is wasteful, as he recognizes he is a greater loser than the mine owner. He does not throw away a prop, for instance. He saves it and uses it because five-sixths of the prop's value is his. Incidentally mine props there are more valuable than here. Supplies come from Nova Scotia and other distant sources. The miner does not load dirty coal because he realizes that most of the penalty will come out of his pocket.

Labor also is making some capital out of claims that the operators are concealing profits. In some instances, it is asserted, the operators also are interested in ships

and in brokerage companies. Because of those interests they are willing, some representatives of labor say, to sacrifice profit at the mine and recoup themselves from the profits made in further handling. In that way, it is maintained, labor loses its just share of profits. The contention hardly is sound, however, as labor is represented on the auditing committee, which has full access to each company's books. Any acceptance of prices out of line with costs would be detected immediately. There are some cases, of course, in which the operators of a mine also are interested financially in shipping, brokerage or coal-consuming enterprises. There may be some instances in which that fact influences to a slight extent the price at which the coal is sold. The tonnage to which this would apply, however, is negligible.

The objections to the profit-sharing plan apparently are diminishing as it is becoming better understood. Evidently it will survive and promises to become the greatest development of the last hundred years in industrial relations.

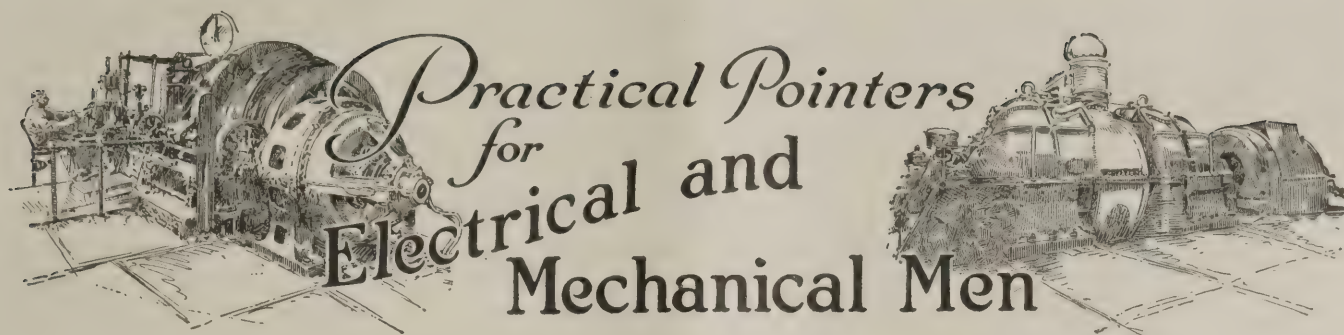
Next week Mr. Wooton compares the sliding scale with the profit-sharing wage plan now in vogue in Great Britain.

Officials Inspect No. 14 Colliery Pennsylvania Coal Co.

AT A RECENT visit of the officials of the Pennsylvania Coal Co. to No. 14 colliery, at Port Blanchard, the mine was closely inspected, the party being divided into five sections which visited every part of the operation. Each section had a leader who was charged with the duty of preparing a report on the part of the mine visited. A photograph was taken of the visiting party of fifty men in front of the colliery office. From this the accompanying illustration has been made. Special interest attaches to the inspection this year as the new steel and glass breaker, one of the most modern in the anthracite region, is just being completed. The steel work and glass are all in position, and finishing touches are being placed on the interior of the structure. The steel and glass exterior incloses not only the breaker proper but also the loading chutes.



OFFICIALS OF PENNSYLVANIA COAL CO. ON INSPECTION TRIP TO COLLIERY NO. 14



Reasons Why Power Generated at Mines May Be Inherently Uneconomic

REFERRING to the letter of Mr. Butcher, which appeared in the Nov. 22 issue of *Coal Age*, I would like to point out some inherent disadvantages of small and large degree which must be considered in a coal-mine power plant.

Mines having a daily output of 2,000 tons are rather common in the industry, but those having a daily output of 6,000 tons are extremely rare, and these, with few exceptions, are well equipped from every angle.

Actual practice has fully demonstrated the fact that central-station power is cheaper than power generated in a privately owned plant of the most modern character for the operation of a coal mine. The only objection to the use of electrical energy as supplied by public utilities has been the question of continuity of service, but this has been solved or is being worked out by the duplication of sources of supply.

Mixed-pressure turbines have been tried at coal mines but have not proved satisfactory as a general proposition, although in a few special cases they have given fair results over short periods of time. This does not condemn the mixed-pressure turbine, but does eliminate its use at coal mines.

Reliability and simplicity of steam consuming equipment at a coal mine is infinitely more important than high efficiency engines. In general, mining plants are of necessity so located as to render the use of condensing equipment of doubtful value in any case because of lack of sufficient water. In large underground steam-pumping stations the use of condensers may have value, but for other coal-mine applications they are not economical.

If it is necessary to operate a steam-driven ventilating fan at full speed over the entire 24-hour period, it is essential that the engine be in duplicate and of extremely rugged design with as few parts as possible, as reliability of operation is really the thing to be considered. The exhaust steam from such a fan would be available for an exhaust turbine if it were practicable to use it.

The steam used in hoisting engines is not available because of the relatively small amount used over the 24-hour period, the wide fluctuation in the load and the incidental cost of an installation that would permit its use.

The engines used to drive generators also produce a widely fluctuating load and the load factor of delivered energy usually is well below 20 per cent. It is, therefore, evident that this is no place for condensing equipment.

The present design of a steam plant at a coal mine

represents the best practice known for this particular class of service and is the result of many costly experiments and careful study. The factors that affect the design of a steam plant are load factor, life of plant and reliability of operation, as well as first cost and cost of operation. Because of the fact that a mine works only eight hours per day for 200 days per year, and in many cases less, the load factor is inherently low, usually being below 20 per cent.

Coal mining represents a constantly changing condition, with the result that the power requirements change from year to year and any arrangement becomes obsolete in a very few years. Because of the short life of the equipment, the increased first cost, as well as maintenance cost of so-called highly efficient equipment, its use is not warranted.

Because of the low load factor existing at coal mines and the demand for a flexible power supply to take care of the constantly changing conditions, central-station energy as supplied by public utilities can be purchased at a lower cost than power generated in a privately owned plant, serving one or two mines regardless of the design of the plant. This is not a theory but a fact based on the actual results obtained over a considerable period of time.

Pittsburgh, Pa.

CHARLES M. MEANS,
Consulting Engineer.

How Electricity Is Produced

ALTHOUGH we do not know what electricity is and we frequently hear it said that it is in its infancy, we know many facts about it. The laws governing its production, or, in other words its generation, what it does under certain circumstances, how to govern its action and how it may be applied to useful work, are all well defined. The feeling of mystery concerning electricity seems to be unwarranted. Steam has been in use for many years, yet there are certain aspects about steam and its application which are as mysterious as many things pertaining to electricity; in fact the laws governing electricity are more extensively known and

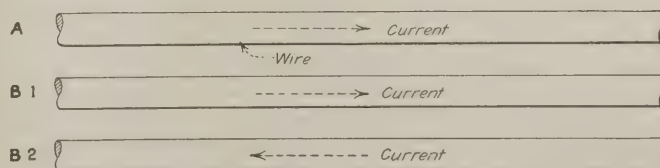


ILLUSTRATION OF DIRECT AND ALTERNATING CURRENT

At A the current is continually flowing from left to right, as indicated by the arrow, and represents direct current. At B₁ the current flows from left to right for only a short interval of time. B₂ shows the same wire as at B₁ but at another instant, showing that the current is now flowing in an opposite direction. This change of direction of current alternates; hence it is distinguished from direct current by being called alternating current.

understood by scientists than the laws of steam. The word electricity comes from the Greek word amber, and its development has come from the fact that the Greeks discovered that when amber was rubbed it had a property that caused it to attract light bodies. Later this attractive force possessed by rubbed amber was found to be a form of electricity.

There are several different forms of electricity and several ways of producing it. Two common forms in which we find electricity are static or frictional and current electricity. The three most common methods of producing it are by friction, chemical action, and by induction.

HOW TO PRODUCE ELECTRICITY

Static electricity is generated by friction. Rubbing a stick of sealing wax and a piece of flannel or a glass rod and a piece of silk will produce static or frictional electricity. It may also be produced by a comb rubbed in the hair, stroking cat's fur or by a person rubbing his feet over a carpet. When electricity is formed by any of these methods one of the two different substances becomes charged with what we call positive electricity and the other with negative electricity. These two charges attract each other while bodies charged with like electricity repel each other. This establishes a general law which may be stated as follows: Bodies charged with like electricity repel each other, and bodies charged with unlike electricity attract each other. The uses of electricity in the static form are not of great practical importance, except at high voltages. Lightning is a form of static or frictional electricity of very high voltage.

Current electricity, as we have stated before, is generated by chemical means or by means of induction. Electricity is generated by chemical means in what is called a voltaic cell. Inside the cell a chemical action takes place which releases the chemical energy in the form of electrical energy. Electricity generated by chemical means is unidirectional and is called direct current.

Electricity produced by induction usually is generated in a machine called a generator or alternator. When generated by induction it may be direct current or alternating current. It is generally understood that direct current is generated in what is called the generator and alternating current is generated in what is called an alternator. Alternating current is one which reverses in the direction of its flow a number of times per second. An alternating current which reverses its direction 120 times per second is called 60-cycle alternating current.

CYCLE OF ALTERNATING CURRENT

A cycle is two alternations. Obviously the more rapid the alternations or changes of direction of current in the wire carrying alternating current the larger the number of cycles per second. Ordinary power and lighting circuits operating on alternating-current electricity are supplied with current of 60 cycles. The number of cycles per second is known as the frequency of the alternating current. High-frequency alternating current has several commercial applications; in radio telephony alternating current of 1,000,000 cycles per second is common. It is the frequency of the transmission voltage which determines what is known as the wave length of a sending station.

To visualize direct and alternating current we may

think of water in a water pipe. If this water is flowing in one direction continually it represents what is understood as direct-current electricity. If the water alternates in the direction of flow it represents what is known as alternating current.

Advantages of Purchased Power

THERE is still much discussion at many coal-mining properties on the subject of purchased power versus power made at the mines and therefore I wish to present a few of the advantages of purchased power to the readers of *Coal Age*.

Wherever purchased power is available it usually will be found to be more economical for the mine operator to purchase power for his use, because of its reliability and ultimate low cost.

How many times a year does purchased power prove itself the more reliable? With power generated at the mine a serious burn-out of electrical generating equipment or a breakdown of some of the other machinery in the power house will frequently mean long and costly delays. With purchased power it is nearly always possible to resort to spare equipment located in the power house when such emergencies arise.

Purchased power usually is cheaper for the operator because it does away with the necessity for experienced power-plant attendants, which always are necessary where power is generated at low cost. Then again, the power bill of the power company is not a complete item of expense to the operator because he must credit himself with the additional amount of fuel he is placing upon the market since he is buying his power instead of making it himself. A mine often is located where water must be pumped a considerable distance for the boilers, which means a large item of expense to the operator making his own power.

Many times the mine operator will have to install transforming equipment for reducing the delivery voltage of the power company to his requirements, but rarely does this equipment cost a great deal; in fact, many such substations are frequently installed by the power company and charged off to the mine operator as small monthly payments included in his power bill.

Apparently purchased power has many advantages which are of interest to the small and large mine operator.

National Electric Co.
Charleston, W. Va.

WILLIAM SCHAFFER,
Electrical Engineer.

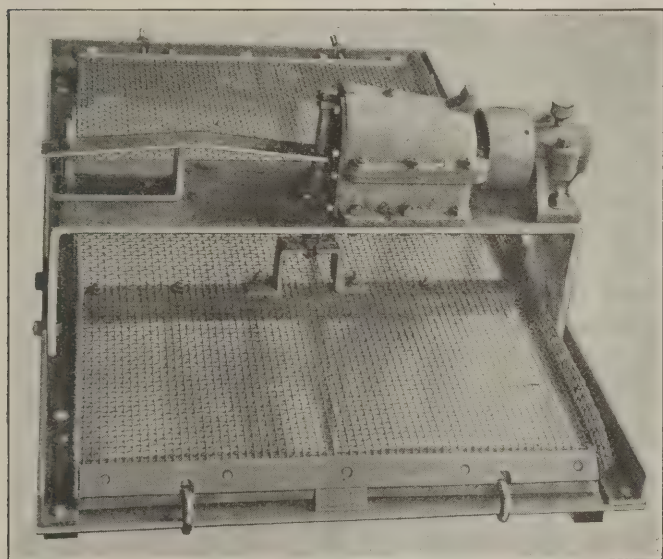
PROFIT SHARING AT BRITISH MINES.—An interesting sociological development in the coal-mining industry of Great Britain, whereby the mine owners and the miners share in the distribution of profits, is reported by George S. Rice, chief mining engineer, U. S. Bureau of Mines. Under this plan the mines are grouped in districts and monthly, in each designated district, the gross expenses of production of the coal are deducted from the gross profits of the mines of that district, and from this gross net profit 6 per cent of the invested capital is deducted, the remainder, if any, being divided between the owners and miners, the owners receiving 17½ per cent and the miners 82½ per cent. The miners' share, if any, is pro-rated among the miners of the district, and the sum thus determined by certified accountants is paid to the miners two months later in the form of an increase in wages.

New Equipment

A Small Screen with Large Capacity

GRAVITY screens must be built long or they are ineffectual. The shaking screen has a greater capacity per square foot and is more efficient than the gravity-operated unit, but the vibrating screens are said to exceed both, not only passing a greater tonnage per unit of screen area but making also a more complete separation of fines. The main difficulty is with wet material.

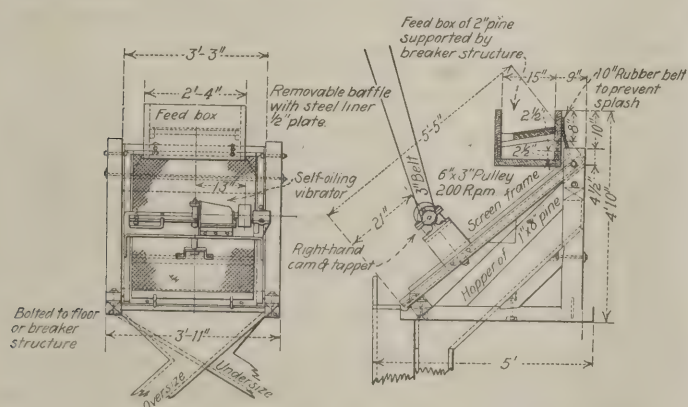
A screen that is said to have given excellent service with both wet and dry fines is the Leahy No-Blind Screen of the Deister Concentrator Co., Fort Wayne,



SCREEN THAT CLEANS ITS OWN MESHES

Constant vibration of the screen keeps the material from building up in the opening and changing the screen into a mere chute, as too often happens with a screen which operates only by gravity or with the aid of shaking mechanism.

Ind. It is said to give a quick return differential vibration that is transmitted to the entire surface of the screen cloth so that the particles are screened and stratified according to their relative masses, and the finer particles pass through the screen without hindrance by those which are oversize.



SCREEN AS INSTALLED IN TIPPLE OR BREAKER

It is only 5 ft. 5 in. long and its projected length is less than 5 ft. so that a real economy of space is attained.

The anvil action at the end of each quick return stroke clears the meshes of the screen cloth so that the screen is non-blinding under all conditions of feed. The vibrator runs in oil and has only two wearing parts. The screen is driven by a 3-in. belt and requires $\frac{1}{4}$ to $\frac{1}{2}$ hp. A single spring adjustment controls the intensity of vibration and adjusts it to suit the load and the material being screened. The screen cloth is held in longitudinal tension by two bolts and can be changed in five minutes time. Any wire-mesh screen cloth may be used. With the vibrator driven at 200 r.p.m. 1,600 quick-return differential vibrations are transmitted directly to the screen cloth. The normal amplitude of the screen vibration is $\frac{1}{16}$ in. directly under the vibrator.

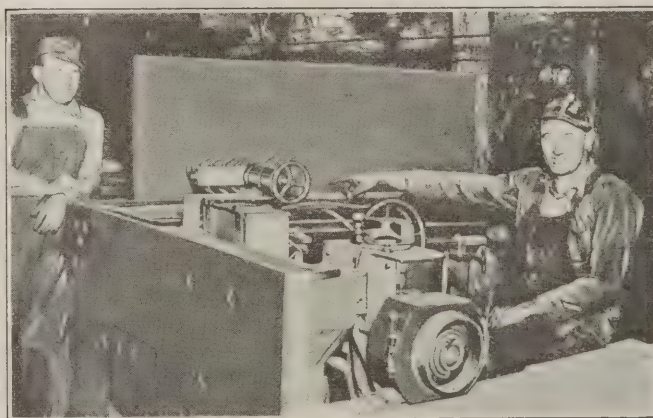
Safety Grease Lubricator

THE Keystone manifold safety lubricator presents a method of applying grease under high pressure with pipe-line distribution to more than one bearing. It accomplishes this result without risk to the operator or waste of grease.

Bearings that are difficult of access due to small clearances between working parts, heat and other unfavorable conditions, are made easy to reach by this medium of lubrication, thus insuring the proper lubrication of bearings that otherwise might be neglected because of inconvenience and hazardous conditions.

Heavy flexible metallic tubing is frequently used for the leads from the manifold to machinery bearings. By means of valves on each outlet the lubrication of any bearing may be regulated. In some instances valves may be permanently adjusted to allow the grease to flow in uniform quantities to all the bearings whenever the lubricator is operated.

This lubricator is designed not only from a standpoint of economy but to safeguard employees while oiling and



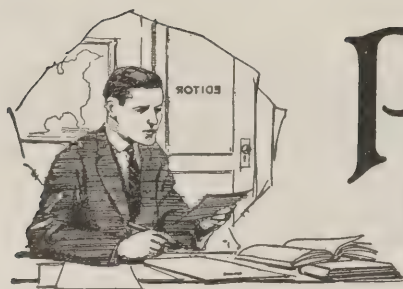
LOCOMOTIVE WITH MANIFOLD LUBRICATOR

Flexible pipe lines leading from the manifold to all the bearings insure proper lubrication at all times. Merely turning the handle with the valves open forces grease to any desired location on the locomotive.

greasing machinery where there may be an element of risk in the work.

For mining machinery this device has many applications, especially on hoisting and locomotive equipment, which is difficult and hazardous to lubricate. Proper lubrication of equipment will thus avoid serious breakdown delays, accidents and waste.

The complete outfit is sold by the Keystone Lubricating Co. of Philadelphia, Pa.



Problems of Operating Men

Edited by
James T. Beard



Working Three Contiguous Seams With Rock Partings

Proposed Plan Impracticable—Insufficient Space to Store Waste Material—Another Plan Described That Has Given Success

HAVING had some experience in working contiguous seams of coal separated by rock partings of varying thickness, it has been with much interest that I have followed the discussion started by the inquiry that appeared in *Coal Age*, Aug. 9, p. 219. Following is the section of the strata described in this inquiry:

Starting from a footwall of hard sandy shale, a 12-in. seam of clean coal is overlaid with 2 ft. of hard slate parting, which separates it from 3 ft. of hard splint coal forming the middle seam. Another parting of hard sandy shale from 4 to 6 ft. in thickness separates the middle seam from the upper coal, which is 3½ ft. in thickness. This top coal is overlaid with a hard sandstone roof.

Kindly permit me to offer a friendly criticism of the plan proposed by the inquirer and which he regards as promising a successful method of working these three seams, with a view to securing a high percentage of production and a good marketable condition of the coal. Following that, I want to describe a plan that appeals to me as certain of meeting every requirement, including safety and economy of working.

WHY PROPOSED PLAN IS IMPRACTICABLE

In the first place, the proposed driving of double or triple rooms, from 60 to 90 ft. in width, between a sandrock roof and a hard shale footwall is, to my mind, impracticable. To drive rooms 90 ft. wide separated by

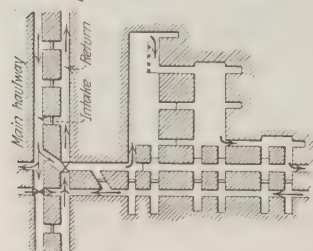


FIG. 1—GENERAL PLAN, SHOWING DOUBLE 50-FT. ROOMS

50-ft. pillars of hard splint coal would tend to produce a creep. Or, driving 60-ft. double rooms with the same pillars between them and, brushing the two roadways to the footwall, each 10 ft. wide, would not provide sufficient space for gobbing the rock between these roads.

Even if the rock is packed with the utmost care, it will be found that there will not be room to hold the waste rock. Moreover, only 33½ per cent of the bottom coal will be recovered at a great expense of labor; and,

50-ft. pillars of hard splint coal would tend to produce a creep. Or, driving 60-ft. double rooms with the same pillars between them and, brushing the two roadways to the footwall, each 10 ft. wide, would not provide sufficient space for gobbing the rock between these roads.

Allowing the ratio of rock in the solid to rock broken

in my opinion, it will be impossible to work the top coal at all by this method.

Briefly described, my plan would be to abandon entirely the idea of mining the bottom seam, except for the coal taken out in the headings and roomnecks. As shown in Fig. 1, I would drive double rooms 50 ft. wide with 60-ft. pillars between them. Driving the roomnecks 10 ft. wide for a distance of 10 yd., leaves a pillar 30 ft. square in the neck of each room. The crosscuts in the room pillars are driven on 60-ft. centers.

DEVELOPMENT STARTED IN MIDDLE SEAM

The rooms are driven in the middle seam. The main and cross-entries are driven 10 ft. wide and 6 ft. high, the lower parting and the bottom seam of coal being taken up on these entries and the rock loaded out. The rooms are driven up from 200 to 250 ft. and well timbered, as indicated in Fig. 2, in the plan on the left.

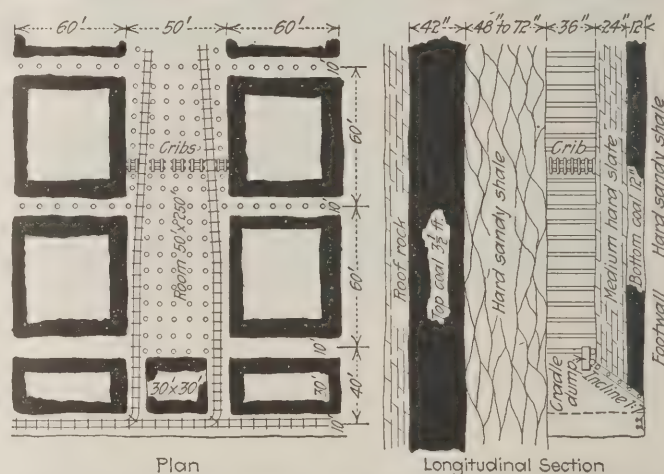


FIG. 2—PLAN AND ELEVATION WORKING MIDDLE SEAM

As shown in the elevation on the right of Fig. 2, starting a short distance inside of each roomneck, an incline pitching about 1 in. 7 is driven up to the middle seam. A special low car is used holding about one ton. Two men can readily push this car up the incline when the room is being worked in the middle seam.

PLAN TO REACH THE TOP COAL

At a point about halfway of the length of the room, is now placed a row of good cribs to take the weight and prevent the rock from riding over all the props when it is desired to get the first fall. The plan is, later, to pull the props in regular order, starting from the cribs and continuing back to the roomneck, allowing the parting rock to fall and probably the top coal above it.

As each room is driven up the required distance and the coal taken out, the track and ties are removed. The use of steel ties gives several inches of much desired

headroom and both the ties and track are more easily removed. When this has been done, the work of pulling the props between the cribs and the roomnecks is begun.

Should it happen that the rock fails to fall when this method is tried in the first room, a row of shotholes must be drilled along each rib. A pillar of solid coal 100 ft. wide separates the first room from the main headings for their protection. A good fall should be made in the first room, before the same is attempted in the room next adjoining. Experience will be a guide to future procedure.

BUGGY USED TO LOAD OUT TOP COAL

After getting a good fall, the crosscuts are choked up to the cribs and it is now necessary to drive two chutes, one in each roomneck, up to the top coal, as shown in Fig. 3, which illustrates the condition after

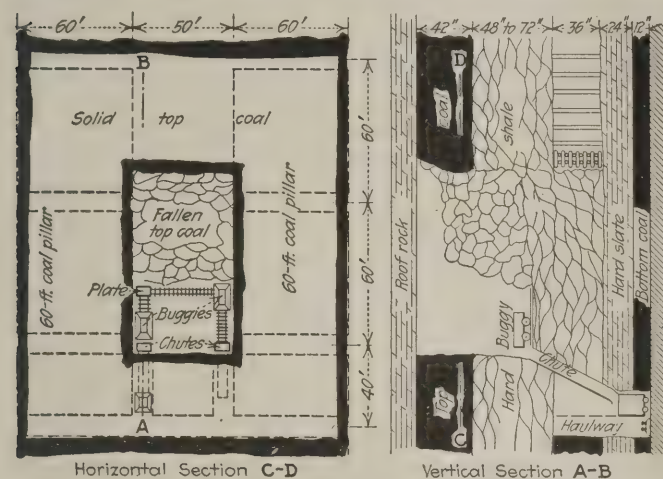


FIG. 3—PLAN AND ELEVATION WORKING OUT TOP COAL

the first fall has taken place as far back as the cribs. A low buggy is used for loading out this coal, the buggy being dumped over a small cradle dump arranged at the top of each chute. The coal falls directly into the mine car standing under the chute. If desired, a door can be arranged to control the descent of the coal, as in a regular loading chute.

Light-weight track is laid from the cradle-dump and sheetiron plates are used to turn the buggies along the face in loading out the top coal. These plates are easily moved forward when necessary. As the work advances, cribs are built to support the roof and protect the track, which must be used to bring back the top-coal pillars.

IDEAL METHOD FOR RETREATING PLAN

The falls in the second and succeeding rooms are produced in the same manner as just described, using the crosscuts as escapeways, in case a hasty retreat becomes necessary. When the cross-entries have reached their distance, the entry pillars are pulled by driving 20-ft. rooms through the center of each pillar, thereby leaving 20-ft. pillars on either side. These pillars are pulled from the inby end to the next outby crosscut, allowing the overhead parting rock and top coal to fall. This top coal is then loaded from the two adjoining rooms, using the track nearest to the pillar and dumping the coal through the chutes.

To my mind, this is an ideal system for driving the entries to their destination or boundary, before working the rooms. If that is done, both the wide and the

narrow rooms can be worked at the same time, starting from the inby end. As soon as the last of the top coal is loaded out of the rooms, the narrow room can be ready for its first fall. The top coal may then be loaded continuously, until both the room and the pillar are loaded out. Moreover, there will be less danger from the cribs in the top seam rotting away while waiting for the pillars to be pulled back, and there will be no danger from creep.

In the use of this method, it is quite evident that there is very little shooting required to mine the top coal, whether it falls with the parting or holds fast to the roof. As a result, a maximum of lump coal will be produced and a good output obtained, per man, per day. There is not as much danger in pulling the props as would seem.

For two years, I was foreman at a mine working two seams of coal separated by from 12 to 36 in. of slate. The bottom seam ran from 3 ft. to 6 ft. in thickness, while the top seam averaged 3 ft. The coal was overlaid with stratified sandrock. We employed the system just described and I never knew a man to meet with an accident in pulling the props for a fall. Any of the experienced men would "throw in" a room 20 ft. wide, for a distance of from 75 to 100 ft., for \$3. This was in 1917.

JOHN WALLS, SR.

Bayview, Ensley, Ala.

Resistance to Flow of Air Offered by Obstructions in Airway

Investigation underway to determine amount of resistance offered by different forms of obstruction—Important to provide for stream-line movement of air current.

IT WAS with much pleasure that I noticed the reference to "Reducing Resistance to Flow of Air in Fan-shaft," which appeared in *Coal Age*, Oct. 11, p. 561. The inquirer desired information in regard to the benefit to be derived by rounding the bottom of the fan shaft so as to avoid abutting surfaces for the air current to strike against.

It was also stated that 40-lb. steel rails had been placed across the shaft to resist the pressure due to a quicksand formation a few feet below the surface. The question was asked to what extent these rails would obstruct the flow of the air in the shaft.

Inasmuch as the investigations in my charge at the present time have for their object the determination of the resistance offered by different forms of obstruction to the flow of air in airways, I was deeply interested in reading the reply of the editor to this inquiry.

INVESTIGATIONS TO DETERMINE THE RESISTANCE OFFERED BY TURN IN AIRWAY

In general, the resistance offered by a right angle turn in an airway, such as is met at the foot of a shaft, has been found to cause a theoretical loss of pressure equal to twice the velocity head of the current, as the editor has stated in reference to the effect that may be expected to result from rounding the bottom of the shaft. This was one of the first results shown in our investigations, which are just beginning to get underway. Later, we expect to be able to specifically evaluate the various forms of obstructions commonly found in airways.

Regarding the resistance offered by the steel rails

described as placed across the shaft, it is quite probable that their effect is greater than may be generally supposed. While we are unable, at this time, to present any precise numerical data on this form of obstruction, it can be said that some work which has been done indicates that the loss of pressure due to the air current striking such an obstruction at a high velocity is considerable, I may even say surprisingly large.

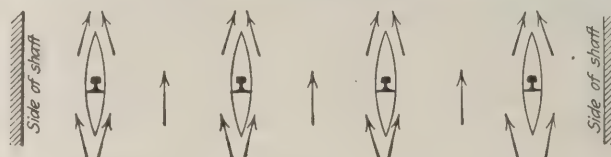
STREAM-LINE CURRENT REDUCES RESISTANCE

In my opinion, such losses may be cut down to one-half or even one-fourth by giving the crossbeams a fish shape that will divide the air current and cause it to follow stream lines, instead of creating an eddy just beyond the obstruction. Let me suggest, therefore, that much benefit would be derived, in this case, by building up a shell about the rails placed in the shaft, so as to give them a stream line effect.

Using light sheet metal, a good mechanic can do this at a comparatively small cost. Or, possibly, the rails can be encased in concrete so as to present the same stream-line shape to the air current. The exact position of these rails in the shaft is not given in the inquiry further than to say that they are placed across the shaft. I have shown, in the accompanying sketch, how these

may be encased in sheet metal, or concrete, to produce the desired effect and very much reduce their resistance to the flow of the air.

In view of the investigations in progress along this line, it might be a benefit both to the operator and to ourselves engaged in the work, if arrangements could



CREATING STREAM LINES PAST OBSTRUCTING RAILS

be made to take some readings in this shaft, for the purpose of determining the pressure losses resulting from the obstruction offered by the rails. We would be glad to take such readings, both before and after the suggested changes are made, if that is done. For that work, we have developed some precise sensitive instruments for measuring such pressure differences.

THOMAS FRASER, Research Asst. Professor,

Engineering Experiment Station,

Urbana, Ill.

University of Illinois.

Inquiries Of General Interest

Weight and Expansion of Water, Formulas for Calculating

*Temperature of Water at Maximum Density—
Coefficient Shows Expansion Is Then Zero—
Maximum Density Basis of Calculation*

KINDLY give the weight of a gallon of pure water and state whether this weight per gallon is the same for all temperatures. If not, how can the weight be estimated for any given temperature?

Denver, Colo.

STUDENT.

For ordinary calculations, the weight of pure water is commonly taken as 62.5 lb. per cu.ft., or $62.5 \times 231/1,728 =$ say 8½ lb. per gal., making 12 gallons per hundred pounds of water. For closer calculation, however, the weight of pure water, at maximum density (39.2 deg. F.), is 62.4283 lb. per cu.ft., or 8.345 lb. per gal.

Owing to a very slight expansion of the water by heat, its density and weight, per unit volume, is slightly less at the higher temperatures. In order to calculate the weight of any given volume of water at a given temperature, it is necessary to multiply the weight of the water at maximum density, by its density at the given temperature. For example, the density, (*D*) of pure water, at any temperature (*T*, absolute), is given very approximately by the formula,

$$D = \frac{1,000 T}{500^2 + T^2}$$

This formula is based on a density of unity, or 1, at

the temperature of maximum density of the water. In the calculations, all the temperatures are absolute temperatures making that of maximum density 460 + 39.2 = say 500.

CALCULATING THE COEFFICIENT OF EXPANSION

As stated previously, the expansion of water, for any given rise in temperature, is very slight. The coefficient of expansion for any given temperature, may be calculated thus: Since the formula just given expresses the density of pure water at an absolute temperature *T*, its volume per pound at such temperature, is the reciprocal of that formula, which gives

$$\text{Vol. per lb.} = \frac{500^2 + T^2}{1,000 T}$$

Then, taking the volume at maximum density as unity, or 1, the increase in volume, at any temperature *T*, absolute, is

$$\frac{500^2 + T^2}{1,000 T} - 1 = \frac{500^2 + T^2 - 1,000 T}{1,000 T} = \frac{(T - 500)^2}{1,000 T}$$

The original volume at maximum density being 1, this increase in volume, at any temperature *T*, gives the ratio of expansion for such rise in temperature. Finally, dividing again by the temperature, absolute, gives for the average expansion per degree, or approximate coefficient of expansion.

$$\text{Coef. of expansion} = \frac{(T - 500)^2}{1,000 T^2}$$

Notice that the expansion at maximum density becomes zero, since then *T* = 500. By way of illustration, let it be required to find the volume of 1,000 cu.ft. of pure water at a temperature of, say 240 deg. F. (460 + 240 = 700 deg. abs.). The coefficient of expansion of the water at the given temperature being

$$\text{Coef. of expansion} = \frac{(700 - 500)^2}{1,000 \times 700^2} = 0.00008$$

which makes the increase in this volume 1,000 × 0.00008 = 0.08 cu.ft., which is so slight as to be practically inappreciable.

Examination Questions Answered

Anthracite Foremen's Examination, Districts 15 and 16, 1923

(Selected Questions)

QUESTION—*Why is it that firedamp may be found and ignited near the roof of a mine when there is none near the bottom; and why does blackdamp seek the lower level?*

ANSWER—Firedamp is an explosive or an inflammable mixture of methane (marsh gas) and air. The specific gravity of methane is 0.559, showing it to be little more than half again as heavy as air. On this account, the firedamp mixture is always lighter than air and has a tendency to accumulate at the roof and at other high points in the mine.

On the other hand, blackdamp is a mixture of carbon dioxide and air. The specific gravity of carbon dioxide is 1.529, showing blackdamp to be more than half again as heavy as air. On this account, a blackdamp mixture tends to accumulate at the floor or in other low places in the mine.

QUESTION—*If two breasts are being driven toward each other what precaution would you take to prevent accidents from blasting?*

ANSWER—The utmost care must be taken, in such cases, to give ample warning before proceeding to fire a shot in either place. One must be sure that the warning is understood by the response given to the signals indicating that a shot is about to be fired. When the breasts have approached each other closely and but a few feet of barrier coal remains the safest plan is to stop the men working in one of the places till the shots have holed through.

QUESTION—*If you were acting as assistant mine foreman, where would you consider the proper place to leave your ordinary mine lamp when making the early examination of the section of the mine you have in charge?*

ANSWER—When making his early examination in the morning a fireboss should never carry an open light into the section of the mine in his charge. He should have with him none but an approved safety lamp that has been duly examined, cleaned and assembled, except he may carry an electric cap lamp to give him the best possible light in examining the roof, coal and timbers at the working faces. If an open light is taken at all into the mine it should be left on the shaft bottom.

QUESTION—*Why is the ignition of a small body of firedamp more dangerous in a thin seam of coal than in a thick seam? State fully.*

ANSWER—When a body of gas is ignited in a thin seam or contracted openings the expansion of the hot gases causes the flame to practically fill the opening and there is little escape for the men who may be present. On the other hand, in a thicker seam where there is ample headroom, the flame of the igniting gas will often travel along the roof, thereby affording greater opportunity for the men to escape.

QUESTION—*How would you proceed to remove a body*

of firedamp from a series of breasts, pitching 30 deg., the gas having accumulated during the stopping of the fan?

ANSWER—Before making any attempt to remove or disturb the gas, notify and withdraw all the men working in that section or exposed to the return current in its passage out of the mine. Then, starting at the outby end on the intake side of the section, deflect all the air toward the face of the first place, by erecting a brattice or hanging a canvas for that purpose in the entry. Allow none but experienced men to assist in the work and use none but approved safety lamps that have been carefully examined and assembled.

Proceed slowly, allowing plenty of time for the air to sweep away the gases accumulated at the face of the pitch, in the first chamber. Make frequent tests with a safety lamp to ascertain the progress of the work. When the first chamber is clear of gas, carry the brattice through the last crosscut and extend it so as to sweep the gas from that place. In like manner, continue to clear each place of gas throughout the section. The entire section must then be carefully examined and reported safe before men are permitted to enter again for work.

QUESTION—*What care and attention should safety lamps receive if used in a mine giving off considerable gas? Who does the law require to furnish and care for the safety lamps?*

ANSWER—The Anthracite Mining Law, Art. 12, Rule 9, requires the employment of a competent person charged with the duty of examining every safety lamp immediately before it is taken into the workings for use. All lamps must be clean, safe and securely locked before being given to the men, except when the mine foreman permits a lamp to be used unlocked, which he is authorized to do. The same section provides that the lamps shall be the property of the owner of the mine.

QUESTION—*Explain the difference between natural and mechanical ventilation and state which, in your opinion, is the most dependable, giving your reasons in full.*

ANSWER—Natural ventilation depends on the circulation of air through the operation of a natural agency, such as the natural heat of the mine; the force of surface winds acting on the mine opening; or the action of water falling in a shaft. The natural heat of the mine forms an air column in a shaft or a slope mine and in rise and dip workings. The resulting pressure is determined by the difference in temperature of the inside and outside air and height of the air column.

On the other hand, mechanical ventilation is that produced by mechanical means, as the action of a fan, steam jet or blower. Mechanical ventilation is more dependable than any form of natural ventilation, being under better control and capable of being increased according to requirements.

QUESTION—*Why is the ventilation of a mine necessary? Describe fully.*

ANSWER—Ventilation is necessary in order to remove all noxious gas generated in a mine and supply in its place fresh air that will support life and make the mine safe for work. The air current entering the mine dilutes and renders harmless the inflammable and poisonous gases that may be produced and which render the mine unsafe for work. When properly conducted the force of the air current sweeps these gases from their lodgments and carries them out of the mine.

High Spots in U. S. Coal Commission's Report On Bituminous Miners and Their Homes

The Coal Commission made a study of original census returns for 1920. It found:

Soft-coal mine workers numbered 584,985 and 147,456 were anthracite workers.

Twenty-one per cent of soft-coal workers live in towns of 2,500 or more, 79 per cent live in the country.

Nearly 60 per cent are native-born white, 8.1 are native colored, and 32.7 were born outside the United States.

Sixty-nine per cent of the foreign-born bituminous-mine workers have been in this country 10 years or more; of anthracite workers 78 per cent.

Eighty-eight per cent of soft-coal workers are able to read and write.

Over 62 per cent maintain homes where they work, and over 95 per cent of these are or have been married men.

Nearly 11 per cent of the soft-coal mine workers are sons of mine workers.

Approximately half the soft-coal mine workers live in company owned houses.

The report lists 66 "best" company controlled mining towns out of 713 examined, and 82 "worst."

This report represents "three distinct but related field investigations and a tabulation of census data hitherto unutilized." Field agents made surveys of 880 communities—713 controlled by companies, 167 independents—for data on physical environment and community resources; sanitary surveys were made for the Commission by the U. S. Public Health Service in 123 communities, 64 company controlled and 59 independent, and retail prices, rental rates, etc., were studied in selected districts and family budgets collected for information about the cost of living.

Pinchot Inspection Plan Maintains Quality of Anthracite

The State Department of Mines of Pennsylvania has received the first reports of the inspection made by order of Governor Pinchot to ascertain what quality of coal is being furnished the public by the anthracite producers. These show that stone and bone were found in a number of cars of domestic sizes of coal, and that the coal was below the required standard. The coal was condemned.

A statement issued by the department reads:

"An important part in Governor Pinchot's plan to correct the abuses in the anthracite industry of Pennsylvania is the improvement in the quality of coal furnished to consumers. This is one of the most deplorable phases of the situation, as coal of inferior quality means a decided increase in the actual cost to the consumer. Among the reputable operators there is a standard of quality and when it is adhered to no complaint is made regarding the quality of the coal. This standard, roughly speaking, allows the following percentages of unburnable matter: In broken or grate coal, 1 per cent slate and 1 per cent bone; egg, 2 per cent slate, 2 per cent bone; stove, 4 per cent slate, 3 per cent bone; chestnut, 6 per cent slate, 5 per cent bone, and in the very small steam sizes from 10 to 20 per cent slate and bone.

"To get first-hand information on this subject and to accomplish immediate results for the benefit of the public the Governor directed Secretary Walsh, of the Department of Mines, to take charge of the matter. Secretary Walsh last week issued instructions to the state mine inspectors in the anthracite region to go to the mines and inspect the coal that was loaded for shipment to market. Reports have not yet been received from all of the inspectors, but those that have been received show the wisdom of the course being pursued to obtain clean coal, and the effect upon future shipments no doubt will be such as to guarantee a very much better grade of coal in many instances than has been furnished in the past."

Mining Institute Nominates Officers

William Kelly, of Vulcan, Mich., mining engineer and industrialist, has been nominated as president of the American Institute of Mining and Metallurgical Engineers for 1924. As vice-presidents and directors, Everette L. DeGolyer, geologist, of New York City, and Charles W. Merrill, metallurgist, of San Francisco, were named. Directors were selected as follows: R. V. Norris, engineer, of Wilkes-Barre, Pa.; George Otis Smith, of Washington, director of

the U. S. Geological Survey; P. B. Butler, mine operator, of Joplin, Mo.; B. D. Quarrie, steel manager, of Cleveland, Ohio, and L. D. Ricketts, engineer, of Warren, Ariz. The nominating committee was composed of Raymond Guyer, chairman; Stuart Crossdale, L. H. Duschak, Carle R. Hayward, Sidney J. Jennings, Birch O. Mahaffey and Dwight E. Woodbridge.

The annual meeting of the Institute will be held in New York City Feb. 18, 19, 20 and 21.

Keeney Proposes Unionizing West Virginia

That the United Mine Workers of West Virginia propose to organize all the miners in the state if possible, is the gist of a statement just made by C. F. Keeney, president of district 17, United Mine Workers, under whose jurisdiction comes all the organized miners of the state at the present time. Coupled with the statement is a general invitation extended to the unorganized coal miners to become identified with the union.

The district president in issuing the invitation declares that "all lawful assistance and moral support" will be extended those desiring to accept the union invitation. He states that the international organization and all its financial resources are back of the campaign to organize non-union fields. Not only is the announcement of the president of district 17 considered significant coming as it does on the heels of the meeting of the policy committee of the union at Cincinnati, but the statement made by Keeney even hints that the announcement is a result of the Indianapolis policy meeting.

2 Dead, 13 Injured in Orient Mine Blast

Two miners were killed and thirteen injured in an explosion in the No. 1 mine of the Chicago, Wilmington & Franklin Coal Co., at Orient, Ill., on the morning of Nov. 26, according to a press dispatch. Six of the injured, it is said, are likely to die. Thirty-five men were working in the section affected by the blast, all of whom had been brought to the surface by the rescue teams at 1 p.m. The big mine employs more than 1,000 men, 922 of whom were in the mine when the explosion occurred. A greater disaster probably was averted by the company's disposition of air currents, which confined the effects of the blast to a small area.

WASHINGTON, Nov. 25.—A pure-coal bill, to follow as nearly as possible the form of the pure-food law, is to be introduced by Senator Borah on the convening of Congress.

Urges Regulation of Anthracite From Mine to Retailer

Governors Asked to Make Concerted Move to Insure Public "Honest Coal at Decent Price"

Governor Pinchot of Pennsylvania opened his anthracite conference in Harrisburg on Monday, Nov. 26, with an appeal to the governors and their representatives from anthracite-consuming states to join with him in a concerted effort to put the anthracite industry from mine to retailer under state and federal regulation.

"The anthracite-using people of America are justly entitled to three things. The first is coal. The second is honest coal. The third is honest coal at a decent price." With these words the Governor opened his address. He said that the settlement of the recent strike provided coal but it could not assure relief from impure coal, nor could it assure freedom from extortionate prices. He said that no other question holds the attention of the people like this question of "honest coal at a decent price and that upon no other question will consumers of anthracite demand such an accounting from executive and legislative authority," adding, "there is no more certain way of incurring their resentment than by failing to take the necessary steps."

There is a tendency, the Governor said, among conservative business men and conservative journals "to consider the government's taking over the anthracite mines, if justice can be had no other way. The public feeling is so deep," he said, "because the people know the anthracite business is a monopoly—greedy, relentless, defiant." Anthracite is a necessity in the control of a monopoly and therefore the anthracite industry is affected with a public interest, and, being a monopoly affected with a public interest, "according to the Supreme Court, is a proper subject for government control."

SAYS OPERATORS TOOK UNFAIR ADVANTAGE

Charging that the settlement of the strike put the wages of the miners only where they should be, increasing production cost 60c. per ton, the Governor charged that the operators "not only passed the whole increase over to the public, which was thoroughly unjust, but took advantage of the situation to make their own profit greater than before." He reiterated his opinion, expressed at Philadelphia two weeks ago, that the whole combination is a "hard-boiled monopoly whose prime interest in the public is that it shall consume their coal at their price."

He stated that the first thing to do is for the state executives to use the power they now have, as by publicity as to fraudulent practices. State officials also can "ascertain and tell the people what extortions are being practiced, and by whom." Discussing Pennsylvania's share, the Governor said that he had already vigorously attacked the problem of rock and dirt in anthracite and is making public the names of operators who are guilty. Royalties, he said, are matters of private contract and cannot be changed. He defended the certification of miners and said that "nothing could be more foolish than to open the anthracite mines to unskilled mining." The certification law is a just and proper one, he said; "It should not be repealed."

The Pennsylvania anthracite tax has no effect on the price of coal, and Governor Pinchot stated that he was emphatically against its repeal.

Federal action was urged because nine-tenths of the anthracite moves in interstate traffic. Standards for clean coal and for sizes in interstate commerce in anthracite, licenses for all who engage in the trade and authority for denial of railroad cars were three things, together with publicity of accounts, that Governor Pinchot recommended particularly.

Whatever doubt there may be as to the right of the United States "to fix prices, establish uniform accounts, examine books, or require reports in the anthracite industry," Governor Pinchot pointed out that each state can do all of these things if it chooses. He suggested that the

"treaty or compact between the states authorized by the federal Constitution" be seized upon by the anthracite-consuming states as authority under which to set up a joint commission and agree upon a form of regulation of the anthracite industry.

He called for a committee of the governors to prepare a draft for federal legislation and to draft a form of compact to utilize state powers, "with a view to immediate action."

Anthracite Margins Continue to Shrink, Says Federal Trade Commission

Margins taken by anthracite wholesalers have steadily declined since the anthracite strike in September, the Federal Trade Commission reported Nov. 26. There also has been a sharp decrease in the proportion of sales at premium prices. Heavy production at the mines, the commission said, probably is chiefly responsible for the falling off in such sales, but the publication of facts concerning profits and prices has also helped to "bring about a return to normal."

In the first week after the strike the commission found as much as 66 per cent of the coal handled by wholesalers had a profit margin of more than 50c. a ton put upon it. In the week of Nov. 13, the last for which figures were assembled, about 34 per cent was sold at a 50c. wholesale margin.

During the two weeks ending Sept. 22 as much as 30 per cent of the coal traded through wholesalers' hands had cost more than \$12 a ton at the mines. During a like period ending Nov. 3, only 18 per cent of the coal traced had been sold at so high a price.

The commission said that all during the period of investigation "the railroad" anthracite producers, which control most of the tonnage, had sold their output at from \$8.75 to \$9.25 a ton at the mines.

"For the two weeks ending Nov. 3, as compared with the two preceding weeks," says the commission's latest report, "there was no change in the proportion of domestic sizes of anthracite passing through the hands of two or more wholesalers. During the six weeks ending Nov. 3, approximately 25 per cent of all sales reported passed through the hands of two or more wholesalers. For premium domestic sizes reported by wholesalers for the two weeks ending Nov. 3, 74 per cent passed through the hands of but one wholesaler; 25 per cent passed through the hands of at least two wholesalers, and only 1 per cent passed through the hands of at least three wholesalers. For steam sizes the percentages are quite different; 42 per cent passed through the hands of one wholesaler; 57 per cent passed through the hands of at least three wholesalers."

Jackson-Walker and Midland Coal Cos.

Merge; Each Retains Old Name

A merger of the Jackson-Walker Coal & Mining Co. and the Midland Coal Co. was announced in Kansas City, Nov. 20. The merger was effected by an exchange of stock by C. P. A. Clough, principal owner and president of the Jackson-Walker company, and C. H. Markham and H. G. Kellogg, owners of the Midland. The two firms will retain their individual names, but will occupy joint offices, probably those of the Jackson-Walker company, in Kansas City.

The Jackson-Walker company has a large acreage of coal land under lease in the southeastern Kansas field. A part of this the company itself is working, while much of it is being worked by smaller individual operators under sublease. The Midland company has a well-organized distribution system, and will operate as a distributing medium for the products of the Jackson-Walker mines, Mr. Clough said.

The merged companies have a capitalization of \$505,000, with a surplus of approximately \$600,000.

Mr. Clough obtained control of the Jackson-Walker company a few months ago by purchasing the stock holdings of the widows of the founders of the company.

Midwest Mines Get Little Running Time

Many Operations in Illinois and Indiana Closed for Several Months—Few Are Working More Than Two or Three Days a Week

The effect of low market on coal production in Illinois and Indiana can be seen plainly in the fact that about 70 mines in Illinois and 85 in Indiana are closed down and many have been down for several months. Few of those in operation have been able to get more than three days running time each week all summer and autumn. The average in both states is now a little less than 40 per cent of full running time for those mines that have avoided shutting down.

The 85 Indiana shutdowns were from a total of 204 mines that were in operation Jan. 1, 1923. These closed mines had a daily capacity of 62,561 tons. They constituted 41.6 per cent of the mines in operation in the state last January and the loss of their tonnage amounts to 33.2 per cent of the total capacity of all the mines—183,233 tons daily.

Sixteen of the Indiana mines were abandoned and scrapped because their territory was practically worked out, according to figures and reports filed with the Indiana Coal Trade Bureau, of which Jonas Waffle is manager. Of the 69 which have closed indefinitely, the reason in nearly every instance was, inability to operate at a profit.

It is said that the growing use of coke and the buying by large consumers of the products of the non-union mines of West Virginia and Kentucky are two main reasons for the falling off in demand for Indiana coal.

Another feature of the industry in Indiana is the discrimination in freight rates, Mr. Waffle pointed out. Operators from neighboring states at the present time can ship coal into Indiana at a lower freight cost than the Indiana operators can ship their coal within their own state. John Hessler, president of District No. 11, U. M. W. of A., says he believes this has had quite a good deal to do with the idleness of many of the mines.

Three Big Days with Coal Mine Institute

With the Question Box to the fore, as usual, the Coal Mining Institute of America will open its annual session at the Chamber of Commerce Auditorium, Pittsburgh, Pa., Dec. 19 and 20, and on Dec. 21 will close its session with a trip to the experimental mine at Bruceton, Pa., where the U. S. Bureau of Mines will stage an explosion and show the assembled members the rock-dust barriers, the explosives-testing apparatus and safety-lamp tests.

On Wednesday, Dec. 19, the morning will be devoted to reports of the Executive Board, an announcement of the elected officials, the election of tellers for 1924, an address by the president, Richard Maize, and one by Dr. George H. Ashley entitled "A Practical Classification for the World's Coals." In the afternoon a motion picture entitled the "Story of Dynamite" will be shown, Dr. R. R. Sayers will deliver an address on "Health Hazards in Coal Mining" and John T. Ryan one entitled "Some Observations on European Coal-Mining Conditions."

Three questions also will be discussed: "Does dynamite exert a greater force downward or does it exert the same force equally in all directions?" "What type of safety lamp is the more sensitive to gas—the flat or the round wick?" and "Is radio proving of any practical use in coal mining or for mine-rescue work?"

In the evening a dinner will be given at McCreery's Store with Richard Maize as toastmaster, and Dr. Daniel L. Marsh, pastor of the Methodist Episcopal Smithfield St. Church, "Old Brimstone Corner," as principal speaker. He is the author of "The Challenge of Pittsburgh." Captain Irving O'Hay, "The Soldier of Fortune" and a veteran of eight wars and also author of "From Dan to Beersheba," will come from New York City to address the banqueters, as also the Hon. Abe Potash, a coal operator of New Brunswick, N. J. The new president's address will complete the proceedings.

W. E. Fohl will lead Thursday morning's session, which will discuss three questions, the first being "what precau-

tions should be taken in installing an electrically driven exhaust fan at a gaseous mine to prevent the motor from igniting the gas in the return air when the ventilation is re-established, the fan having stopped long enough to allow the mine to fill with gas? Denver wants the answer. Cleveland, Ohio, will ask "What is the practical limit to the splitting of air currents?" and Altoona is pressing for a reply to the question "What changes in roof, bottom and coal are found when approaching a fault?"

Joseph J. Walsh, State Secretary of Mines, of Pennsylvania, will deliver an address on "Mine Fires and Some Methods for Extinguishing Them."

In the afternoon Thomas Chester will read his paper on "New Data Concerning the Humidification of Mine Air" and Nicholas Evans will preside over a discussion of four questions: "Where does the most dangerous dust lie—on floor, ribs or timbers?" "Is it possible to have an explosion in a mine where your safety lamp gives no indication of firedamp?" "What are the most common causes of the ignition of gas in coal mines?" and "How tight should posts be set in rooms and entries?"

Power and Mechanical Engineers' Exhibit

The power show to be held at the Grand Central Palace, New York City, Dec. 8, will have a complete showing of the latest devices used in measuring the flow of liquids and gases, as well as apparatus for the generation and utilization of power, including boilers, stokers, superheaters, economizers, transmission equipment, and various other items used in the power house.

The demand for increased economies in the operation of power equipment and power-generating equipment has accelerated the development of measuring devices, without which economy of operation is practically impossible. For these reasons the power-plant man interested in effecting savings will surely find much of interest in this exposition. Engineers coping with fuel problems will be interested in the exhibit of fuel burners such as stokers, pulverized-fuel and fuel-oil burners.

During the week of the exposition the annual meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building Dec. 3-6, when topics of interest to fuel producers and consumers will be discussed.

Take Steps to Form Alabama Traffic Bureau

Alabama Mining Institute held its annual meeting at the Roebuck Country Club, Birmingham, Nov. 21 with a large attendance. Reports of officers were made on activities of the institute during the past year. The following new directors were elected to take the places of a similar number whose terms automatically expired with the close of the fiscal year: C. T. Fairbairn, manager of the Republic Iron & Steel Co.; J. B. McClary, president of the Yolande Coal & Coke Co., and S. L. Yerkes, president of the Burnwell Coal Mining Co. Officers for the ensuing year will be elected at a meeting of the directors, consisting of nine members, to be held in December. Steps were taken at the meeting toward the formation of a traffic bureau. The institute was addressed by Harry L. Gandy, secretary of the National Coal Association.

By a standing vote, Institute members announced a renewal of their confidence in the National Coal Association and authorized the appointment of a committee to make an effort for one hundred per cent local membership.

Mine Workers Silent on April 1 Program

Mum was the word among International officers of the United Mine Workers after the executive board meeting in Indianapolis, Ind., ending Nov. 20. Plans were made for the Jan. 22 annual convention of the union in Indianapolis, the call for which issues Dec. 1, but little was said about the probable program for the gathering and, of course, not a word about the probable platform of demands upon which the union expects to meet the operators before the end of the present wage contract, April 1.

Again Rejects Plan to Curb Hard-Coal Prices as Illegal

Warriner Tells Pinchot Proposed Agreement by Operators to Restrict Retailers Offends Criminal Statutes—Counsel Says Scheme Is Subterfuge

Governor Pinchot's proposal that the anthracite operators refuse to sell to retailers who charge more than the retail prices of 1922 "offends the criminal laws of the United States" and the plan cannot be accepted, according to opinion of counsel, S. D. Warriner, chairman of the anthracite operators' general policies committee, wrote the Pennsylvania executive No. 23.

Last week George W. Woodruff, Attorney General of Pennsylvania, rendered an opinion that the operators could agree with one another to control prices for the benefit of the public without infringing on the common law, "although they might be in danger of prosecution under the Sherman law if they agreed to hold prices below a maximum. It is hard to find how they could be attacked unless the federal Department of Justice were hostile to action in favor of the public interest," said the opinion.

WARRINER PRESENTS OPINION OF COUNSEL

Mr. Warriner enclosed an opinion by Walter Gordon Merritt, of New York, which said Governor Pinchot's proposal "involves the commission of criminal acts either directly or by subterfuge and should be declined."

In his letter Mr. Warriner said:

"The enclosed opinion of counsel can leave no reasonable doubt that the only proposal made by you to the anthracite operators, at our recent conferences, offends the criminal laws of the United States. From this follows other conclusions involving the hostile attitude which you have seen fit to take against one of the great industries of our state.

"You assumed to furnish a solution and stated to us that your proposals must be accepted or you would attack the industry. You are now carrying out that threatened attack because of our inability to accept a plan which is both impracticable and unlawful.

"A policy of fixed antagonism on the part of state officials obstructs, rather than promotes, our efforts to meet the problems of the industry and the reasonable expectations of the public.

"Permit me again to express our desire to fully co-operate with the State of Pennsylvania in any lawful and practicable plan."

Mr. Merritt's opinion said in part:

"The Attorney General holds that such a scheme would constitute a crime under the Sherman Anti-Trust law, and with this view I am in entire accord. To evade the application of the Sherman Anti-Trust law, the Governor now urges that the same end, though illegal when accomplished by direct agreement between the operators, can be legally accomplished by independent but uniform agreements between each operator and the Governor.

"The Supreme Court of the United States denounced all such evasions. It ruled in the tobacco case that the Sherman Anti-Trust law "embraced every conceivable act which could possibly come within the spirit or purpose of the prohibitions of the law, without regard to the garb in which such acts were clothed. . . . In view of the general language of the statute and the public policy which it manifested, there was no possibility of frustrating that policy by resorting to any disguise or subterfuge of form, since resort to reason rendered it impossible to escape by any indirection the prohibitions of the statute.

"The Governor cannot legalize such a scheme. The Supreme Court held that President Roosevelt's approval of the acquisition of certain property by the Steel Corporation did not make it legal. The suggestion of the Attorney General that such a benign combination, though illegal, would be free from attack 'unless the federal Department of Justice were hostile to action in favor of the public interest,' ignores the fact that boycotted dealers would demand that

federal authorities perform their sworn duty to enforce the law. The operators cannot afford to place themselves in jeopardy by violating the federal statutes and relying upon the connivance of the federal government for protection."

Illinois Mining Institute Is Told People Should Appreciate Cheapness of Coal

John L. Lewis, International president of the United Mine Workers of America, was principal speaker at a luncheon held by the Illinois Mining Institute at the American Annex Hotel in St. Louis, Mo., Nov. 24. This was one of the largest meetings ever held by the institute, about 250 persons being in attendance.

Mr. Lewis in discussing the differences in living, working and operating conditions between the United States and Great Britain, declared that Americans too often failed to realize that coal was produced and sold for less here than anywhere else in the world, that the British miner produced one ton per day as compared to the four tons which the American mine worker regarded as a proper day's work. The British miner was slow, but the operator did not show any greater speed, his buildings and equipment with a few exceptions not being up to date.

He urged that the evils in the coal industry could best be solved by those who were in it. He declared that Congress could not find a solution and any it might think it found would not remedy the situation and probably would be unconstitutional. He had faith that the operators and mine workers would work out their difficulties in conference.

Herman C. Perry, vice-president of the Fifth and Ninth Districts Coal Operators' Association, the second speaker at the luncheon, said that neither the operator nor the mine worker could be blamed for the excessive development of the coal industry in Illinois. It was caused by the apprehension of a fuel shortage arising from the inability of the carriers to fulfill their duties. Only once, said he, in forty years had there been an actual coal shortage. If the railroads had been able to handle the tonnage when the peak demand came there would never have been any overdevelopment.

Mr. Perry spoke with much favor regarding a bill offered in the last session of the Illinois Legislature which would, in his opinion, have been the biggest step made in recent years in the coal industry. It provided for the retreating system of mining. The bill failed. Had it passed it would have eliminated the small mine and would have given us large mines but fewer of them, thus decreasing the cost of distributing, collecting and hauling railroad coal cars. The mines now in operation in Illinois were, he added, capable of supplying the demands made on the Illinois fields for the next twenty-five years without the opening of another mine. If there were coal equipment available Illinois could produce a million tons a day.

At the technical session, J. A. Ede, consulting mining engineer, of La Salle, Ill., discussed new methods in longwall, arousing some disagreement but on the whole finding a general approval of his advanced opinions. Harvey E. Smith, general superintendent, Leland Coal Co., Springfield, Ill., discussed coal mining in South America.

At the business session, which concluded the meeting, the following were elected: D. D. Wilcox, superintendent Superior Coal Co., Gillespie, Ill., president; Harvey E. Smith, first vice-president; E. G. Lewis, superintendent, Chicago & Sandoval Coal Co., Sandoval, Ill., second vice-president; Martin Bolt, secretary and treasurer (eleventh time); George K. Larrimore, Springfield, Ill.; F. F. Tirre, St. Louis, Mo.; J. A. Jeffries, St. Louis, Mo.; Sam T. Jenkins, St. Louis, Mo., and Bruno Meyers, Staunton, Ill., directors.

ANNOUNCEMENT WAS MADE in Washington last Saturday that the U. S. Attorney for the District of Columbia will ask an indictment of certain Washington retailers on the ground that they have entered into an understanding as to prices. Previous efforts to prove violation of the law by District of Columbia retailers have failed.

Draft Bill for Compulsory Cost Returns to Trade Commission

Blunder Seen in Operators' Failure to Report Voluntarily—C. P. White May Be New Coal Chief of Commerce Department

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

Friends in Congress of the Federal Trade Commission are prepared to insist that there be no repudiation of the commission in the matter of gathering figures on the cost of producing coal. There are a number of national legislators who are expected to insist upon compulsory returns being made to the Federal Trade Commission. Whether the figures are to be submitted voluntarily or on a compulsory basis, the friends of the commission feel that they should go to this agency of the federal government since it was the commission that first embarked on this activity and would be continuing it were it not for the legal technicalities which have been placed in its path by those from whom the returns must come. To allow this function to pass into the hands of the Department of Commerce or any other government agency, in their opinion, would be a sort of repudiation of the commission, or at least it would be failure to uphold its hands.

There are other members of Congress who fear the coal industry would be dealt with too sympathetically were cost figures to be gathered by the Commerce Department. Their idea is that the Federal Trade Commission would come nearer getting the real facts. The experience with the railroads has taught many members of Congress that it is one thing to obtain returns, but quite another to procure figures that tell the real story. There are many who believe most railroads are earning, in effect, more than is indicated by the bare returns to the Interstate Commerce Commission. If either voluntary or compulsory figures are submitted to the Federal Trade Commission, there is a feeling among some members of the national legislature that they would be interpreted not so much as the industry would like but in a way best calculated to serve the public interest.

It is known definitely that a bill has been drafted providing for compulsory returns of cost data to the Federal Trade Commission.

As the situation is shaping itself, the seriousness of the mistake of the operators in not starting the voluntary returns which they promised the Coal Commission is becoming more apparent. Had this plan been put in operation immediately after it was suggested, it is improbable that Congress would have disturbed the arrangement. Since considerable time must elapse from the time legislation is introduced until it is brought up for final consideration, there still is time for the industry if it prefers to co-operate with the Department of Commerce rather than the Federal Trade Commission, to get the plan under headway.

N. C. A. BLAMED FOR CLOUDING SITUATION

The National Coal Association cannot be blamed too severely because of the uncertainty injected into the situation by the fact that Mr. Wadleigh was to leave the department. To reach a thorough understanding of such a plan, many conferences are necessary and much effort must be expended. The operators took the view that it would be better to await the advent of Mr. Wadleigh's successor before attempting to launch their proposal.

As this is written, it seems probable that the new chief of the Commerce Department's Coal Division will be C. P. White. It is known definitely that Mr. White may have the position if he will accept. Mr. White's decision in the matter is expected within the next few days. It is generally admitted that Mr. White is excellently qualified to fill this position. It is well known that he enjoys the confidence of the industry and it is believed that the members of Congress interested in coal will agree that he can be relied upon to be entirely conscientious in the discharge of his duty to the public.

The hope is expressed by persons outside of the coal

industry, who are anxious to see that industry spared the burdens of regulation, that the voluntary returns to the Department of Commerce can be begun prior to the introduction of the bill which would divert the figures to the Federal Trade Commission. If the arrangement starts functioning after that date, there would be ground for the belief that it was contemplated seriously only when the Federal Trade Commission idea was proposed. The chance of preventing the designation of the Federal Trade Commission as the agency to receive coal-cost figures has been reduced by failure to get the plan under way, but it is apparent that even a late start with the Department of Commerce would put the operators in a better position to carry out their desires than would be the case if no start at all were made.

Madeira, Hill & Co. Deny Agreement To Enhance Anthracite Prices

Madeira, Hill & Co., of Philadelphia, anthracite producers, have made a sweeping denial of the charge made by the Federal Trade Commission that the company entered into a secret agreement with certain wholesalers to enhance the price of anthracite beyond that recommended by the Fair Practices Committee of Pennsylvania during the recent strike. Madeira, Hill & Co. was one of six defendants named in a complaint by the commission, the others being wholesalers.

While admitting the Fair Practices Committee had recommended that \$10.50 per ton at the mines for prepared sizes of anthracite would be a fair price, Madeira, Hill & Co. denied it gave any assurance to the committee that it would observe such a price and also denied that it was under any obligation to observe such price.

The total amount of tonnage involved in the sales to the defendant wholesalers amounted to 2,783 tons, it was stated. "Such sales were so trifling in comparison with the total anthracite production that they could not possibly have enhanced or affected the price of coal to the consuming public," the firm's denial said.

Denying the commission has any jurisdiction over the matter of billing any sales made by it, Madeira, Hill & Co. informed the commission "that for some months, prior to the filing of the complaint, all of its sales had been billed, and now are being billed, at the prices at which the coal is sold."

The case will be heard by the Commission on Dec. 3.

The Federal Trade Commission has overstepped its powers in attempting to determine "what is an unfair, unreasonable and unjust margin of profit on anthracite," according to answers filed with the commission Nov. 15 by two of the wholesale coal dealers named in complaints filed by the commission for pyramiding of prices.

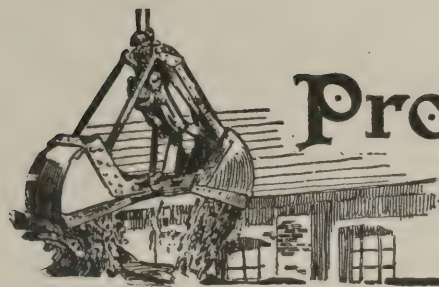
If business men generally adhered to the margin of profits determined by the commission they would be driven "into insolvency and trade stagnation," coal dealers declared. The answers were filed by C. P. Brodhead and Lynn M. Ranger, located at Boston; the Titan Fuel Corporation and Pattison & Bowns, Inc., New York City.

The latter company, after admitting the functions of the office of the Federal Fuel Distributor during the national coal emergency, denied any knowledge or information of how many states "by legislative enactment or proclamation co-operated with the federal government in coping with the emergency."

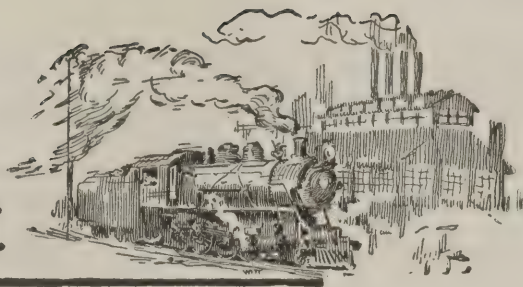
The first-named respondent declared that its information in regard to the appointment of a "Fair Practices Committee by Governor Pinchot of Pennsylvania and a commission appointed by the Federal Fuel Distributor" was received in the newspapers, "but at no time did it receive any communication from these committees to work in conjunction with the Federal Fuel Distributor."

This respondent also questioned the authority of the Fair Practices Committee of Pennsylvania, but after an investigation ascertained it was a voluntary committee, with no authority under the law.

Pattison & Bowns characterized as absurd the charge that they had entered into a conspiracy with Madeira, Hill & Co. to enhance prices.



Production and the Market



Weekly Review

The soft-coal market lacks the usual November snap. Buying of free coals is being done very quietly and cooler weather is needed to bolster up the trade. Current needs are taken care of only when the lowest prices prevail. With the Lake season drawing to a close the mines shipping coal to Lake Erie ports are affected and more closings are reported. This situation has been reflected in the volume of screenings available for spot buyers in the West and has resulted in a stiffening of prices. Smokeless lump suffered a reduction of prices in practically all Western markets, while the steam-coal market showed more strength. The tidewater markets have been strengthened by a practically cleaning up of distress coal.

However, soft coal prices advanced last week to the level attained on Oct. 22, *Coal Age* Index showing 186, an increase of three points from the previous week. The average price was \$2.25. For the corresponding week of 1922 the Index registered 330 with an average price of \$3.99. Increases were recorded in Springfield, Indiana, eastern and western Kentucky, Hocking, Pocahontas, Pittsburgh, Clearfield and Kanawha coals.

INQUIRIES MORE NUMEROUS; ORDERS SCARCE

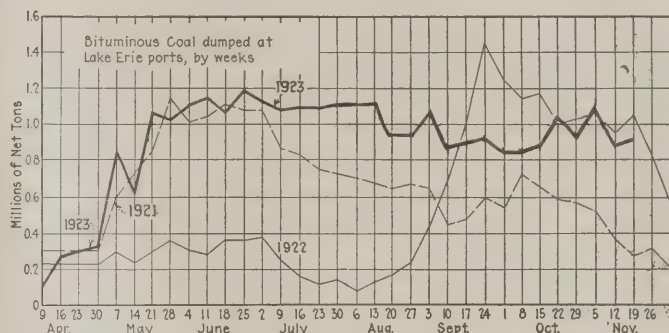
Operators and shippers see a ray of hope in the increased number of inquiries, but new orders are scarce.

Although many mines are closed, production of soft coal during the week ended Nov. 17 is estimated by the Geological Survey to have been 9,684,000 net tons, a decrease of 1,042,000 tons from the previous week, reports indicating that Armistice Day counted only a little more than one-half a normal Monday. Indications point to a production in the neighborhood of 10,500,000 net tons for last week.

There was a marked depression in smokeless coals in the Middle West, but a strengthening in steam coals. Taken altogether the situation is not favorable. Business is practically at a standstill in St. Louis. Similar conditions regarding smokeless coals exist in the Cin-

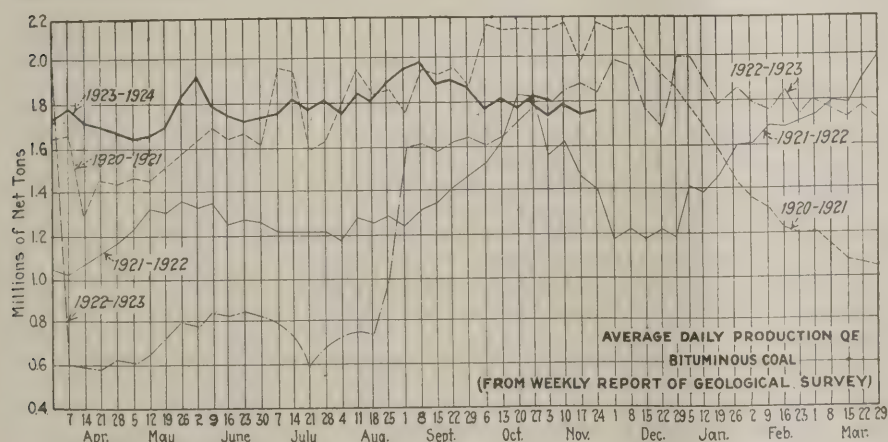
cinnati market. There is a surplus of tonnage available, although many of the mines in southeastern Kentucky are closed. There is little demand and strength in the Columbus market, while at Cleveland business is dull. Production in the Pittsburgh district is being curtailed in keeping with the decrease in Lake shipments, which also has resulted in a slight betterment in slack. There is no improvement reported from New England, but it is noted that distress coal has been cleaned up. A slight encouragement is apparent in the textile field.

Production of anthracite was 1,725,000 net tons in the week of Nov. 17, according to the Geological Sur-



	Week Ended Nov. 19	Season to Nov. 19
Cargo	890,874	28,290,920
Fuel	43,554	1,522,572
Totals	934,428	29,813,492

vey, a decline of 242,000 tons when compared with the previous week, the decrease resulting from Armistice Day idleness. It is estimated that output exceeded 2,000,000 tons last week. Demand for high-priced coals is rapidly disappearing and most shippers believe that it will practically be out of the market before the end of December. Demand centers around stove and



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Nov. 3	10,666,000	10,547,000
Nov. 10 (a)	11,147,000	10,726,000
Nov. 17 (b)	11,215,000	9,684,000
Daily average	1,869,000	1,761,000
Daily average cal. year	1,263,000	1,795,000

ANTHRACITE

Nov. 3	1,872,000	1,373,000
Nov. 10	1,897,000	1,967,000
Nov. 17	2,230,000	1,725,000
Calendar year	42,653,000	84,356,000

COKE

Nov. 10 (b)	246,000	255,000
Nov. 17 (a)	264,000	246,000
Calendar year	6,313,000	16,427,000

(a) Subject to revision. (b) Revised from last report.

chestnut coals, with egg and pea sizes much more in evidence. Steam sizes move slowly.

The export situation looks brighter. Reports from Great Britain indicate that the effect of American competition in the Mediterranean is being felt. Dumpings at Hampton Roads for all accounts during the week ended Nov. 22 amounted to 264,302 net tons, as compared with 290,492 tons in the previous week.

Midwest Steam Coal Firmer

A slight strengthening of steam coals and further depression of Eastern smokeless on the Chicago market were the only notable features of Midwest coal trading during the week. Production has been low for so long that the supply of screenings is small enough to cause a trifling improvement, and this was sufficient to firm up the bottom of the steam market.

Production throughout Illinois and Indiana continues at less than 40 per cent and the market generally is lifeless. There is still a place to put almost all the domestic lump, but no keen demand for it. The recent drop in the prices

of egg and nut sizes in order to relieve the load of "no bills" has had only a little effect. The tremendous production of smokeless in the East has finally mashed down the price of smokeless lump still further. Lump that sold for \$6.25 a few weeks ago is now dragging along on the Chicago market at a bare \$4.50. Smokeless mine-run is hardly able to stay above \$2. The situation generally throughout the Middle West is not cheerful, but cold weather is closer.

St. Louis Trade Is Flat

Warm weather continues in the St. Louis territory and business is at a standstill. The situation is the same in the country as in the city and dealers have their yards full of coal and their equipment idle. Local wagonload steam is quiet. There is no activity in carload steam, either local or in the country, excepting a little moving toward Chicago at prices below cost.

Never in the history of St. Louis have conditions at this particular season of the year been as bad as they now are. In spite of the failure to move coal the low level seems to have been reached. Conditions that are gradually growing worse fail to change prices.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Nov. 27 1922	Nov. 12 1923	Nov. 19 1923	Nov. 26 1923†
Smokeless lump.....	Columbus....	\$6.75	\$5.10	\$4.85	\$4.00@ \$4.25	
Smokeless mine run.....	Columbus....	6.15	2.35	2.15	2.00@ 2.25	
Smokeless screenings.....	Columbus....	5.75	1.35	1.30	1.25@ 1.40	
Smokeless lump.....	Chicago....	6.25	5.10	5.10	4.25@ 4.75	
Smokeless mine run.....	Chicago....	5.60	2.25	2.25	2.00@ 2.50	
Smokeless lump.....	Cincinnati....	6.30	5.50	4.85	4.00@ 4.50	
Smokeless mine run.....	Cincinnati....	6.00	2.35	2.10	1.75@ 2.50	
Smokeless screenings.....	Cincinnati....	5.85	1.50	1.35	1.00@ 2.00	
*Smokeless mine run.....	Boston....	8.90	4.30	4.40	4.50@ 4.80	
Clearfield mine run.....	Boston....	3.60	2.15	2.00	1.85@ 2.50	
Cambria mine run.....	Boston....	4.25	2.55	2.60	2.25@ 3.00	
Somerset mine run.....	Boston....	3.85	2.35	2.35	2.00@ 2.75	
Pool 1 (Navy Standard).....	New York....	5.10	3.00	3.00	2.75@ 3.25	
Pool 1 (Navy Standard).....	Philadelphia..	4.75	3.00	3.00	2.80@ 3.20	
Pool 1 (Navy Standard).....	Baltimore....	4.85				
Pool 9 (Super. Low Vol.).....	New York....	4.50	2.25	2.25	2.25@ 2.50	
Pool 9 (Super. Low Vol.).....	Philadelphia..	4.50	2.30	2.30	2.20@ 2.45	
Pool 9 (Super. Low Vol.).....	Baltimore....	4.60	2.05	2.05	2.00@ 2.15	
Pool 10 (H.Gr.Low Vol.).....	New York....	3.85	2.00	2.00	1.75@ 2.25	
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	3.75	1.85	1.85	1.75@ 2.00	
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	3.35	1.90	1.90	1.85@ 2.00	
Pool 11 (Low Vol.).....	New York....	3.25	1.75	1.75	1.40@ 1.75	
Pool 11 (Low Vol.).....	Philadelphia..	3.15	1.60	1.65	1.65@ 1.75	
Pool 11 (Low Vol.).....	Baltimore....	3.10	1.80	1.75	1.70@ 1.85	
High-Volatile, Eastern		Market Quoted	Nov. 27 1922	Nov. 12 1923	Nov. 19 1923	Nov. 26 1923†
Pool 54-64 (Gas and St.).....	New York....	3.50	1.60	1.60	1.50@ 1.75	
Pool 54-64 (Gas and St.).....	Philadelphia..	3.50	1.60	1.65	1.60@ 1.75	
Pool 54-64 (Gas and St.).....	Baltimore....	3.30	1.70	1.70	1.70	
Pittsburgh sc'd gas.....	Pittsburgh....	4.50	2.55	2.55	2.50@ 2.60	
Pittsburgh gas mine run.....	Pittsburgh....	2.60	2.25	2.25	2.20@ 2.30	
Pittsburgh mine run (St.).....	Pittsburgh....	2.60	1.90	1.90	1.90@ 2.10	
Pittsburgh slack (Gas).....	Pittsburgh....	3.10	1.05	1.05	1.25	
Kanawha lump.....	Columbus....	5.75	3.00	3.00	2.85@ 3.15	
Kanawha mine run.....	Columbus....	3.35	1.85	1.85	1.75@ 2.00	
Kanawha screenings.....	Columbus....	3.25	.65	.75	.75@ .85	
W. Va. lump.....	Cincinnati....	6.25	3.10	3.25	2.60@ 3.75	
W. Va. Gas mine run.....	Cincinnati....	3.60	1.50	1.50	1.25@ 1.75	
W. Va. Steam mine run.....	Cincinnati....	3.40	1.50	1.50	1.25@ 1.75	
W. Va. screenings.....	Cincinnati....	3.25	.80	.85	.50@ 1.25	
Hooking lump.....	Columbus....	5.05	2.90	2.90	2.85@ 3.10	
Hooking mine run.....	Columbus....	3.25	1.85	1.85	1.75@ 2.00	
Hooking screenings.....	Columbus....	3.00	.70	.90	.75@ .85	
Pitts. No. 8 lump.....	Cleveland....	4.10	2.55	2.55	2.15@ 3.00	
Pitts. No. 8 mine run.....	Cleveland....	3.70	1.90	1.90	1.90@ 2.00	
Pitts. No. 8 screenings.....	Cleveland....	3.20	1.00	1.05	1.10@ 1.25	
Midwest		Market Quoted	Nov. 27 1922	Nov. 12 1923	Nov. 19 1923	Nov. 26 1923†
Franklin, Ill. lump.....	Chicago....	\$5.00	\$4.10	\$4.10	\$3.90@ \$4.35	
Franklin, Ill. mine run.....	Chicago....	4.10	2.60	2.50	2.25@ 2.50	
Franklin, Ill. screenings.....	Chicago....	2.50	1.45	1.45	1.40@ 1.50	
Central, Ill. lump.....	Chicago....	4.25	3.10	3.10	3.00@ 3.25	
Central, Ill. mine run.....	Chicago....	3.10	2.10	2.10	2.00@ 2.25	
Central, Ill. screenings.....	Chicago....	1.65	1.05	.85	1.00@ 1.10	
Ind. 4th Vein lump.....	Chicago....	5.10	3.35	3.35	3.25@ 3.50	
Ind. 4th Vein mine run.....	Chicago....	3.85	2.60	2.60	2.50@ 2.75	
Ind. 4th Vein screenings.....	Chicago....	2.05	1.20	1.20	1.25@ 1.50	
Ind. 5th Vein lump.....	Chicago....	4.75	2.50	2.50	2.25@ 2.75	
Ind. 5th Vein mine run.....	Chicago....	3.60	2.10	2.10	2.00@ 2.25	
Ind. 5th Vein screenings.....	Chicago....	1.85	.80	.80	.90@ 1.00	
Mt. Olive lump.....	St. Louis....		3.10	3.10	3.00@ 3.25	
Mt. Olive mine run.....	St. Louis....		2.25	2.25	2.20@ 2.30	
Mt. Olive screenings.....	St. Louis....		1.00	1.25	1.25	
Standard lump.....	St. Louis....	4.00	3.05	3.05	2.90@ 3.25	
Standard mine run.....	St. Louis....	2.60	2.05	2.05	1.80@ 2.30	
Standard screenings.....	St. Louis....	1.35	.55	.55	.50@ .60	
West Ky. lump.....	Louisville....	3.75	3.00	3.00	2.75@ 3.25	
West Ky. mine run.....	Louisville....	2.25	1.65	1.65	1.50@ 2.00	
West Ky. screenings.....	Louisville....	1.50	.60	.60	.60@ .75	
West Ky. lump.....	Chicago....	4.10	2.85	2.85	2.75@ 3.00	
West Ky. mine run.....	Chicago....	2.60	1.75	1.75	1.50@ 2.00	
South and Southwest		Market Quoted	Nov. 27 1922	Nov. 12 1923	Nov. 19 1923	Nov. 26 1923†
Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@ 4.00	
Big Seam mine run.....	Birmingham..	2.35	1.95	1.95	1.75@ 2.15	
Big Seam (washed).....	Birmingham..	2.60	2.35	2.35	2.25@ 2.50	
S. E. Ky. lump.....	Chicago....	6.10	3.25	3.25	3.00@ 3.50	
S. E. Ky. mine run.....	Chicago....	4.25	2.25	2.25	1.75@ 2.00	
S. E. Ky. lump.....	Louisville....	6.50	3.50	3.50	3.25@ 3.75	
S. E. Ky. mine run.....	Louisville....	3.75	1.85	1.85	1.50@ 2.25	
S. E. Ky. screenings.....	Louisville....	3.60	.75	.75	.65@ .85	
S. E. Ky. lump.....	Cincinnati....	6.35	3.00	3.25	2.50@ 3.75	
S. E. Ky. mine run.....	Cincinnati....	3.60	1.50	1.50	1.25@ 1.75	
S. E. Ky. screenings.....	Cincinnati....	3.25	.85	.85	.50@ 1.25	
Kansas lump.....	Kansas City..	5.00	5.10	5.10	5.00@ 5.25	
Kansas mine run.....	Kansas City..	3.50	3.50	3.50	3.00@ 3.50	
Kansas screenings.....	Kansas City..	2.50	2.25	2.00	2.00	

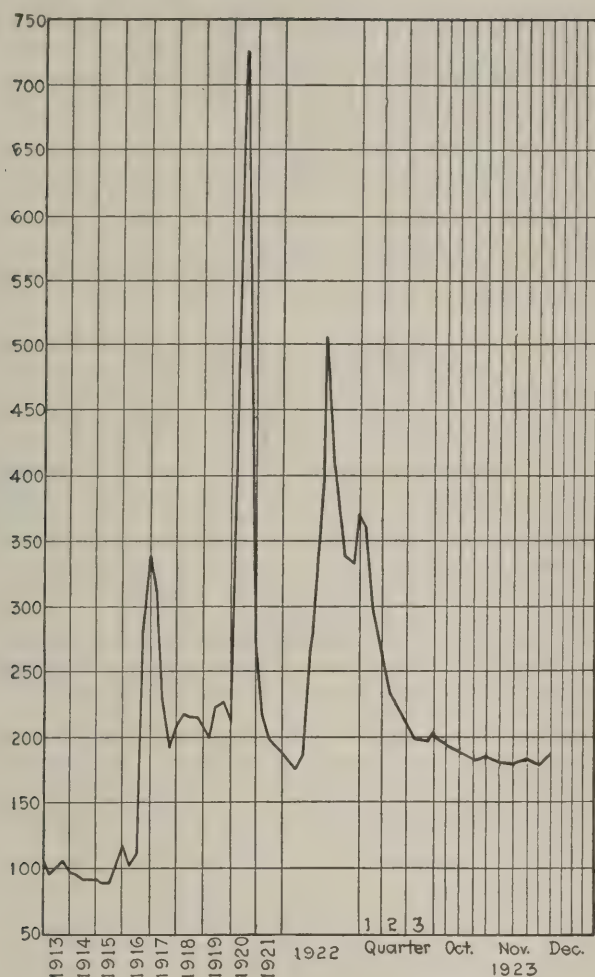
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Nov. 19, 1923		Nov. 26, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34		\$9.00	\$7.75@ \$8.25	\$9.60@ 10.50	\$8.00@ \$9.25	\$8.50@ 10.00	\$8.00@ \$9.25
Broken.....	Philadelphia..	2.39			7.90@ 8.10		8.75@ 9.25		8.75@ 9.25
Egg.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Egg.....	Philadelphia..	2.39		9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago*	5.06		12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Stove.....	Philadelphia..	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Stove.....	Chicago*	5.06		12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York....	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 12.25	8.75@ 9.25	9.85@ 12.25	8.75@ 9.25
Chestnut.....	Philadelphia..	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Chestnut.....	Chicago*	5.06		12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range.....	New York....	2.34			8.25		9.00		9.00
Pea.....	New York....	2.22		7.00@ 11.00	6.15@ 6.30	6.50@ 7.75	6.15@ 6.65	6.40@ 7.75	6.15@ 6.65
Pea.....	Philadelphia..	2.14		7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea.....	Chicago*	4.79		7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York....	2.22		4.00@ 5.00	4.00@ 4.10	2.00@ 2.50	3.50	1.75@ 3.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14		5.00	4.00	2.25@ 3.50	3.50	2.25@ 3.50	3.50
Rice.....	New York....	2.22		3.00@ 3.25	2.75@ 3.00	1.50@ 2.00	2.50	1.25@ 2.50	2.50
Rice.....	Philadelphia..	2.14		2.50@ 2.75	2.75@ 3.00	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York....	2.22		1.75@ 2.00	1.50@ 2.00	1.00@ 1.25	1.50	.90@ 1.50	1.50
Barley.....	Philadelphia..	2.14		1.00@ 1.75	2.00	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Birdseye.....	New York....	2.22			2.10		1.60	1.25@ 1.45	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Nov. 26	Nov. 19	Nov. 12	Nov. 27
Index	186	183	184	330
Weighted average price	\$2.25	\$2.21	\$2.23	\$3.99

This diagram shows the relative, not the actual, prices on four-teen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Southern Illinois mines continue to shut down on account of no market and the entire field has taken on an air of depression that will disappear only after a lot of cold weather arrives. Cars are plentiful and the movement of loads is good, but all mines have plenty of "no bills." There is considerable dissatisfaction at different points among the miners. This condition prevails in every field—Carterville, DuQuoin, Mt. Olive and Standard. Railroad tonnage in all fields is light and not much encouragement is held out for any change for the better until cold weather arrives.

Kentucky Market Dull

In spite of low prices in the western Kentucky field some concerns have been quoting prices at considerably under the market on nut, egg and small lump sizes. Coal is hard to sell at any price just now. Retailers are fairly well stocked. Steam coal is moving sluggishly to industrials and railroads. Many large consumers are well stocked, and buy only on the market dips or when coal is offered at well under the usual market.

Screenings are selling for 60@75c., and while some houses are quoting as high as \$1.25@\$1.35 for 3-in. nut and slack, so-called nut and slack is selling as low as 75@85c. a ton, as a lot of operators cannot find a nut market, and do not figure that it pays to screen it when a ready market

is not available. Mine run is \$1.50@\$2, good nut \$1.75@\$2.25; egg, \$2.25@\$2.75; and lump \$2.50@\$2.75, while block is quoted at \$2.75@\$3.25. However, there is a good deal of shading being done from these prices.

In eastern Kentucky some non-union mines that are working on the 1917 wage scale and low-cost strippers continue to disturb the market by underselling most producers. Retailers are waiting as usual for a lower market, and may profit by so doing, as prices are working lower on prepared, but at the same time there has been no improvement on screenings.

Northwest Market Still Dull

Little life is noted yet in coal trading throughout the Northwest. Unseasonably warm weather and the long-price cutting battle between lake and rail shippers still combine to produce lethargy. The soft-coal market is about as demoralized as it could be. In most parts screenings continue to sag in price. Other quotations remain steady on circulars but cutting to get business prevails on occasion. The region feels better about hard-coal supplies though popular sizes are still a little short.

Trade at Duluth remains lethargic, with heavy shipments of bituminous coming in and crowding the docks, slight stocks of anthracite on hand, and buyers watching generally for some shifting in the soft-coal market. Hocking screenings have dropped from \$3.75 to \$3.50 and shading is taking place in Youghioghenny and splint coal of the same grade. Other grades are firm at Duluth.

The anthracite situation looks as if it were ready for improvement. In forty-eight cargoes landed last week four were hard coal, and of the twenty-four reported on the way, five are hard. All docks are short of nut size, and stove is not plentiful. Prices remain firm in anthracite with no sign of increasing.

It is estimated that the largest shipments of soft coal will be recorded at Duluth this year for several years past. The total arrivals of soft will come to almost 11,000,000 tons.

The Milwaukee market is quiet. Winter has not yet arrived, consequently the demand is light. The same is true of the back country. Jobbers report everybody well supplied with coal and disinclined to contract for more. Prices hold steady. Lake receipts continue liberal and stocks on hand are increasing daily. November's record thus far is 91,500 tons of anthracite, and 454,361 tons of soft coal, making the season's cargo receipts to date 875,824 tons of the former, and 3,052,062 tons of the latter.

Western Markets Lifeless Too

Coal business generally is low throughout the West with no outstanding improvement anywhere. Running time in the Southwest as well as in Colorado and Utah is low with the trade bemoaning the absence of enough demand to keep mines entirely clear of "no bills." Lump moves with some ease, but slack drags and middle sizes must be forced. Hence there are all sorts of quotations on egg and nut sizes. Circular on those coals mean little.

In Utah lump orders are about all filled and slack is heavy on producers' hands so that the general market comment of sales officials is "Trade is rotten." All sorts of prices on egg and nut sizes are out, varying up to \$1 from day to day, but lump holds fairly firm. A good deal of coal has been shipped on consignment into the Northwestern states and causes the usual demurrage difficulties. It is generally held that the supply of coal in consumers' hands is not large and that a real cold snap will bring a rush of demand.

More Coal Available in Ohio

With the lake trade practically over for the 1923 season more coal is available in the Ohio territory, although production is being reduced because of the lack of demand. Quotations on smokeless lump coal took a sudden drop in the Cincinnati market during the week and large producers were selling as low as \$4.50, although some have refused to cut below the cost of production on mine-run and the higher grades. Retail prices remain stationary.

Buying continues quiet in the Columbus market and is expected to continue so until stimulated by cooler weather. Retail dealers are well stocked and it is said in some instances are cutting prices in order to move their supplies. With large reserves in storage, buying of steam coal is slow, with distress coals showing the only activity. Screenings, which started to show some strength, are easier because of the absence of some of the heavy buyers from the market.

Operators and jobbers in the Cleveland market say it has been a long time since conditions have been so dull. There is no demand for any size of coal. Consumers of all kinds are well stocked. Reports that more mines will close are current, as production is exceeding demand.

There is still a fair movement of lake coal from the Pittsburgh district, although these shipments have been tapering off. Production is being curtailed in order to meet the lowering demand, but it is lessening the volume of slack available. The result has been an advance in quotations for this grade of coal. Cement makers, who use slack exclusively, either steam or gas, bought heavily in anticipation of present conditions at the old market quotations of 85c. to \$1 and are pretty well stocked up. There is no noticeable increase in the line demand for either steam or gas coal.

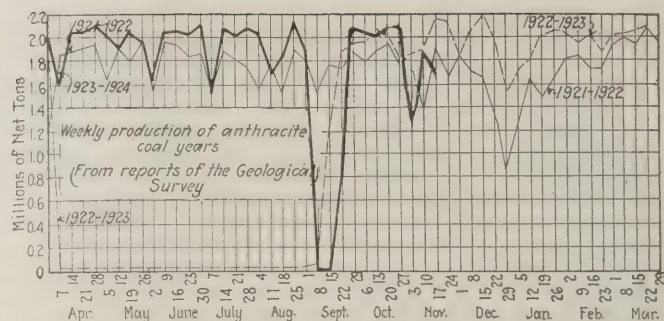
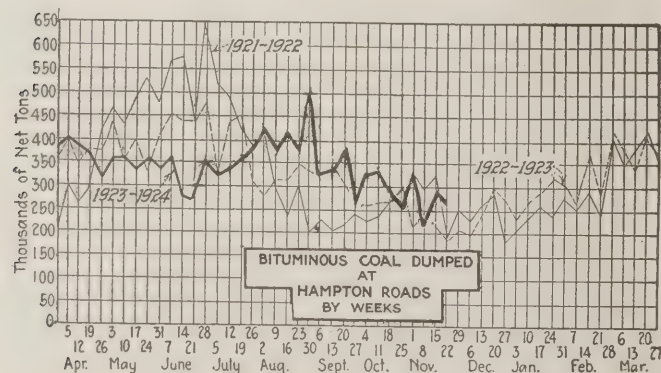
During the week ended Nov. 17 car loadings in central Pennsylvania amounted to 12,900 cars, as compared with 14,177 cars the week previous and with 11,779 cars during the week ended Nov. 3. The decrease in loadings is taken by the operators to indicate increased competition with non-union coal.

New England Shows Little Change

In New England there is little change in the market for steam coal. No improvement in inquiry is yet noticed, although the gradual absorption of distress coal both at Hampton Roads and "down East" has given factors there an opening to quote higher prices to the smaller buyers. Ostensibly the on-car level at Boston has been lifted to \$5.75 @ \$6 for No. 1 Navy Standard Pocahontas and New River, but at the same time there has been quiet selling at 50@75c. less in moderate quantities to make room for cargoes in transit. A very few consumers are making small purchases as weak spots appear, partly on general principles and also to insure against increased requirements between now and spring. Some of the agencies show enough willingness to undertake contracts for January to March periods to discount talk of possible labor troubles later on. In general the spot market is but little improved as compared with a week ago.

F.o.b. Hampton Roads there are also higher quotations than were shown in our previous report; \$4.50@4.80, however, is about the range of actual sales in cargo lots. Demand is no better, but there is less coal on wheels than earlier in the month, and curtailment in the smokeless districts is now the rule.

There is practically no new business in New England for all-rail coal from central Pennsylvania. The high tariff to points east of the Connecticut River precludes competition with Southern coals on the present basis and apparently there is nothing to do but await better things. No better price level is noted on any of the coals normally shipped in this direction all-rail.



Better Inquiry on Seaboard

Inquiry for soft coal increased slightly last week in the New York market, but buying failed to show any improvement. With distress coal practically out of the way quotations for the various grades at the piers were somewhat stronger. Receipts were slower, 1,218 cars being reported at the various piers on Nov. 23, while daily dumpings during the first five days of the week averaged 395 cars. There is a better feeling, but increased buying is not expected until the new year. The spot market at Philadelphia continues to hover around the better grades of coal and the consumer finds it difficult to get a supply below the general market quotations. Some consumers are beginning to talk of April 1. The tidewater trade is unsatisfactory, with little coal moving that way.

Demand at Baltimore for both gas and steam coals for home consumption is below the average. Buying is being urged by the producers and low quotations are the rule. Some coal men look for an upturn in December while others do not look for so early an improvement.

In some sections of West Virginia there has been a slight improvement in slack due to the curtailment of shipments to the Lakes, quotations hovering around \$1. Improvement is noticed also in the higher grades of smokeless coals, due to more favorable conditions at tidewater and no accumulations. More mines are closing, but this has not affected production to any great extent.

The Birmingham market is in an unsatisfactory condition, with practically no demand for spot coals. The domestic market is suffering from unseasonable weather conditions and only the best qualities of the suitable coals are moving. Some improvement is reported in the pig iron market, with the prospect of additional furnaces being blown in soon, which will tend to increase coal production by the furnace company mines, many of which are now either idle or working on about half schedule.

Anthracite Market Active

Lack of stove and chestnut creates the real activity in the anthracite market. These two sizes are in constant demand in the seaboard trade, while egg and pea are becoming harder to move. While some houses in the New York market continue to quote as high as \$12.50 for the domestic coals, few if any sales at this figure are reported. Retail dealers in the territory served by local houses are buying comparatively little of the high-priced coals, and in most instances are able to buy at much lower figures if they can use a proportionate share of the steam sizes. In Philadelphia similar conditions exist. Demand is centered on stove and chestnut and there are signs that this situation is righting itself. Indications are that in a few weeks there will be plenty of all sizes of anthracite available to fill all demands.

More seasonable weather conditions are helping the steam-coal situation and there is a slightly better movement, although storing is still necessary to take care of accumulations.

Baltimore dealers continue to complain of lack of receipts sufficient to take care of their customers' wants. There is no emergency, however.

Production of beehive coke during the week ended Nov. 17 was 246,000 net tons, a decrease of 9,000 tons from the previous week, 8,000 tons of which decline is attributed to Pennsylvania and Ohio, according to the Geological Survey.

Foreign Market And Export News

Great Britain's Coal Market Shows Firmer Tone; Production Slightly Reduced

Reduced production of coal by Great Britain's mines has resulted in a firmer tone to the market and a slight advance in prices. Output during the week ended Nov. 10 was 5,572,000 tons or 23,000 tons less than the previous week. Production during the corresponding week of 1922 was 5,440,500 tons.

The somewhat steadier tone of the Welsh market has been considerably upset by the severe gales which delayed shipping and resulted in empty berths.

France is buying on a better basis, orders are more free from Germany, and business is better with Holland and Belgium. The Italian trade is slow.

Considerable interest is shown in contract sales for 1924. Approximately 200,000 tons of coal and coke are reported sold to Germany for delivery over the next six months. One effect of the shortage of ready steamers is that freights have a stiffening tendency, and exporters delay chartering as long as possible in the hope that there will be a fall in the current market.

The Newcastle market is strong but is hampered by delays to shipping through gales. Best steam is oversold and there will be none available till January. Germany is inquiring for steams for the State Railways. The pressure of American competition in the Mediterranean is being felt. There is not much contract business.

French Miners' Wages Increased

Agreements have been made between French mine owners and miners whereby the workers in the North and Pas-de-Calais Basins receive increases in wages during the period from Nov. 1 to the end of February. The new schedules provide that under-ground men shall receive increases ranging from 2.75 to 3 fr.; younger crews, 1.25 to 1.75 fr.; surface men, 2.50 fr.; younger classes 1 to 1.75 fr. and women 1 to 1.25 fr. In the Loire Basin the new agreement provides for increases ranging from 2.50 to 1 fr. according to the character of work. In the other basins agreements have been arrived at or are

being discussed. Although the new agreements provides for wage increases it is said they are not satisfactory to all workers. Advances in the prices of coals is now looked for.

Inquiry for industrial and house coals is not active. Buying is slow and retail yards contain a large supply of house fuel. Paris dealers are now prepared to meet the Government's requirements for "popular" coals which will sell around 200 fr. per ton, and if sufficient Ruhr lignite briquets can be obtained they will be disposed of at 170 fr. In addition the Nord and Pas-de-Calais collieries will send to the Paris Prefecture a monthly supply of about 5,000 tons of special coals, to be distributed at a very low cost among the poor.

France and Luxemburg received during October the following tonnages of indemnity fuels: 144,200 tons of coal; 195,600 tons of coke and 14,700 tons of lignite briquets. Coke receipts by the S. C. O. F. during October were 132,175 tons. An advance of 8 fr. per ton is expected in the price of manufactured coke as a result of the increase in wages, and as a similar increase is to be made on German coke according to the agreement with the French Government, it is expected that the latter will be quoted at 134 fr. per ton.

Market at Hampton Roads Weak

Business at Hampton Roads was not particularly active last week, the strike on the Virginian Ry. resulting in marked decrease in coal movement, while the Chesapeake & Ohio piers at Newport News showed a decided slump. The Norfolk & Western alone held its own.

Export business dropped to practically nothing, with little new foreign business in sight. Coastwise trade was fair and bunker business was good, the former showing a tendency to increase with the approach of cold weather.

The market weakened in spite of the scarcity of coal at the piers, all grades being quoted far below \$5 which for many months was regarded as the low-

est possible market. Despite curtailed movements over the Virginian Ry. no shortage of coal was anticipated, the demand being much less than supply.

United States October Domestic

Coal Exports

(In Gross Tons)

	1922	1923
Anthracite.....	404,999	400,599
Value.....	\$4,532,777	\$4,437,241
Bituminous.....	1,729,425	1,488,887
Value.....	\$10,834,993	\$7,516,221
Coke.....	38,613	77,737
Value.....	\$503,716	\$744,987

TEN MONTHS ENDED OCTOBER

Anthracite.....	1,543,221	3,846,392
Value.....	\$16,284,882	\$41,736,118
Bituminous.....	7,996,158	16,823,508
Value.....	\$45,986,103	\$92,825,649
Coke, tons.....	294,894	1,010,456
Value.....	\$2,977,064	\$10,978,978

Export Clearances, Week Ended

Nov. 24, 1923

FROM BALTIMORE

For Italy:	Tons
Br. SS. Lord Ormonde.....	3,027
Ital. SS. Giovanni.....	11,277
For France:	
Ja. SS. Chili Maru.....	8,485

FROM HAMPTON ROADS

For Brazil:	
Br. SS. Fernmore, for Rio de Janeiro.	7,362
For Canada:	
Amer. Schr. Katharine May, for St. Georges.....	1,403
For Dominican Republic:	
Amer. Schr. Balsa, for Santo Domingo	649
For West Indies:	
Amer. Schr. William Booth, for St. Stephens.....	797
Amer. Severance, for Fort de France	6,780

FROM PHILADELPHIA

For Newfoundland:	
Nor. SS. Skulda, for St. Johns.....	...
Br. Schr. Flowerdew, for St. John's.....	...

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Nov. 15	Nov. 22
Cars on hand.....	2,480	1,899
Tons on hand.....	147,506	113,069
Tons dumped for week.....	106,219	119,592
Tonnage waiting.....	9,300	10,000
Virginia Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,044	1,051
Tons on hand.....	63,550	64,450
Tons dumped for week.....	84,840	26,327
Tonnage waiting.....	.....	.....
C. & O. piers, Newport News:		
Cars on hand.....	1,661	1,629
Tons on hand.....	86,615	81,335
Tons dumped for week.....	68,309	90,065
Tonnage waiting.....	5,340	9,510

Pier and Bunker Prices, Gross Tons

PIERS

	Nov. 17	Nov. 24†
Pool 9, New York.....	\$4.75@ \$5.00	\$4.75@ \$5.25
Pool 10, New York.....	4.40@ 4.75	4.50@ 5.00
Pool 11, New York.....	4.25@ 4.50	4.40@ 4.75
Pool 9, Philadelphia.....	4.90@ 5.05	4.85@ 5.10
Pool 10, Philadelphia.....	4.00@ 4.65	4.00@ 4.65
Pool 11, Philadelphia.....	3.95@ 4.00	3.95@ 4.00
Pool 1, Hamp. Roads.....	4.75@ 5.00	4.50
Pools 5-6-7 Hamp. Rds.	4.15@ 4.35	4.15@ 4.35
Pool 2, Hamp. Roads.....	4.20@ 4.50	4.15@ 4.25

BUNKERS

Pool 9, New York.....	5.05@ 5.30	5.05@ 5.55
Pool 10, New York.....	4.70@ 5.05	4.80@ 5.30
Pool 11, New York.....	4.55@ 4.80	4.70@ 5.05
Pool 9, Philadelphia.....	5.10@ 5.45	5.10@ 5.50
Pool 10, Philadelphia.....	4.60@ 4.95	4.65@ 5.00
Pool 11, Philadelphia.....	4.25@ 4.50	4.30@ 4.55
Pool 1, Hamp. Roads.....	4.75@ 5.00	4.50
Pool 2, Hamp. Roads.....	4.20@ 4.50	4.15@ 4.25

Current Quotations British Coal f.o.b. Port, Gross Tons

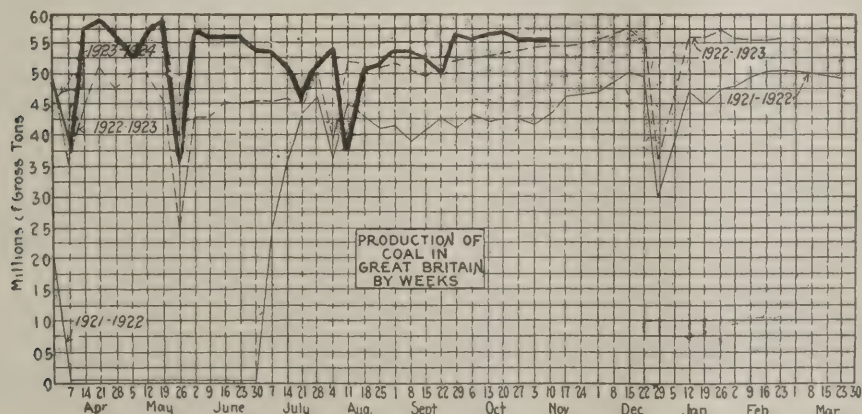
Quotations, by Cable to Coal Age

	Nov. 17	Nov. 24†
Admiralty, large.....	27s.6d. @ 28s.	27s.6d. @ 28s.6d
Steam smalls.....	17s. @ 18s.6d.	18s. @ 19s.6d

Newcastle:

Best steams.....	25s.6d. @ 26s.	25s. @ 26s.6d.
Best gas.....	24s.	23s.6d. @ 24s.6d.
Best bunkers.....	22s.6d. @ 24s.	24s.6d.

† Advances over previous week shown in heavy type; declines in italics.



News Items From Field and Trade

ALASKA

The government-owned coal mine at Chicaloon, which has been producing a little naval coal of good grade, has been closed down under orders from Washington, the pumps and machinery have been pulled out of it and the mine is now flooded. The Eska government mine, however, is held in readiness to produce coal on short notice.

J. J. Corey, for several years a mining engineer at Coos Bay, Oregon, on the Southern Pacific Ry., has been made assistant to B. D. Stewart, supervising mining engineer for the Bureau of Mines at Juneau.

ILLINOIS

Governor Small has appointed Martin Bolt of Springfield as director of the Department of Mines and Minerals. He will take charge Dec. 1, succeeding Robert M. Medill, who has resigned. Bolt has been assistant director of the department. A. D. Lewis, of Springfield, a brother of John L. Lewis, international president of the U. M. W. of A., becomes assistant director.

Attempts of creditors to force the Smith Lohr Coal Mining Co., of Pana, into bankruptcy have failed. The creditors charged that the company transferred its holdings to the Springside Coal Co. to avert payment of claims held by them. Attorneys for the Smith Lohr company state that the Springside company is a corporation formed to lease for a year property of the Smith Lohr company, a receiver for which had been appointed in the Christian County Circuit Court. This lease they said was approved by the Christian County court and was made in order to keep the Smith Lohr company afloat and not to avoid payment of any claims. The creditors' bankruptcy petition has been denied.

The Clarke Coal & Fuel Co. of Peoria, has discontinued business. For a score of years this company has employed about four hundred miners and its average weekly payroll has been about \$60,000. These miners are now seeking employment at other mines. The mines and all equipment have been purchased by the Case and Moon coal companies, of Peoria, and these operators will handle the Clarke property in the future.

The Coal Valley Mining Co., Mathersville, has dismantled its buildings and shipped its machinery to other mines owned by the company. The old shaft has been fenced in and only an ash pile remains to recall the industry which was established 14 years ago. At one time this mine employed about 200 men. The mine has been idle for the last two years.

Although many mines have now closed down entirely or are working only part time, the nine months of 1923 between Jan. 1 and Oct. 1 were record breaking months in the production of coal in Central Illinois. A total of 3,500,000 tons more of coal have been mined in the first nine months of 1923 than were produced during the corresponding period of 1922. From January 1 to Oct. 3 a total of 10,551,569 tons were mined.

No. 4 car of the U. S. Bureau of Mines was stationed at the University of Illinois,



STANDING AT EXTREME LEFT, R. S. CORBIN; NEXT TO RIGHT END, W. W. HUNTER

Urbana, two weeks this year, during which time the seniors in mining engineering were given short but intense courses in first-aid and mine-rescue work. A. J. Hoskin, acting head of the department, hopes to have the courses repeated annually, as the students showed deep interest in the work. They received their certificates from the Bureau and also have taken examinations and passed in competency under the Illinois regulations.

William Hutton, of Du Quoin, who for several years has held various positions with the Illinois Mine Workers union, has resigned and will hereafter be connected with the Illinois Coal Operators Association as a field man with headquarters in Springfield.

During the month of October and in spite of the poor marketing conditions, the Southern Gem Coal Corporation broke its total hoisting record at mines Nos. 1, 5 and 6. The latter two mines are in Perry County while the former is located near West Frankfort, in Franklin County.

A. J. Hoskin, acting head of the mining engineering department, University of Illinois, Urbana, was recently in the Jellico field of eastern Tennessee inspecting mines in the Swamp Angel, Blue Gem and Jellico seams.

INDIANA

The United States Steel Corporation has made arrangements at Universal, where it owns two coal mines, to install fire protection for the mining town. A complete fire department will be installed, pipes being laid throughout the village, hose purchased, apparatus furnished and placed in a building especially built to house the department.

Fire caused a loss of \$25,000 or more in the tippie building and hoisting apparatus at the Interurban Coal Co. property, known as the Struggling Monkey mine, northeast of Clinton Monday, Nov. 19. About 150 men will be thrown out of employment. The mine was formerly operated by C. W. Whitlock, of Terre Haute. The origin of the fire was not determined.

Drilling for coal has been begun at Weldon by L. M. Butts and L. G. Jamison, on land belonging to the former. Indications are that coal will be found at a depth of 200 to 250 feet.

The Pershing mines near Knoxville, have been busy recently. The tonnage for two weeks in October averaged 1,650 tons per day from No. 12 mine. Officials state that this has been the best year, with the largest output of coal, since the mine began operating. During 1923, up to October, the Pershing mines produced 260,000 tons of coal.

KENTUCKY

It was reported from Harlan on Nov. 8 that the plant of the Wisconsin Steel Co., at Benham, near Lynch, had closed down its No. 2 mine, throwing 400 men out of work. It was reported that the company has good stocks of coal in its steel-mill yards and had found that it could buy coal cheaper than it could produce, and from the Central Competitive Field, with a shorter freight haul and lower rate. It was also reported that the Wilson-Berger No. 2 mine had closed, and that the Harlan Collieries Co., at Ages, was planning to close soon.

The Barking Coal Co., of Kimball, W. Va., is making preparations to develop new coal lands located near Dalna, Letcher County. The company operates the Barking mine at this place, on the L. & N. Ry.

The Porter-Givan Co., which was recently incorporated in Aberdeen, has organized with C. H. Givan, of Spring Lake, president and manager, C. V. Porter, secretary and treasurer. Coal lands are under development. Daily output is about 225 tons.

The homes of two non-union miners employed by the Hart Coal Corporation, a company which has been running "open

shop" since July 1, were fired upon, and bundles of switches along with threatening notes were left on the doorsills early in November. The county attorney's office has been investigating the cases. There has been no follow-up to the threats.

MARYLAND

Announcement has been made that the strike in progress for the last eighteen months in District 16, embracing the Upper Potomac field and the Georges Creek region, has been called off by the International organization of the United Mine Workers. Operators in these fields declined to become parties to the agreement which terminated the last nation-wide strike and announced that they would operate their mines open-shop. Although a few of the smaller companies signed an agreement most of the mine owners refused to do so and have been successful in mining coal without an agreement with the union. A number of the miners originally on strike returned to work. Calling off of the strike is construed to mean that such miners in the district as have refused to work will no longer be aided by the union and that the union organization will have to be abandoned. If that is the case it means that two districts have been wiped out as a result of the 1922 strike—districts 16 and 29—the latter having embraced the New River field.

MASSACHUSETTS

Representative Treadway of Massachusetts has sent an open letter to Governor Pinchot of Pennsylvania calling on the Governor to answer five questions relating to the coal situation. They are: "Will you call a special session and recommend the repeal of the state tax in order to reduce the cost of anthracite to the consuming public by about \$8,000,000? Will you allow this tax to continue in effect until the regular session of the legislature in 1925? Will you use your great influence to reduce the royalties now extortionately laid on the consuming public by the land owners in your state? Will you set these examples to the operators and then repeat your request to them to refuse their profits? Will you arise to the opportunity or will you continue to act the part of a demagogue?"

Attorney General Daugherty in a letter to Congressman John Jacob Rogers says that proper legal action is being prepared by the Federal Department of Justice regarding certain features of the anthracite industry and will be taken very soon. Mr. Daugherty's letter was in reply to one from Mr. Rogers asking that the department make a searching inquiry to determine whether there was a conspiracy in the Pennsylvania coal fields to muzzle the public by price manipulations. Congressman Rogers said that he does not think much congressional legislation regarding anthracite was necessary, as there was "law enough now on the statute books to pull down the price of anthracite to the consumer."

MINNESOTA

Civic bodies of St. Paul and Minneapolis have filed statements in Washington, protesting against the proposed 11c. decrease recommended on coal freights from the docks to the Twin Cities. This would cut the rate for soft coal from \$1.82 to \$1.71. They contend that any rate in excess of \$1.50 is discriminatory against the Twin Cities, and state that if a permissive order were issued by the commission, the roads would voluntarily put that rate into effect.

NEW YORK

The Walter Engineering Corporation, of 299 Broadway, announces the affiliation of David L. Wing as an associate. Mr. Wing is an expert economist and accountant. He has just completed work for the U. S. Coal Commission and comes to the firm with an exceptionally thorough grasp of the economics and facts of the coal industry.

The Pennsylvania Fuel Co., with \$20,000 capital stock, has been organized at Buffalo, with Clayton Ewell, president and George J. Mechau, vice-president.

Sealed Proposals will be opened by the Superintendent of Lighthouses, Staten Island, 2 p.m., Dec. 3, 1923, for approximately 1,800 tons bituminous steam coal during January, February, and March, 1924, in quantities as required trimmed in vessels bunkers under contractor's coal chute, New York Harbor. Information on application.

Governor Smith at the request of the mayors of the respective cities, has appointed the following fair-price coal commissioners to act with two commissioners appointed by the mayors, one to represent the consumers and the other the dealers: For Corning, Aaron F. Williams; for Yonkers, Dr. Elmer A. Sheets. With the exception of Schenectady, no other cities have made requests for the appointment of such commissioners. As soon as Mayor Whitmyre of Schenectady names the two commissioners for that city, Governor Smith will name a commissioner to represent the state and act with them. Some of the cities from which the governor has heard have said they have no need for such a commission.

The Fair Price Coal Commission of New York City on Nov. 20 announced its schedule of what it regards as **fair prices for anthracite** in the five Boroughs as follows: Manhattan, \$14.25 a ton; Brooklyn, \$14.50 to \$15 dependent on the distance from tide water; The Bronx, \$14.25 to \$15; in Queens, \$14.50 to \$15.75; and in Richmond, \$15.50. In setting this price scale, after an extensive investigation by Health Department inspectors, the committee pointed out that the price of coal to the retailers is \$9 for the long ton, the freight costs averaging about \$2.79 and the cost of local handling about \$2.08. The coal is sold by the short ton, and this, with 75c. added to allow for deterioration, would bring the price per short ton, as delivered to the consumer, to \$13.22. The margin allowed is held to be the legitimate profit of the retailer.

No action was taken by the directors of the Elk Horn Coal Corporation at their meeting last week on the dividend on the preferred stock. The corporation reports for the ten months ended Oct. 31 net earnings of about \$204,000. A preferred dividend of \$99,000 was paid this year, leaving a balance of \$105,000 to be carried to surplus. Output for the first ten months was 992,883 tons, as against 738,627 for the same period last year.

NORTH DAKOTA

The proposed advance of freight rates on lignite from North Dakota into Minnesota has started a general fight. The State Railroad and Warehouse commissions of North and South Dakota have protested against the increase, and have been granted a suspension to permit a hearing. The North Dakota body has also asked the Interstate Commerce Commission for a joint conference on the petition of the railroads for an increase. Lignite operators have entered their objection and declare that the raise would kill the lignite business. They state that 75 per cent of the lignite mines would be closed if the increase is made.

OKLAHOMA

A recent traffic agreement between the Joplin & Pittsburg Ry. Co., and the Northeast Oklahoma Railroad Co., together with the recent completion of physical connection between the two lines, made possible the **first transportation of coal directly from the Pittsburg field to the Oklahoma zinc field, Nov. 9.** On that day six cars of coal were moved from Crawford County to Columbus, Kan., over the Joplin & Pittsburg and from Columbus to Picher, Okla., over the Northeast Oklahoma.

PENNSYLVANIA

The Bertha-Consumers Co., of Pittsburgh, at a cost of \$500,000, has completed installation of shaker screens, picking tables and loading booms on the tipples of all its mines, together with storage-battery locomotives for gathering purposes. John H. Jones, president of the company, who, accompanied by his son, Marshall J. H. Jones, has just returned from an inspection tour of the properties, is very optimistic concerning future business conditions and looks for continued prosperity during 1924.

The Philadelphia Division of the **B. F. Sturtevant Co.** will be located after Nov. 19, 1923, at Thorne & Copewood Streets (near White Horse Pike and Haddon Avenue), Camden, N. J., in a modern daylight building, with railroad siding. The new shop will manufacture all kinds of sheet-metal work required for the complete installation of fan systems including heating, ventilating, drying, exhaust, and conveying work. Guards for machines, pulleys, and gears also will be manufactured. Standard equipment such as electric propeller, monogram, and planing mill fans, steel pressure blowers, turbo undergrate blowers, blast gates, etc., will be carried.

The first steps of the Reading Company to comply with the decree of the U. S. District Court in divorcing its coal business from its railroad business was taken last week, when an application for approval of a merger of all the railroad corporations of the company was filed with the Public Service Commission at Harrisburg. The Reading Company, as the holding company, controls the Philadelphia & Reading Railway Co. and twelve other underlying companies. The merged companies will be known as the Reading Company, and the commission will hear the application Dec. 5. The company contemplates forming another holding company for the coal and iron business, independent of the railway company.

Harry B. Henderson, referee for the Workmen's Compensation Board in the Pittsburgh district, **has resigned,** effective Dec. 1. Dr. Royal Meeker, Secretary of Labor and Industry, has appointed Charles F. Pearson, of Pittsburgh, as the successor to Mr. Henderson.

Leroy Coal & Mining Co., Youngwood, has been incorporated to mine, transport, purchase and sell bituminous coal with a capital of \$20,000; Incorporators are Logan G. Harrold, treasurer; L. W. Blackburn and N. L. Miller, Youngwood.

T. F. Quinn, president of the Quinn Coal Co., **has obtained a long-term lease on the Consolidated breaker of the Hillside Coal & Iron Co.,** below Moosic. He will prepare coal from his own mine in the section at the leased operation. The Consolidated mine has been worked out, officials of the Hillside company announced.

John Carr & Sons, Inc., Irwin, has been incorporated to mine coal and such other minerals as are incidentally developed; capital \$10,000; incorporators, James E. Carr, North Irwin, treasurer; John Carr, North Irwin, and John S. Carr, Irwin.

The Hudson Coal Co. has instituted a school for mine officials. Twenty young men have been employed by the company to study the various phases of mining. The course will cover a period of two and a half years, and the students, most of whom are college graduates, will be given positions of official capacity at the completion of the course.

Louis Hamer will be purchasing agent of the Hazle Brook Coal Co. after Dec. 1. Stores of the firm are located at a number of towns, including Hazle Brook, Maryd, Mid Valley, Park Place, Buck Mountain and Upper Lehigh. Mr. Hamer will succeed Guy Watson, who has resigned after five years' service in the position. Mr. Hamer's office will be located in Hazleton.

The Scranton Coal Co. has placed its West Ridge colliery on the market at a price of \$200,000. The mine has been idle for the past two years due to severe water conditions. It is reported that negotiations for the sale of the operation are now under way.

UTAH

The Pittsburg Boiler & Machinery Co. has purchased the plant of the Salt Lake Iron & Steel Co., at 540 West Seventh South St., Salt Lake City. Announcement of future operations include the building of complete equipment for coal fields and the erection of tipples. The company plans to spend \$500,000 on enlargement of its plant.

The Wyoming-Utah Coal Co., a Scofield corporation, has been adjudged a bankrupt in the U. S. District Court. S. T. Corn, of Salt Lake City, has been appointed referee. The company filed a petition in voluntary bankruptcy.

WEST VIRGINIA

The Fordson Coal Co. has acquired the title in fee to between 5,000 and 6,000 acres of coal land lying west and north of Davy embracing the Twin Branch operation and tracts, leased by the Fordson company several months ago. The purchasing company obtained the property and title from the J. B. B. Coal Co. and William B. Wheeler, John Gilbert and others, as trustees of the Lasher estate, of Philadelphia. After the Fordson company leased the J. B. B. property a short time ago it began to make many improvements, repainting houses, building sidewalks and erecting a club house.

After denying on Nov. 16 the motion of counsel for William Blizzard, placed on trial for participation in the armed march of 1921, for a change of venue, **Judge Sumners H. Sharp** in the Circuit Court of Greenbrier County, on Nov. 20, after making a further investigation **granted the mo-**

tion of the counsel for Blizzard. Choice of another county in which Blizzard shall be tried was left to attorneys in the case for agreement. When the attorneys were unable to agree on a county to which the Blizzard case should be transferred, Judge Sharp designated Fayette County.

The tax program adopted by the West Virginia Manufacturers Association at its annual meeting at Huntington calls for the imposition of a **service tax of 1 per cent on the sale value** at the mouth of the mine of all coal produced in the state, the proceeds of the tax to be used for the maintenance of the state constabulary, miners' hospitals and the mine inspection bureau.

F. A. Scott, of Fairmont, has completed arrangements to **purchase the mine of the Stone Lick Coal Co.,** located about two miles from Weston. The new owner plans, it is understood, to install all new mine equipment and expects to mine coal on an extensive scale.

The Big Vein Anthracite Collieries, Inc., **has closed negotiations for the purchase** of the mining operations of the Superior Anthracite Corporation on Brush Mountain, at McCoy, the consideration being \$225,000. The deal becomes effective at once.

A large tract of high-grade coal in Webster County, in the Eagle and Sewell New River series is being developed by the **Holly Elk Coal Co.,** organized by Clarksburg business men and capitalized at \$350,000. A. C. McIntyre is president; George W. Lynch treasurer and Walter M. Elliott secretary. Levi Keister is superintendent in charge of development work. Progress is being made in getting the mine ready for operation. The coal will be shipped over the Baltimore & Ohio, as a line from Centuria is now being graded and will be extended four miles up Elk River.

B. A. Lindeman, of Chicago, having resigned as president of the Fairmont Mining Machinery Co., **O. A. Seyferth,** of Fairmont, has been chosen to succeed him. C. R. Burt, of Toledo, has been elected vice president and director of the company.

R. T. Hubbard, of Fayetteville, has been appointed by the Circuit Court of Fayette County **as receiver for the Gaymont Coal Co. and the U. S. Pocahontas Coal Corporation,** which operates the old Gaymont mine near Hawk's Nest on New River. The court has also enjoined W. A. Ohley and others from selling the property under distress warrants or executions. The property has been under the direct management of W. A. Cravner. The president of the Gaymont Company is Jean F. Smith, of Huntington, who also is a creditor to the extent of \$50,000. Other liabilities are said to aggregate to \$75,000. The Gaymont mine ranks as one of the oldest on New River. There is a leasehold of 1,345 acres involved, on which a royalty of 10c. per ton is paid. Not more than 300 acres have been so far mined.

With a view to furnishing more power to the mines in the territory reached by it the **Appalachian Power Co. is installing its third 20,000-kw. turbine** as well as additional boilers at its Glen Lyn steam plant. When the improvements are completed the plant will have a capacity of 58,750 kw., or nearly 80,000 hp., which added to the hydro-electric development of the company of 28,000 kw., or nearly 40,000 hp., will give the company a total plant capacity of approximately 130,000 hp. Four boilers are being installed.

With the completion of its new plant and tippie at Concho, the **Rock Lick Smokeless Coal Co. has begun the production and shipment of coal.** The new steel tippie built by the Kanawha Manufacturing Co., has a daily capacity of more than 2,000 tons. It is so equipped that lump, slack, egg, three quarter lump and mine-run may be loaded. The tippie also is equipped with the necessary safeguards for the men working on and about it. C. H. Mead, one of the leading coal men of southern West Virginia, is president and general manager of the Rock Lick company.

WASHINGTON, D. C.

George H. Cushing is completing a two-weeks' speech-making tour of the Northwest, under the auspices of the National Coal Association.

F. R. Wadleigh, former chief of the fuel division of the Department of Commerce, has been appointed consulting engineer in the Bureau of Mines, effective Nov. 16. It is also stated, says a newspaper dispatch on reliable authority, that Mr. Wadleigh will receive a similar appointment in the Department of Commerce.

CANADA

Production of soft coal in eastern Canada during the first ten months of 1923 amounted to 4,363,737 tons, as compared with 4,259,366 tons for the twelve months of 1922, according to a statement attributed to the British Empire Steel Corporation. Premier Armstrong of Nova Scotia estimates that the production of coal in eastern Canada for the year will amount to more than 6,000,000 tons.

H. J. McCann assistant general manager of the Dominion Coal Co., has been appointed general manager. A. S. MacNeil has been appointed general superintendent of all the mines of the British Empire Steel Corporation, and Walter Herd chief mining engineer.

Charles Stewart, Minister of the Interior in the Dominion Government, recently proposed to the Government of the Province of Alberta that the province take over the supervision of fuel conservation work in conjunction with the regular inspection of mines to avoid the present overlapping between the two governments.

Those associated with the coal-mining industry in British Columbia have been interested in the recent reports of the efforts being made by Wm. Sloan, Minister of Mines, to induce the provincial government to place a sales tax on fuel oil used in British Columbia. Indications are the government will give the legislative assembly a chance to pass upon a small sales tax on all imported oil.

The Dominion Coal Co. has shipped its first coal cargo of the present season amounting to 8,500 tons to Holland, and it is expected that many other consignments will follow. Last year the company sent 125,000 tons to Rotterdam and negotiations for obtaining an increased contract are in progress.

The Newfoundland Coal Mining Corporation is being formed by Canadian and American capitalists to take over and operate the property of the St. George's Coal Fields, Ltd., says a newspaper dispatch. This property is located near St. John's, and is said to contain much high-grade coal. The new corporation will have \$5,000,000 capital.

Lieutenant-Colonel Charles Villiers has been appointed general manager of the Canadian Collieries (D) Ltd., to succeed the late J. M. Savage. Thomas Graham, who has been performing the duties of general manager temporarily, will continue with the company as general superintendent in charge of operations. Colonel Villiers formerly was assistant manager of the Johannesburg Consolidated Investment Co. He was for a time general manager of the African and European Investment Co., which controls several coal mines of the Transvaal. He also was with the Transvaal Chamber of Mines.

The "Coal Mines Regulation Act" of British Columbia is to be amended at the session of the Provincial Legislature now in progress to provide that all cases of ignition of gas or dust underground, all cases of fire underground, all cases of breakage of ropes, chains, or other gear by which men are lowered or raised, all cases of overwinding cages, all cases of inrush of water from old workings and any other dangerous occurrence shall be reported to the Inspector of Mines. At present this is not obligatory unless someone is injured, fatally or otherwise, as a result. Penalties also are to be substantially stiffened.

These officers of the Canadian Institute of Mining & Metallurgy (Vancouver Island Division) were elected in annual meeting at Nanaimo, Oct. 31: Chairman, Charles Graham, general superintendent, Canadian Collieries (D) Ltd.; vice-chairman, Charles Campbell, general superintendent, Granby Coal & Coke Co.; secretary-treasurer, Wm. H. Moore, Western Fuel Co., of Canada; Executive Committee, George O'Brien, Cumberland; Robt. Henderson, Nanaimo; Charles Touhey, Cassidy, and T. A. Spruston, Ladysmith. An address was given by Hugh F. Marriott, of London England; who was passing through the province in the course of a tour of the Empire. He explained that he was working on the organization of an Empire Federation of Mining Engineers, that he had visited South Africa, Australia and New Zealand with success and that he wanted general co-operation in making the Empire Exposition of next year in London an outstanding event in point of its mineral exhibits to the end that it might lead to a closer union and a better understanding in the mining engineering profession throughout the Empire with respect to the development of mineral resources.

Trade Literature

"The Kites Tail," a new publication issued for the automotive department of the Colonial Supply Co., 217 Water Street, Pittsburgh, Pa. The booklet contains profusely illustrated descriptions of transmission equipment designed to stabilize this portion of plant operation and reduce production cost.

Storage-Battery Locomotives. Mancha Storage Battery Locomotive Co., St. Louis, Mo. Pp. 19; 9x10 in.; illustrated. This book contains some very useful data on the different phases of haulage and should prove especially attractive to mine superintendents. In describing the Transfer Rack on the last page mention is made that by furnishing an additional battery and box the capacity of a locomotive is increased 100 per cent.; the transfer is made in three minutes.

William Ganschaw, president of the Williams Ganschaw Co., Chicago, Ill., is editing a new handbook on gears and speed transformers which will be combined with the forthcoming Ganschaw General Catalog No. 100. It will be sent upon request.

Traffic News

A phenomenal increase in coal loadings from the Logan, eastern Kentucky and other fields along the line of the Chesapeake & Ohio has made the creation of a new division of the Chesapeake & Ohio with headquarters at Russell necessary. The new division has been created primarily to facilitate the movement and handling of coal freight through the yards at Russell, Ky. W. S. Butler, heretofore first assistant to the general superintendent, E. L. Bock, has been appointed superintendent of the new division. As showing the heavy volume of traffic moved over the Chesapeake & Ohio westward, the daily average forwarding of loads west from Russell in October was 1,808, establishing a new record. In September a record had been established with daily average movement west of 1,798 cars. The management of the road has announced that on Oct. 13 a single shift operating on Pier No. 9 from 7 a.m. to 3 p.m. dumped 228 cars of coal or a total of 10,472 tons, as against a previous record of 205 cars on June 11, 1923.

Questions involved in the matter of Western coal rates will be considered at an Interstate Commerce Commission hearing in Salt Lake City Jan. 10. The case of the Cameron Coal Co. vs. the Santa Fe will be considered at the same time. Examiner Pattison will preside.

The Car Service Division of the American Railway Association says that on Nov. 1 freight cars in need of repair totaled 150,624, or 6.6 per cent of the total number owned. This was a decrease of 5,013 under the number in need of repair on Oct. 15, at which time there were 155,637, or 6.9 per cent.

During the month of October there passed through the Canals at Sault Ste. Marie, Michigan and Ontario, according to the report of L. C. Sabin, superintendent, 2,031,084 net tons of soft coal and 200,600 net tons of hard coal. Of this tonnage all but 31,365 tons of soft coal passed through the United States Canal.

The Interstate Commerce Commission has set for hearing Dec. 13 at 10 a.m., at Kansas City, the complaint brought by the Western Petroleum Refiners' Association against the Missouri Pacific R.R. for lower rates on fuel oil in competition with coal. The hearing will be before Examiner Shanafelt. It was previously assigned for Oct. 31, but postponed on application of complainant.

The Superior Coal Co., of Wheeling, W. Va., has filed a complaint against rates on coal from Chandler, Ohio, to Akron, Ohio.

The American Railway Association announces the removal of offices of the car service division and Bureau of Railway Economics to the Transportation Building, Seventeenth and H Streets, N.W., Washington, D. C., Effective Nov. 15, 1923.

Complaints have been filed with the I. C. C. attacking coal rates from Ziegler, Ill., to Lake Preston and Miller, S. D.

The freight rate on coal from Russellton, Pa., to Youngstown, Ohio, has been found not to be unreasonable. The rate was attacked by the Republic Iron & Steel Co.

Freight rates on lump coal in earloads from mines in western Kentucky on the Illinois Central and the Louisville & Nashville to Marianna, Ark., are not unreasonable, the Interstate Commerce Commission has ruled in a case brought by certain consumers of coal in Marianna.

Class 1 railroads, which operate 90 per cent of the country's rail mileage, earned \$92,238,400 during September, according to estimates prepared from Interstate Commerce Commission reports by the Bureau of Railway Economics. This total was said to represent an annual return rate of 4.46 per cent on the tentative value of property owned by the roads. It compared with earnings of \$58,677,600 made in September of last year and \$98,343,200 earned last August. For the first nine months of 1923, the bureau said, railroads earned a total of \$718,948,600, which represented an annual return rate of 5.27 per cent on the tentative value of railroad property and compared with \$529,470,680 during the same period of 1922.

A new high record in the amount of freight carried was made by the railroads of the United States during the first nine months this year, say reports by the Bureau of Railway Economics. The freight traffic for that period amounted to 343,796,799,000 net ton miles. This was an increase of 2.79 per cent over the corresponding period in 1920, when the previous record, which amounted to 334,457,000,000 net ton miles, was made. Compared with the first nine months of 1918, when freight traffic was greatly stimulated by the war, the total from Jan. 1 to Oct. 1 this year was an increase of 4.86 per cent. For the month of September this year alone the freight business of the railroads of this country totaled 39,449,128,000 net ton miles, which was the greatest traffic for any September in history except in September, 1920, which exceeded it by about 33 per cent, and September, 1918, which was greater by about one-third of 1 per cent.

Fewer locomotives were in need of repair on Nov. 1 than there have been in years, according to a report by the American Railway Association. On that date the number in need of repair totaled 10,112, or 15.3 per cent of the number owned. This was a reduction of 397 below the number in need of repair on Oct. 15, at which time there were 10,509, or 16.4 per cent. The railroads on Nov. 1 had 54,080 serviceable locomotives, an increase of 489 since the middle of the previous month, while the number of serviceable locomotives in storage and ready to meet increased traffic demands numbered 2,517, or 30 more than on Oct. 15. During the last half of October, 21,989 locomotives were repaired and turned out of the shops, an increase of 2,666 over the first half of the month.

Authority to acquire and operate a branch line in Gibson and Pike Counties, Ind., to develop a coal property, has been asked by the Evansville, Indianapolis & Terre Haute Ry. Co. in its application to the Interstate Commerce Commission, the company points out that this facility is intended for use in the development of "an extensive field of commercially valuable strip-mine coal acreage, comprising from 20,000 to 30,000 acres with an estimated yield of 8,000 tons per acre of high-grade bituminous coal or an aggregate of from 160,000,000 to 240,000,000 tons. The acquisition is approved by the Governor of Indiana and by the Public Service Commission of that state."

Substantial reductions in the rates on coal from producing points in Illinois and Indiana to Mason City, Iowa, have been requested by consumers in that city, who use 600,000 tons of this fuel annually. An example of the reductions requested is the rate from Christopher, Ill. The present rate on lump coal is \$3.47. The Mason City consumers attempt to show that the rate should not exceed \$2.90. On fine coal the existing rate is \$3.29. The rate requested is \$2.65.

Coming Meetings

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

West Virginia Coal Mining Institute. Annual meeting Dec. 4 and 5, 1923, Huntington, West Va. Secretary, R. E. Sherwood, Charleston, West Va.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, DECEMBER 6, 1923

Number 23

Lingering Doubt

NO ONE is yet in position to hold unqualifiedly that interstate wage agreements between coal operators and the United Mine Workers are legal. The famous Indianapolis indictments in Judge Anderson's court have been dismissed, it is true, but the air has not been cleared of doubt. There are those who are decidedly of the opinion that the government has not changed its mind as to its original position.

Window-glass producers and hand workers in that industry entered into a wage agreement during the war to maintain wages at a certain level. Their contracts have been renewed from time to time. The federal government has haled them both into court on the charge of having violated the Sherman Anti-Trust law and last month the case was argued before the Supreme Court. In arguing the case Solicitor-General Beck said that the agreement complained of had been entered into for the purpose of enhancing prices and that it imposed *the additional cost of maintaining an industry which worked only a portion of the year*. Sounds much like the charge that is raised against the union coal-mine workers' contract, doesn't it? It furthermore suggests the necessity of forcing, some way, a clear-cut decision on the question of whether coal production, declared by the Supreme Court to be intrastate business, comes under the federal laws which affect interstate business, when producers and miners from two or more states agree on wage contracts. Perhaps a decision in the window-glass case will settle some of these debatable issues.

The New Competition

THIS year has seen the greatest advance in any twelve months in the substitution of oil for anthracite in household heating. A survey made by the anthracite operators shows in New York City alone more than 200,000 tons of anthracite annually replaced by oil in homes, apartments and office buildings. New England has been a fertile field for the oil-equipment people. The coal question in New England is mainly the question of prepared sizes of anthracite. The Northeast Yankee is looking for something cheaper for his furnace than \$16 stove coal; hence his willingness to try oil. Already fuel oil has replaced a large tonnage of soft coal in industry in that market.

The anthracite operators have taken hold of the situation. They are going to show the householder something better than oil and cheaper as well—the steam sizes. When everything has been said for the advantages of all so-called substitutes, one finds that on the points of cleanliness, convenience and reliability, anthracite plays second to none. In Philadelphia this week the anthracite operators begin a belated campaign to educate the public to the use of that neglected por-

tion of their necessary output, buckwheat, rice and barley. They have opened a Fuel Economy Exhibit, where will be shown all tried and tested ways of using these cheap sizes of hard coal. The householder will be shown full-sized equipment for utilizing small sizes costing at the mine from \$1.50 to \$3.50 per ton against \$9 for the customary stove coal.

The cost of equipping homes to use this neglected fuel is no more than to install oil. The results are certain to be more satisfying. There will never be a question of adequacy of supply or of insurance. Oil is not the ideal fuel for the home that it is commonly supposed to be. The present fever will subside and by promptly extending their educational exhibits to every large community in the East the anthracite operators may overcome the handicap of a late start. The hard shell of conservatism is cracked.

Congress and Coal

SO ACCUSTOMED has the coal industry become in recent years to having the threat of federal legislation sidetracked in Congress that it is by way of losing interest in the subject. As a subject for action by this Congress, coal must take its place with such live topics as taxation, bonus, wheat prices and the World Court. The prospects for new laws affecting coal are thus obscured, and many for this reason display no anxiety, even though they would deplore any steps toward federal control.

Fulminations against coal will be abundant this winter in Washington, but what we are interested in is the direction that will be taken by serious intentioned legislators. Two are likely, quite probable: Compulsory reporting of the facts on the coal companies' books, and a measure authorizing the President to assume certain control of coal production and distribution during national emergencies.

With respect to compulsory fact finding it is pertinent to point out that the National Coal Association has defaulted on its promise to the Coal Commission to institute voluntary reporting. Whatever excuse or reason be assigned, it remains a default and as such becomes added argument for federal compulsion. There is an important section of the National Association, largely represented in West Virginia, that is opposed to any and all manners of giving the public any facts with respect to its business. These men were primarily responsible for the institution of the Maynard case, and resisted for a long time the Coal Commission's efforts to collect facts. They are those who honestly believe that what they do is nobody's business, and in general they may be expected "to stand on their constitutional rights" in resisting all efforts in that direction.

Strangely enough the United Mine Workers is largely of the same mind, not caring to have the federal gov-

ernment probe too deeply into its affairs. The union will line up behind any program of resisting regulation of coal.

There are, on the other hand, many substantial interests, not all among the organized soft-coal fields, that if not actually favoring complete publicity of their business at least have no objection and will offer no opposition. The opponents are aggressive, hence we may expect the coal industry to give every indication of actively fighting whatever coal measure may be offered in Congress.

Neither of these two broad proposals is a panacea for coal ills, and compulsory fact finding will prove very expensive to the government and a disappointment to the public. Nevertheless, to neither can we find substantial argument in opposition beyond the general one that these proposals or any others, however harmless or ineffective, are but the opening wedge for more drastic regulatory measures. That argument is wearing thin. If the organized resistance of the coal industry can estop such a simple thing as an act to collect and publish currently certain facts about coal, then why cannot that same organized effort more easily prevent more drastic and obviously oppressive measures? The test of the good faith of the operators in going on record in favor of giving the public the facts will be their position on a federal law looking to that end, provided the issue is clearly drawn on that measure.

A Small Corner of a Panorama

STANFORD E. THOMPSON, in his unbiased report on production, of which we publish a part this week, lays stress on the danger of reducing the miner's capacity to earn by poor car supply, and he does not by any means exhaust the arguments against that practice. Much of the miner's disposition to go home early has arisen from the fact that he has become used to a low tonnage and cannot be induced to do more than has for many years been customary. That stint performed he does not see why he should not go home. Thus shortening the stride of the miner to a walk has developed in him a tendency to restrain himself from which he can with difficulty be aroused.

In his study of fewer men and more topping, however, Mr. Thompson lifts but a corner of the sheet, revealing only a small portion of the full panorama. He does not consider what he knows well, that miners go home when they have completed what they consider their stint, that they do not have cars ready always when the gatherers need them, that the problem of railroading is complicated by that fact. Furthermore, he does not recall the fact that the miners do not strike so much because their wages are lower than they ought to be but because they think they should have a rise in wages every so often and because they believe that a labor leader whose platform does not include such a raise is not earning his pay.

Mr. Thompson does not consider what every operator knows, that decisions ultimately rest on political considerations and not on wage earnings. So long as the politicians flaunt the facts and so long as the mine workers continue to win out on the basis of their power to coerce the country, arguments to the operators to give miners a chance to earn more, to go home earlier and to lay off, and so tie up the transportation system, and even to insist on being hauled and hoisted out to the detriment of coal haulage or at risk to their lives,

so long will the operator be indifferent. Some blame may be accorded to the mine executive doubtless, but so badly is he imposed upon that he is not prepared to take this loss, and so keen is the competition in union mines that if he takes it his mine is idle, his men are without work and he is made bankrupt.

LaFollette Performs Without Calder

SENATOR LAFOLLETTE has broken out again in an attack on the National Coal Association. He excoriates that organization for its large expenditures, but he does not attempt any comparison with the expenditures of the United Mine Workers, which spent more in salaries alone in six months than did the National Coal Association in a year for all purposes.

Senator LaFollette never has recovered entirely from the unexpected blow he received during the Calder agitation. After Senator Calder had obtained Congressional funds and Congressional support for his committee on the pretense that a study of reconstruction problems was to be undertaken, he launched into an investigation of coal. He thought it would be popular with the public and with labor. Mr. LaFollette was of the same opinion. A coup was sprung and the Calder legislative recommendations were referred to Mr. LaFollette's committee. The coal industry was pilloried to the entire satisfaction of Senators LaFollette and Calder. Just as each was pluming himself to receive the plaudits for their work, in stepped Samuel Gompers, who condemned in no uncertain terms the whole conception. The proceeding was dropped quickly. Soon thereafter Mr. Calder was pulled off the national stage by his own constituents. Mr. LaFollette returns to his attack on the coal industry sporadically, but his old-time enthusiasm has been lacking since the day Mr. Gompers testified.

Siphonic Pumping

SEEING that the siphon works on the principle that falling water will lift other water up a grade by the vacuum it creates, why not use the power of the siphon even when a pump is used? Frequently it is possible to extend the pipe far enough down the hill that the load on the pump will be reduced or even, as in those cases where the lift is less than twenty feet, entirely removed. When the pump discharges underground, extending the pipe line often may enable the siphon to pull or the pumps to drive the water over a second and lower eminence and so save repumping the water from a sump between two summits. Of course, the starting load of the pump would not be decreased but the running load would be, and that is important. Some care to free the line of air should be taken as also some precautions against air leaks, but what efforts are used to this end need not be as painstaking as those which would be taken where the siphon is to operate without a pump.

GIFFORD PINCHOT PITCHED his "compact" scheme for anthracite regulation to the governors last week. Silzer of New Jersey at the bat, hit it over the fence. Pinchot's outfield expects to have retrieved the ball by Dec. 13, when the game will be resumed. Meanwhile the sport writers of the daily press are "knocking" the sportsmanship of Pennsylvania's leader, suggesting that he clean up the tax, miners' law, and other matters at home before passing the buck to the other states.

How Swinging Chutes Are Applied to Thin Seams

In Advancing Face Along the Strike Coal and Waste May Be Delivered by Same Chute or by Two Entirely Different Chutes — Pros and Cons for Working up Pitch or on Level

BY ARTHUR GERKE
Waldenburg, Silesia, Germany

IN *Coal Age*, Vol. 22, pp. 487-489, I discussed the methods employed in the mining of thin seams with swinging, or bumping, chutes where stowing was not employed for the support of the roof. The purpose of this article is to describe the methods as modified when the places mined are stowed as they are worked, but, prior to discussing this matter, it seems advisable to give the reasons why on the Continent of Europe the practice of replacing coal with rock when mining is regarded as being of great importance.

These reasons are the frequent falls of rock in roadways worked without stowing, crushing of the coal seams, heaving of the coal floor, injury to the surface, heavy expenditures for timbering, loss of large quantities of coal in squeezed working places and roadways, the probability of mine fires, the risk of firedamp collecting in the goaf, the danger of extinctive atmospheres or water collecting in the extracted areas and pouring down on the men when working below them in other seams or in lower levels of the same seam.

BACKFILLING HELD ESSENTIAL TO LONGWALL

In many cases the reasons for backfilling will be found to be only indirectly connected with the working methods. Such causes are the possibility of damage to the surface, the scarcity of dumping room and the fear that the rock if dumped on the surface will burn and create a nuisance. An advantage incident to backfilling is that the pressure on the pillars is relieved along headings and galleries permitting them to be more easily kept open and the coal in them removed.

With the use of backfilling the removal of barrier or

safety pillars is expedited. The principal advantage, however, consists in being able to operate "broad" or "longwall" workings. "Broad work" usually is laid out as in Fig. 1, the working face being from 125 to 300 ft. long. This face usually moves forward in the direction of the strike, the line of the face following the full pitch of the seam. A swinging chute fixed directly in front of the coal wall serves to convey the coal mined down to the entry.

After a section is mined the swinging chute is moved toward the face so as to leave room for the storage of rubbish. This same chute is then used to take the waste, delivering it where needed. Men stand along this chute and throw the rubbish with a shovel into the section to be filled.

If the mining is to be done by a large gang of men and the roof, or hanging wall, as well as the floor or foot wall, are reasonably solid, a wave will be noted originating in the hanging wall and following directly the cutting of the coal. If the stowing is kept at an appropriate distance from the coal face and if the latter is long enough and is moved along at a quick rate, the coal will be loosened by the pressure and will be the more easily brought down.

To produce that particular effect the face must be of sufficient length or the pressure will not be produced or not be of sufficient force to be effective. These considerations, which apply to all systems of longwall work, have important essentials, the most important being to have as many men as possible in every section and to mine the coal as quickly as can be contrived.

To accelerate coal extraction a miner is provided for

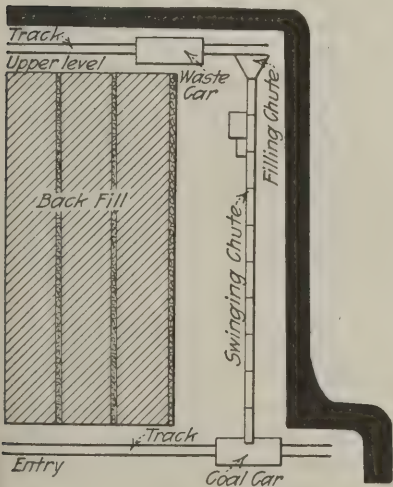


FIG. 1—ONE CHUTE SERVES FOR COAL AND WASTE

With only one chute operation is continually hampered, especially in the early morning when many of the cars are filled with waste that should be unloaded promptly.

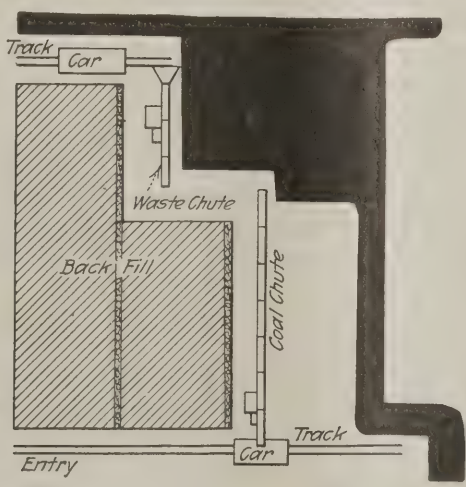


FIG. 2—TWO CHUTES USED BUT FEW MEN CAN WORK

With two chutes waste can be backfilled almost at any time, but, as the chutes are unloaded and loaded only at the extreme end, few men can be employed in driving any one coal face.

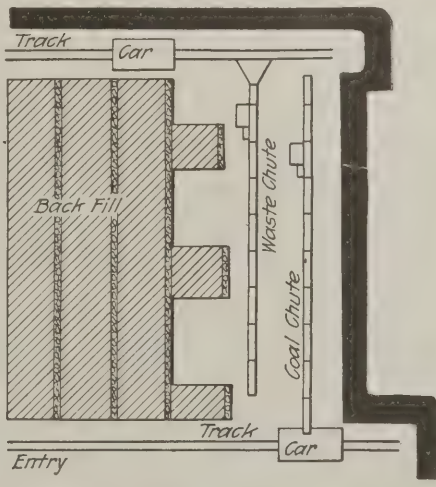


FIG. 3—UNSHORTENED CHUTES: FULL FORCE OF MEN

Here the chutes are laid at full length. Hence waste can be unloaded and coal loaded at any point. At various places outstanding walls may be built rapidly to protect the face.

every 12 ft. of face, and to him that part of the work is assigned. He has to break down the coal and do the timbering. After the coal has been removed from before the face, with the aid of the shaking chute a part of the mined section is filled. For that purpose another swinging chute is used which must be shifted every day if the work advances with sufficient rapidity, as is, of course, the intention. Thus the working face, measuring from 125 to 300 ft. in length, advances every day by the width of one cut—about 5 ft.—if the miners are first-class men and the haulage system does not delay loading. Where the miners are not up to standard they are used at timbering work, in which they soon become specialists.

CONCENTRATION SAVES ROOF FALLS AND TIMBER

Owing to the speed with which the coal is won, the action of the hanging wall in such working places noticeably improves; not only is the danger of the roof breaking down close to the face diminished but also the quantity of timber needed to protect the workmen is much reduced.

This method works well if the seams are not too close together and if the hanging wall, as well as the foot-wall, are reasonably solid. Otherwise, the traveling pressure will not exhibit sufficient force to bring the coal down and may break the cohesion of the roof beyond the working face. Furthermore, if this plan is to be found satisfactory, there must be layers of coal that can be cut with the pick. If these are not found and the coal is so hard that it is necessary to blast it, the mining will not go forward rapidly enough if a single swinging chute has to handle the coal and also the waste by which it is to be replaced.

In consequence, two chutes must be employed and the area kept open in front of the face will have to be both larger and longer maintained, and the result will be that more timber will have to be used. Another serious drawback to success with this class of work is the irregularity with which the backfilling material may be received. On some days there will be a scarcity of rubbish in the mines, unless exploratory headings are being driven. On other days only a small quantity may be wanted in the mine, and the surplus may have to be hauled to the surface.

This trouble can be avoided by introducing a second swinging chute parallel with the face, using it solely for shifting rubbish and restricting the use of the inner chute to the conveyance of coal. The front chute remains in place even after the coal in the cuts has been removed. It is then used for filling until the section where the second chute once stood has been filled. In the meantime the second chute is moved forward to be used for conveying coal during the mining process.

When using two chutes, filling may be done in different ways. Fig. 2 shows the method of filling in the rising direction, where the chute is shortened according to the advance of the filling. This method can be recommended where the roof is sufficiently solid and where, for some reason or other, only a few men are employed at the particular place being worked.

When the face is mined in accordance with Fig. 3 the filling chute always is of full length, and consequently miners or loaders can be located about every 30 ft. As the full length of chute is in front of the area to be stowed they can take the rubbish with a snovel out of the swinging chute at any point they

please. This allows advance walls of rubbish to be built at many spots simultaneously, which enables sufficient support to be erected in a short time, a great advantage where the roof is of insufficient strength to support itself over a large area. This method is of special advantage in thick seams.

It is obvious that the use of the second swinging chute increases the equipment, as also the labor cost, a drawback that is, however, more than counterbalanced by the advantages which the duplication confers. Should there be a lack of empty cars, the miners, instead of being unoccupied, can be employed in backfilling until empty cars arrive. Moreover, if no waste material is at hand the men can be employed to undercut and load coal. Thus all the men will be kept working, and to great advantage, because they will be occupied throughout the shift.

If a shaft or inclined plane is to be found near by, sections equipped with two chutes can easily be supplied with empty cars, because the emptied waste cars need only be conveyed to the foot of the working face for filling with coal. In most cases this assures a sufficient number of cars always being available. A still more important advantage in actual practice will be found in the better distribution of the work of backfilling.

At the end of the second shift whatever cars are empty will be taken by the timbermen for use in their work. During the night they load these cars with rubbish and in the morning at the beginning of the early shift these cars are full and need to be unloaded promptly. As fast as they are unloaded they are moved to the discharge end of the chute at the foot of the working face. Here they should be loaded promptly in order to get things moving.

The face is full of coal that the weight has broken down. It is ready to be loaded but would have to wait long if the use of the chute for coal had to be delayed till all the waste in the cars was completely dumped. With two conveyors working—one for waste and one for coal—cars loaded with waste can with minimum delay be brought to the foot of the coal chute, shortening the time during which the loading of coal is delayed.

Nor is this all; with the single conveyor, as the backfilling must be done in cycles and not in any sense concurrently, the line of backfilling cannot be offset and must for that reason be kept near the face. As a result, if coal is ready to load it must be loaded so as to set the conveyor over for backfilling. This may not be at all convenient, for the waste in the morning fills the cars, as they cannot be emptied because there is coal to load before the conveyor can be moved. Yet they must be emptied before there are cars to load the coal.

CAR STEALING UNLIKELY IF FILLED WITH WASTE

This is an interesting dilemma, only to be solved by having more cars than would otherwise be necessary or by leaving the backfill far behind the face. With two chutes this need not cause delay, for the second chute can be used at all times or all the time for conveying waste regardless of the conditions that may exist at the face. With rope haulage the use of a single chute is quite difficult, for the car supply is discontinuous and long waits may result.

If for any reason an unusual number of cars is needed for a working face, one or several trips filled

with waste toward the end of a shift may be directed toward the area being worked and can be emptied at the beginning of the following shift. It need not be feared that cars full of waste can be taken away by men of adjoining work places, as too often happens with empty cars, especially during night shifts, for the laborers and timbermen who work without sufficient supervision at night can make no use of such cars. With two chutes, therefore, waste is conveyed with far greater regularity than with one only, and time is saved in the end even though there is a loss in moving two chutes instead of one.

Where the joints of the seam run in the direction of the strike it would not be well to choose what is known as "broad work," as it would not be possible to utilize the joints in the mining of the coal.

It should be said that a further disadvantage in mining in the direction of the strike is that the seam often contains rolls where the coal thins and that there are other similar disturbances that affect extraction. As such displacements generally run more or less diagonally through the seam, the face exhibits this roll or spar as an open wound so long as it is being worked. At the point of disturbance excess pressure may be experienced, and often bottom must be lifted to make room for the swinging chute. As the work progresses, the pressure moves along the face and consequently an unusual quantity of timber is required and some damage is done.

Ways there are of meeting these difficulties. The stowing may be done with greater promptitude and carried nearer the face or the entry may be driven to the limit and worked on the retreat. But whatever may be done, wherever such rolls occur, there always will be interruptions and roof falls that involve much expense, these difficulties continuing until the place is finished.

SOME CONDITIONS FAVOR WORKING UPWARD

In such cases a method is employed with advantage which is based on the rising longwall system of earlier days but which is readily adapted to use with swinging chutes. It is true the inclination must be steep and the seam not too thin or the waste will be conveyed with difficulty. Fig. 4 illustrates this method in which the seam is worked in a wide breast and to the rise. In some cases the face is placed at a greater angle to the strike than is shown in Fig. 4, so as to increase the inclination of the chute.

In opening up the workings by this system one or two entries—one of which is shown in the illustration—are driven on the strike from the main tunnel by which the seam is approached from the shaft, which tunnel is not shown. At distances of 660 ft. or less, airways are driven straight up the pitch to an upper level, the interval between these places being twice that of the longest face it is purposed to operate.

It is not well to make any one face longer than 330 ft. The entries should be driven through to the limit before starting to open the faces, but this is not always done. The working of any or all the faces may start at the same or at any convenient time.

The working face is opened as follows: At the side of this airway a narrow cut is made from the entry. A second and shorter rise is made 15 ft. or more therefrom, the distance depending on the number of men available. The next rise is started at the same distance but is extended a shorter distance, and this is continued

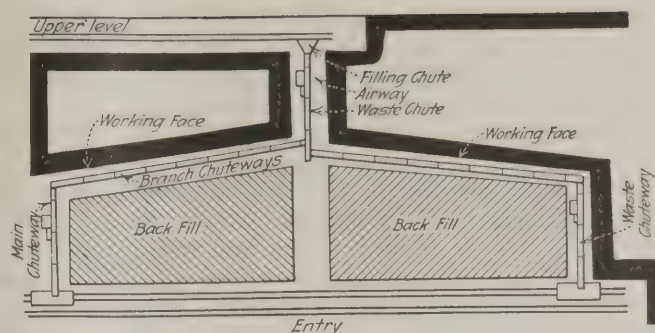


FIG. 4—WORKING THE COAL STRAIGHT UP THE PITCH
The waste and timber may be brought in from the upper level or may be hauled up the center airway by a hoist driven by electricity or compressed air.

until a point 330 ft. from the original chuteway is reached.

The faces of the various rises are arranged to be at an angle 8 to 10 deg. from the line of the strike. When this composite face has been completed a chute is placed in front of it, and work advances in the direction of the pitch. The coal may be conveyed to the entry in many ways, and the method employed in bringing in rubbish also may be varied. Of course, the waste need not be brought in if enough rock falls in the seam or if the rubbish need not be built up solidly.

In the method shown in Fig. 4 waste is unloaded from a car in the upper level into a filling chute by which it is conveyed to a swinging chute in the airway. By giving this chute less inclination than the full pitch of the seam the chute can be caused to deliver to either of the face chutes without the necessity for any excavation in the bottom of the seam. Thus the waste, as also the timber, is brought in from above. However, some bring it up the center airway on an inclined roadway in which the bottom must be lifted if the cars are too high to travel in the seam. A small hoist serves to pull up the cars.

As will be seen, the coal is dumped in a swinging chute in front of the face, which in turn dumps into another chute which descends at one end of the face from the face chute to the car at the entry. This chute may also carry the coal brought to it by the chute stationed in front of a neighboring face.

WHY ADVANCE TO PITCH IS AND IS NOT FAVORED

Thus by one working method two chutes and two small hoists worked with compressed air or electricity are needed. The costs that must be met in this method are saved by the other plans where the longwall is advanced in the direction of the strike and the face lies parallel to the pitch. Other disadvantages of the method with the hoist is that it is in itself objectionable as moving it is troublesome and expensive, that disturbances running in the direction of the strike cannot be evaded and that the maintenance of this inclined plane and of the air connection leads to expense. Replacing the chute also is difficult in a seam with much inclination.

Though these drawbacks cannot be denied they are compensated for by considerable advantages. In the first place the opening of the longwall is much simpler, for we can dispense with the roadways driven between the two levels to subdivide the area, thus saving the expense of maintaining them. If, however, a haulage road has been driven as an upper level we can dispense with the incline. If it is not necessary to bring in waste from other places or if the road for convey-

ing waste is high enough so that the cars can be tipped in it, then again an inclined road is not needed. As a result a number of men are relieved from unproductive work and much timbering is avoided.

Above all it must not be forgotten that by this method the output of the seam is increased in a comparatively short time. The longer the level the more places at which new longwall workings can be started. This makes it possible to concentrate production and consequently reduce the quantity of unproductive work more than is possible when the longwall is advanced in the direction of the strike. Needless to say the traveling pressure will exhibit itself here as in the other method and facilitate mining if the cutting is done quickly.

Each Fan Airs Part of Mine, but Either Can Relieve the Other

Royal Mine Protected by Automatic Doors That Open and Close When Either Fan Shuts Down, Giving All Workings Reduced Current

BY S. TESCHER

General Superintendent, the Royal Fuel Co., Denver, Colo.

NO FAN idles at the Royal Mine waiting, like an understudy, for the failure of the main fan. Two fans are kept busy, each ventilating its own separate area of the mine, and if one fails the other takes up the burden, the doors being hung so as to open or close when the direction of the current shows signs of changing. The fans thus relieve one another without reversing the direction of the current in the principal roadways. Returns remain returns, and intakes remain intakes. All the energy of the moving current is retained, and the air continues to travel with only slightly decreased volume and velocity. Thus the addition of a second fan means not only additional safety but more air without an equivalent power consumption.

This fan installation and a new airshaft were completed Sept. 1, 1923, by the Royal Fuel Co. at its Royal Mine, Aguilar, Colo. The installation gives this property two ventilating fans, each delivering air by a separate intake and a separate return to a different

section of the mine. By means of a bypass entry, which allows either of the two returns to go to either of the two fans, and by a system of doors and overcasts, either fan in case of disability can be made to ventilate the entire mine without any serious interruption to the ventilating current.

The new shaft has two compartments, the inside measurements of each being 9 ft. 6 in. x 9 ft. 11½ in. The depth of the shaft is 404 ft. The new shaft is located 1,600 ft. west of the present hoisting shaft, which is just that much closer to the working places.

The shaft is lined with 4x12-in. Oregon fir, tongued and grooved and surfaced on four sides, with the exception of a 22-ft. concrete collar at the surface and a 13-ft. concrete base near the landing. One compartment of this shaft is used as an intake or downcast, and the other is used as a return or upcast. The upcast compartment is connected by a steel housing to a double-inlet reversible Sirocco fan, which is driven by a 200-hp. motor equipped with a semi-automatic controller. The new fan can be started or stopped from the hoist house, where a man is in attendance 24 hours per day.

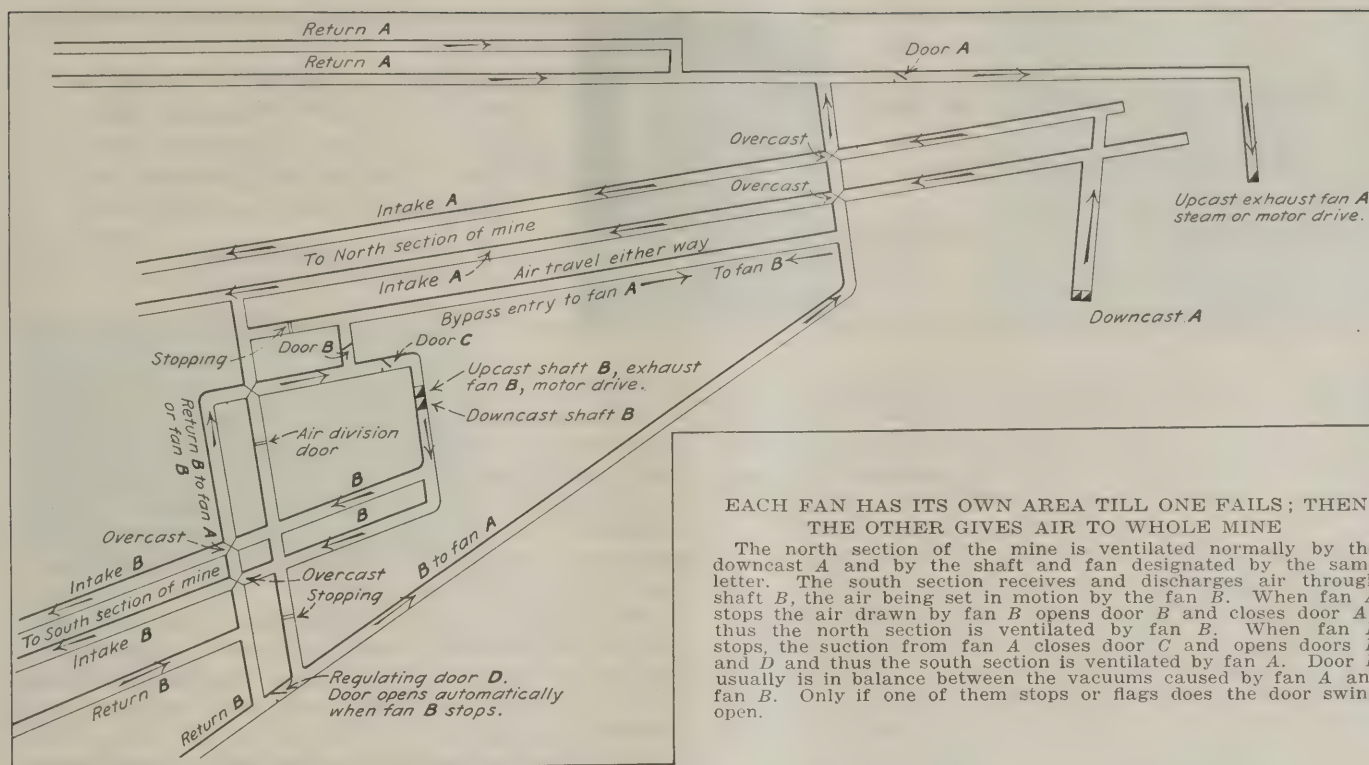
An automatic signal system rings a bell at the hoist house as well as in the mine, if the fan stops or its speed is reduced to any appreciable extent. The motor driving the fan is of ample size to take care of any overload and will keep the fan in operation under single-phase current.

Prior to the installation of the new fan and airshaft the old fan, which may be operated by either steam or electricity, ran at a speed of 300 r.p.m., consumed 107 hp. and delivered 96,000 cu.ft. of air per minute at a 4.5-in. water gage. Since the installation of the new fan the old fan has delivered 85,000 cu.ft. of air per minute to its section of the mine at a 3.7-in. water gage, it being driven at a speed of 270 r.p.m., and consuming about 75 hp.

The new fan, running at a speed of 250 r.p.m. and consuming about 75 hp., is delivering 100,000 cu.ft. of air per minute to its section of the mine at a 3-in. water gage. In other words, the total quantity of air coursing through the mine has been practically doubled, though the power consumption has been increased less than 50 per cent. To have doubled the quantity of air coursing through the mine without some such change



PANORAMA OF THE ROYAL MINE AT AGUILAR, COLO., SITUATE



EACH FAN HAS ITS OWN AREA TILL ONE FAILS; THEN THE OTHER GIVES AIR TO WHOLE MINE

The north section of the mine is ventilated normally by the downcast A and by the shaft and fan designated by the same letter. The south section receives and discharges air through shaft B, the air being set in motion by the fan B. When fan A stops the air drawn by fan B opens door B and closes door A; thus the north section is ventilated by fan B. When fan B stops, the suction from fan A closes door C and opens doors B and D and thus the south section is ventilated by fan A. Door B usually is in balance between the vacuums caused by fan A and fan B. Only if one of them stops or flags does the door swing open.

in the system such as provided would have been impracticable, as it would have required over 800 hp.

Gas analyses taken at three different points on the return aircourses prior to the new installation gave 0.9, 1 and 1.5 per cent methane respectively. Gas analyses taken after the new installation at these same points gave 0.4, 0 and 0.6 per cent methane, respectively. The absence of methane in the second sample is due to its having been taken out of the intake air before that air had entered the mine far enough to be contaminated.

Tests made at the mine after the new fan was installed show that if the new fan is stopped, the old fan automatically picks up a portion of the load of the new fan. On one occasion the new fan was shut down for 30 minutes. At the end of that time changes were made which allowed the old fan to ventilate the entire mine, and mine officials reported no change in the most

gaseous working places. The changes consumed about 15 minutes and were made, as stated, without a total stoppage of the ventilating current.

In the planning of this new ventilating system the direction of the air in the mine was in no place changed. This proved to be an important factor, as the air travel is aided by differences in temperature. The two fans are now capable of delivering over 250,000 cu.ft. of air without overloading their present driving equipment.

Four important factors entered into the improvement of the ventilation as above outlined: Shortening the distance of air travel by locating both the new intake and new return closer to the working faces; reducing the total volume of air passing in the old intake and old return by dividing the mine into two sections; placing of two additional splits in the air current; and installing an additional ventilating fan.



IN THE MOUNTAINOUS REGION OF LAS ANIMAS COUNTY

Profit Sharing Plan in British Coal Mines Simplifies Wage Problem



Coal Age Correspondent Finds Enterprise No Longer Penalized—Labor Now a Partner—Workers Interested in Effecting Economies—Change in Attitude Toward Machinery

By PAUL WOOTON
Washington Correspondent of *Coal Age*

DESPITE its popularity among operators in South Wales, the old sliding scale of wages, based solely on the price of coal, is not desirable, I learned from discussion with students of this subject in Great Britain. They believe that profits form a better basis on which to determine the amount the industry can afford to pay labor.

Under the sliding-scale plan the tendency was, for the wage to decrease as the output would increase. Rather than work themselves out of a job, the coal diggers were inclined to withhold their best efforts. In most cases the result was to penalize their enterprise. On the other hand, the sliding scale worked out inequitably for certain mines, particularly those where the relative cost of production was high. The rate of pay was uncertain and the men had little interest in avoiding waste.

By ascertaining what the operation can afford to pay, and by basing the wage on the profits, labor becomes a partner in the enterprise. Experience in Great Britain has been that the interest of the men in effecting economies is aroused at once. A workman who is wastefully inclined is held in check by his fellows. The plan is beset with difficulties, but none of them is regarded as insurmountable. Each month is seeing some progress in the effort to iron out these difficulties.

VIEWPOINT CHANGED ON MACHINERY

Under the profit-sharing system, labor occupies a different viewpoint with regard to the use of coal-cutting machines and other mechanical devices which make for economy in mine operation. They increase the profits of the men. The best authorities on coal in Great Britain believe that a material increase in the use of labor-saving devices may be expected from this time forward. There are physical reasons, however, which will preclude the use of cutting machines to the same extent that they are used in the United States.

England and Wales have a great asset in the fact that most of their miners are of British birth. Poles and other foreigners have been introduced into the mines of Scotland with resultant troubles. Experience there as well as in the United States has convinced British operators that it is wise to seek their labor at home. As it is, the mine worker in England is a substantial citizen. He has ideas and opinions of his own. He reads and is well versed in the trend of public affairs. As a result he is not led far astray by false prophets. He is willing to play the game and there is strong sentiment for living up to all agreements.

There is no hope that accord ever will be reached as to what constitutes a fair minimum wage, a feature of the coal treaty, which, in the words of Prof. James A. Bowie, of the Manchester School of Technology, "was thrust like a ramrod into the delicate mechanism of the

agreement at the last minute." Despite Professor Bowie's caustic criticism of the agreement itself, which he describes as imperfect and superficial, he nevertheless is outspoken in his belief that the principle which the agreement attempts to apply is sound. In fact he declares it to be "the most hopeful and comprehensive experiment in industrial relations that has been made during the present century." He calls attention to the fact that the coal agreement of 1921 comprises the first definite democratic pact in the history of the British coal industry, "embodying objectively the subjective principles on which collective bargaining had confusedly worked."

The operators are convinced that the minimum wage is too high and the men believe it is too low. The lack of accord is understandable, however, since employer and employee always have had divergent views on that subject. The minimum wage is the most troublesome feature of the present agreement, but there is little danger that it will wreck it, as some have predicted. The fact that the plan is an arrangement within the industry and is not handed down from above appeals to both operators and men. The scheme is proving to be a splendid antidote for socialism, which had gained a considerable following among British workers.

In discussing employer-employee relationships with this correspondent, a titled Englishman made the point that labor once was the slave of the master. The world progressed and the laborer became a wage earner. Another epoch now is dawning, this Englishman declared, in which the laborer becomes a profit-sharer. This is the secret, he thinks, of restoring productivity.

SCIENTIFIC LOAFING PASSING

Formerly labor became much more efficient during periods of unemployment. Since the war, however, the existence of large masses of unemployment has not tended so decidedly to such a result. The sentiment which governs in non-profit-sharing industries is one prompting the men to do as little as is possible in order to make way for more workers. The viciousness of such a policy is apparent in nearly all trades. Costs have been inflated to the point where production is limited greatly, with the result that unemployment continues on a larger scale than otherwise would be the case.

All of this has a direct bearing on the world coal situation, since the abnormally low industrial demand in the United Kingdom forces more British coal on the export market in competition with American and other coals. Moreover, the situation is one that is encountered in the United States with each dip in the curve representing industrial activity.

Next week Mr. Wooton writes of labor and labor leaders in the British coal industry.

Too Many Miners—What That Means to Themselves, The Operators and the Public



Well-Topped Cars May Save a Cent or Two per Ton in Haulage but May Make an Eighteen Cent Increase in Mining Rate Equitable

AT ONE of the mines visited by the engineers of the U. S. Coal Commission the general superintendent, who had charge of a number of large mines, stated that notwithstanding the fact that the miners were at present losing time waiting for cars, he planned to raise his output by increasing the number of loaders 50 per cent, thereby cutting down still further, by 33 per cent, the number of cars delivered to individual miners.

He said that in consequence of this proposed action the miners would be obliged to put more coal in the cars in order to earn the wages they were receiving, and with better filled cars the haulage cost would be lowered. In these mines the men were paid by the ton and not by the car. Furthermore, if under the new schedule some of the miners were absent he could give some of those who were in, 50 per cent more cars, and they would readily make up for the tonnage of the men who were out. In this way he could maintain his production. He could do this, furthermore, without breaking the letter of the "square turn" agreement with the union.

BALANCE LOSSES OF MINER AGAINST GAINS

It is of interest to note the relative effect in money losses to the miner and in apparent gain to the operator of extreme topping of cars, that is, piling up the coal above the top by careful stacking of lumps around the sides. Although a special case, this is of interest as illustrating the general principles involved in delays in work which is on a piecework basis.

In the mine to which reference is made 85½ per cent of all the coal produced was being loaded in rooms by men who frequently waited for cars and were expected to top them to the maximum height, whereas 14½ per cent was being loaded by men working in gangs in entries where the company was pushing the work. There they received all the cars they wanted, the purpose being to get out a big piece-rate tonnage. These heading men were not required to top their cars. In order to simplify consideration of the subject the figures have been reduced to a basis of 1,000 cars, and assuming each car to hold one ton when topped, the results of

actual loading during a representative eight-hour day for these two groups of men are given in the following tables in order to show the loss in tons of production due to a failure to top to the maximum height. This is based on direct observation of one day's work, except that the actual number of cars and their capacity has been converted for simplicity in figuring into their equivalent of 1,000 one-ton cars.

It will be seen from this table that with the conditions existing in this mine, where the miners are in rooms frequently waiting for cars and where the management requires the miners to top their wagons, the cars loaded and hauled are topped to an average of 91 per cent of capacity. On the other hand, in entries, where the miner was not kept waiting for cars and was not required to top them, the miners loaded 200 tons less than the cars would have carried if topped to capacity. This is only 80 per cent of the topped capacity instead of the 91 per cent that obtains where the cars are loaded in rooms.

CHANGE DOES NOT APPLY TO ENTRY MINERS

The decrease proposed by the management in the number of cars delivered to each miner applies only to miners in rooms, as the men driving entries will still be given all the cars they need. Allowing for the separate loading of bug dust, which cannot be topped, and for cars partly filled when cleaning up a cut, it is fair to estimate that the cars in rooms will be loaded to an average of 97 per cent of capacity if the supervision is close and the miners are compelled to wait still longer for cars. With this assumption the total cost of haulage and hoisting labor per ton will be as shown in Table II.

From these figures it is seen that the extreme saving to the company between the conditions of giving all miners all the cars they can load without requiring

TABLE I—LOSS OF OUTPUT BY LOW TOPPING

Loading in Rooms			Loading in Entries		
No. Cars	Percentage of Maximum Topped Capacity	Loss in Tons Due to Failure To Top To Capacity	No. Cars	Percentage of Maximum Topped Capacity	Loss in Tons Due to Failure To Top To Capacity
167	100	20	0	100	0
528	95	6	71	95	3
174	85	26	413	85	62
87	75	22	485	75	121
25	65	9	10	65	3½
9	55	4	10	55	4½
8	40	5	10	40	6
998	91	92	999	80	200

Fifth installment of report on "Underground Management in Bituminous Mines" made by Stanford E. Thompson and associates to the U. S. Coal Commission. Previous installments may be found in the issues of Nov. 8, p. 691; Nov. 15, p. 733; Nov. 22, p. 773, and Nov. 29, p. 811. Other sections of this interesting report will follow later.

topping and giving all the miners less than two-thirds of their carload capacity and requiring topping is the difference between 29.5 and 24.5, the entry and the room costs, or 5c. per ton.

There is further indirect saving to the mine operator by decreasing overhead per ton with increasing production and also by increasing the regularity of operation, as already has been indicated. The maximum real saving in labor, as shown by the table, however, is only 1.5c. per ton. This direct saving to the management is offset not only by increased expense for track and timbering but by greater and more insistent demands by the miner for deadwork allowance, about which he is much more contentious when he has much idle time.

TABLE II—EFFECT OF TOPPING ON HAULAGE COST

	Present Arrangement			After Reducing Cars 33 Per Cent		
	Room	Entry	Total	Room	Entry	Total
Per cent of total mine output	85.5	14.5	100	85.5	14.5	100
Per cent of mine-car capacity loaded	91	80	89.3	97	80	94.5
Total haulage and hoisting labor cost per ton	26.0	29.5	26.5	24.5	29.5	25.0

This, then, is the saving to the operator. It is well to look now to the effect of such methods on the miner. He is faced with the unchangeable schedule of union rates under which the miner is paid the same rate per ton whether he can mine one, ten, or twenty tons. With an average loading of six 2-ton cars, or twelve tons per day, for which he is paid 84c. per ton, he earns under the conditions of present car supply, \$10.08 per day, but when this is reduced one-third or to four 2-ton cars, the maximum he can load in a day (allowing for the extra topping and ratio assumed) is only

$$4 \times 2 \times \frac{97}{91}, \text{ or } 8.53 \text{ tons.}$$

This gives him, at 84c. per ton, \$7.16 a day against the \$10.08 formerly earned. Thus he loses \$2.92 a day. If the tonnage rates were immediately corrected to make up to the miner the loss in daily earnings, as is indeed sure to come to pass ultimately, it would be necessary to raise the rate per ton from 84c. to \$1.01½. This would represent an increase in the cost of mining labor of 17½c. per ton against a saving in haulage labor cost of 1½c. per ton.

The superintendent, however, knows that the men are working under definite rates which by the union agreement cannot be changed prior to April 1, 1924. If the idle time of the men were directly reflected in costs, it is inconceivable that any company would adopt a policy which would result in increasing that loss. Eventually, however, this increased cost would be borne by the company in increased rates per ton, and in turn would be passed on to the public. Such things as these indicate the need of analyzing the costs of mine-car loading and haulage so as to reach just and scientific solutions of the questions which are of such major importance to the industry.

IN THE ANTHRACITE REGION rock is frequently being loaded by compressed-air shovels, thus removing from the shoulders of the miners the burden of mucking. The operation being purely mechanical there is no necessity to give the shovel spells for rest, which with manual labor are necessary and tend to stretch out so unduly that work is the exception rather than the rule.

Examination Questions Answered

Solutions to Queries Involving Ventilation Problems

QUESTION—What pressure will be required to pass 150,000 cu.ft. of air per minute in the following splits or airways: Split A, 8x10 ft., 3,000 ft. long; split B, 7x12 ft., 4,000 ft. long; split C, 8x8 ft., 2,000 ft. long. Find the horsepower on the air at the mouth of each split.

ANSWER—The solution of this question depends on the principle, in splitting air currents; namely, the quantity of air passing in each split is proportional to the potential factor of such split as determined by the expression $X = a\sqrt{a/s}$. For the sectional areas and rubbing surfaces of the several splits we have

$$\begin{aligned} \text{Split A, } a &= 8 \times 10 = 80 \text{ sq.ft.;} \\ s &= 3,000 \times 2(8 + 10) = 108,000 \text{ sq.ft.} \\ \text{Split B, } a &= 7 \times 12 = 84 \text{ sq.ft.;} \\ s &= 4,000 \times 2(7 + 12) = 152,000 \text{ sq.ft.} \\ \text{Split C, } a &= 8 \times 8 = 64 \text{ sq.ft.;} \\ s &= 2,000 \times 2(8 + 8) = 64,000 \text{ sq.ft.} \end{aligned}$$

For the several potential factors of these splits, we have

$$\begin{aligned} \text{Split A, } X &= 80\sqrt{80/108,000} = 2.1773 \\ \text{Split B, } X &= 84\sqrt{84/152,000} = 1.9748 \\ \text{Split C, } X &= 64\sqrt{64/64,000} = 2.0239 \end{aligned}$$

$$\text{Sum of potentials} \quad \Sigma X = 6.1760$$

The pressure-producing circulation is found by dividing the total quantity of air in circulation by the sum of these potential factors and multiplying the square of this result by the coefficient of friction, which gives for the unit pressure in this case

$$p = k \left(\frac{Q}{\Sigma X} \right)^2 = 0.00000002 \left(\frac{150,000}{6.176} \right)^2 = 11.8 \text{ lb. per sq.ft.}$$

The total horsepower producing the circulation is

$$H = \frac{150,000 \times 11.8}{33,000} = 53.6 \text{ hp.}$$

The power on the air at the mouth of each split is proportional to the potential factor for such split; thus,

$$\begin{aligned} \text{Split A, } 6.176 : 2.1773 : : 53.6 : x &= 18.90 \text{ hp.} \\ \text{Split B, } 6.176 : 1.9748 : : 53.6 : x &= 17.14 \text{ hp.} \\ \text{Split C, } 6.176 : 2.0239 : : 53.6 : x &= 17.56 \text{ hp.} \end{aligned}$$

$$\text{Total} \quad 53.60 \text{ hp.}$$

QUESTION—A rectangular airway is 6 ft. high, 12 ft. wide and 2,500 ft. long; what is the rubbing surface in square feet?

ANSWER—The perimeter of this airway is $2(6 + 12) = 36$ ft., and the rubbing surface is, therefore, $2,500 \times 36 = 90,000$ sq.ft.

QUESTION—What is the maximum distance required by the mine law, for crosscuts to be from the working faces of chambers, headings and airways?

ANSWER—The law requires (Art. 10, Sec. 15) that headings or crosscuts shall not be driven more than 60 ft. from the face of each chamber or breast.

Washer That Removes Refuse in Coal as It Travels

Raw Coal Is Swept by Water Along Troughs—Slate and Bone Stratify Out and Are Trapped in Slots Which, by an Upward Current of Water, Are Kept from Admitting Coal

By JOSEPH KERSTEN*

Consulting Mining Engineer, Brussels, Belgium

THOUGH coal is washed in many ways, in all of them gravity has its effect. When a body falls in space that is filled with a fluid—liquid or gas—the velocity of its descent is diminished by the resistance of the fluid to displacement, and the denser the fluid the greater is this resistance. As the density of water is 800 times that of air, this diminution in velocity is of no little importance, in fact it may be calculated that the speed of the falling, or sinking, body rapidly reaches a maximum, after which its downward velocity becomes constant.

But the size of the falling particles also influences the velocity of sinking and in consequence a particle of any given specific gravity may fall at the same rate as one of a totally different specific gravity provided the size is such as to compensate for the difference in density.

Mathematical calculations show that during the first part of the fall, during which the velocity is accelerated,

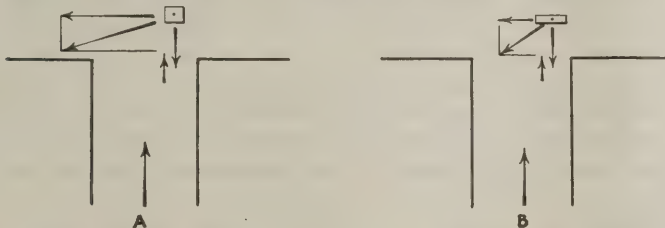


FIG. 1—ONE REASON WHY THE SLATE IS TRAPPED

In sketches A and B are shown pieces of coal and slate respectively. In actual practice the slate would be working its way near the bottom of the trough. Here, however, both are at the same level. The coal, being cubical, gets the full sweep of the current and is less disposed to fall than the slate because of its low specific gravity. Consequently the resultant of the forces on the coal is more nearly horizontal than the resultant of the forces on the slate. Furthermore, the coal is moving rapidly as it approaches the slot and the slate is not, and hence, as in the Emery picker, the coal ignores the slot and passes on.

the particles are sorted, or, as it is technically termed, classified, according to specific gravity, but during the period of the fall at constant velocity, the speed of the descent depends not only on the specific gravity but on the size. When these two elements compensate one another, the classification is according to equal settling qualities, or "equivalence," as it is termed, and not according to specific gravity. This is a consideration that must not be overlooked.

Of course the sorting according to specific gravity is the only separation that will divide the coal satisfactorily according to its ash and pyrite content. A means of separation known as the Rhéolaveur (Ray-oh-lah-ver), or flow washer, has been devised by A. France-Focquet, of Liège, Belgium, that depends on the separation of coal and refuse in the first period of settling, in which the particles are accelerating and during which the classification is according to specific gravity and not affected, at least in so great a degree, by the size of the particle as it would be in the latter part of

the settling process, when the speed of the particle has reached its maximum and is no longer accelerated. Owing to the separation being effected in the manner indicated, close screening, such is customary in ordinary washers, is not necessary.

The raw coal is run by means of a current of water through an inclined trough, in which it is submitted to two forces: (1) An impelling force due to the motion of the water and (2) a retarding force due to friction of the particles. If 0.4 and 0.6 are taken as the coefficients of friction of coal and slate respectively, and the specific gravity of coal and slate are taken as 1.3 and 2.4, it can be proved by mathematical calculation that when coal is washed by horizontal currents of water no useful purpose is served by screening with openings the diameter of which bear a relation to each other less than 6 to 1.

When, however, coal is washed by upward-moving currents the screening should be in ratios of 2 to 1. Thus in treating raw coal from $\frac{1}{8}$ in. to $4\frac{1}{2}$ in. by the Rheolaveur, it is necessary theoretically to size the coal only into grades running between $\frac{1}{8}$ in. and $\frac{6}{16}$ or $\frac{3}{8}$ in., between $\frac{3}{8}$ and $1\frac{8}{8}$ or $2\frac{1}{4}$ in., and between $2\frac{1}{4}$ in. and the larger size, namely $4\frac{1}{2}$ in. With a washer using only upward currents coal should be divided into sizes running between $\frac{1}{8}$ in. and $\frac{1}{2}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., $\frac{3}{4}$ in. and $1\frac{1}{2}$ in., $1\frac{1}{2}$ in. and 1 in., 1 in. and 2 in., 2 in. and 4 in., or with less exactitude $4\frac{1}{2}$ in. This makes it necessary to separate the coal into at least six sizes with upward currents of water and into not more than three sizes with the washer being described, and even such a degree of sizing can be still further diminished with the modifications to be described later.

Coal has been washed for many years in inclined troughs, the Elliot and Blackett washers being especially well known. The first is composed of a trough about 70 ft. long inclined on a slope of about 1 in. to the foot. Down this trough runs an endless chain fitted with scrapers. Raw coal is fed about half-way down the trough, the water being run in at the upper end. The clean coal carried along by the water passes over

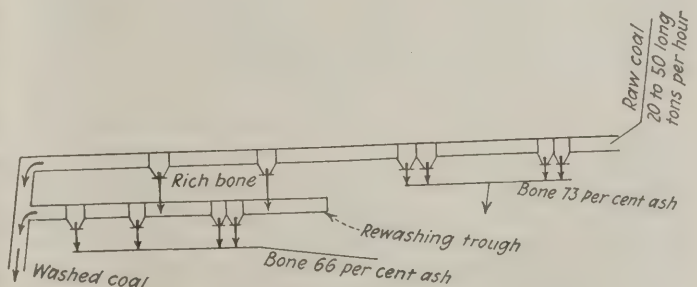


FIG. 2—CASCADE BATTERY REWASHES COAL

Little irregularities in washing may make commercial coal pass through the slot with some of the inferior coal. That being so, only coal of superior excellence is allowed to pass direct to the clean-coal pipe. The rest is allowed to fall with the bone coal into another trough, where it is washed again. There the absence of slate and superior coal makes it easier to classify the clean coal and bone coal into their proper classes.

*Translation by Amand Andry, Secrétaire de la Maison France-Focquet, 17 Quai Saint-Léonard, Liège, Belgium.

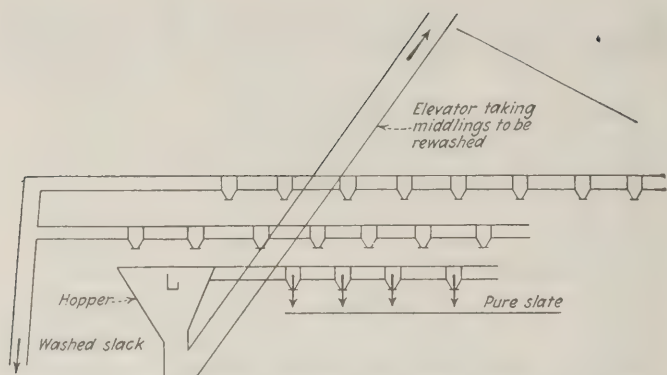


FIG. 3—ILLUSTRATES THE CLOSED CYCLE IN WASHING

The bone coal, discharged at the end of the third trough, is given yet another trial. It is delivered with the feed to the head of the first trough and plays a valuable part in the primary classification by putting a barrier between the slate and the clean coal.

the scraper, which moves in the opposite direction to the water screen. Thus the slate is scraped to the upper end of the trough.

On the other hand the Blackett washer consists of an inclined cylinder the internal surface of which is fitted with a spiral. The cylinder is rotated and fed with coal and water at the upper end by means of a trough which extends an adjustable distance into the cylinder.

The water carries the clean coal to the lower end, and the slate and other impurities are conveyed backward along the spiral and discharged at the upper end of the cylinder. Such washers do not by any means produce a perfect separation; the motion of the scraper and of the spiral so disturbs the water in the washer that classification is hampered.

The Rhéolaveur consists of a trough of sheet metal, cast iron or reinforced concrete, as desired, inclined at the upper end of a gradient of 1 in 10 or even of 1 in 5, the slope being diminished gradually till it is only 1 in 20 at its lower end. In the bottom of this trough are cut at intervals orifices beneath which are placed special boxes divided into two compartments and having adjustable orifices for the extraction of slate. Into the troughs, water is fed under a head of 20 ft. or less. The coal, whether round or cubical, is transported freely by the water along the trough, but the slate, being relatively flat, moves at much lower speed and lags behind the coal. In consequence the feed sinks in the water and is classified according to specific gravity. As it is carried along the classification continues.

The particles of slate are deposited first and form a natural slope inclined in the direction of the stream. When this slope has reached a certain sufficient inclination the particles of slate are carried along by the force of the water, but quite slowly because of their shape and of their friction on the deposited material.

If a simple slot were made in the bottom of the trough at that point the particles of slate would fall through it, as also the water and coal; consequently in order to keep the water and the coal within the trough, an upward current of water is produced by a special device known as the Rhéolaveur box, which allows the slate to fall but does not disturb the classification or allow the water or coal to leave the trough. If the bed of slate is sufficiently thick and the slot correctly placed, only a slow upward current will be required to sustain the coal and bone. In these boxes is also a downward current which facilitates the discharge of the slate from the box. The pressure of the water is regulated

by a valve and the extraction of the slate by conical apertures.

The upward current also has the effect of pushing the lighter particles above those that are more dense, thus preparing the slice of slate for extraction at the slot following.

The classification progresses as the feed continues along the trough until the last slot is reached. Here the bone coal, or middlings, is discharged. The whole process is so regulated that at the end of the trough nothing is left but commercially pure coal, and for this purpose the last boxes are arranged so as to extract a product containing some commercially pure coal which is to be re-treated, as will be explained later. Thus all the dense particles must reach the bottom of the trough before they arrive at the last box. This is why the slope of the trough is diminished toward the end and why no upward current is provided in the last slot.

Dams also are arranged in the bottom of the trough, the object of which is to retard the flow of water and increase the friction of the slate.

It has just been said that the product extracted by the last box is to be rewashed, and accordingly the washer is arranged as in Fig. 2, which shows what is known as a "cascade battery."

In instances where the washing of the product is unusually difficult, a considerable number of successive washings could be provided. To guard against this inconvenience, the scheme known as "rewashing in a closed cycle" has been devised. This rewashing consists of conveying back to the head of the plant the product carried to the end of the rewash trough by means of a suitable elevating conveyor (see Fig. 3). This product consists, of course, of particles of specific gravity greater than coal and less than slate. When introduced into the feed it forms a sort of artificial barrier be-

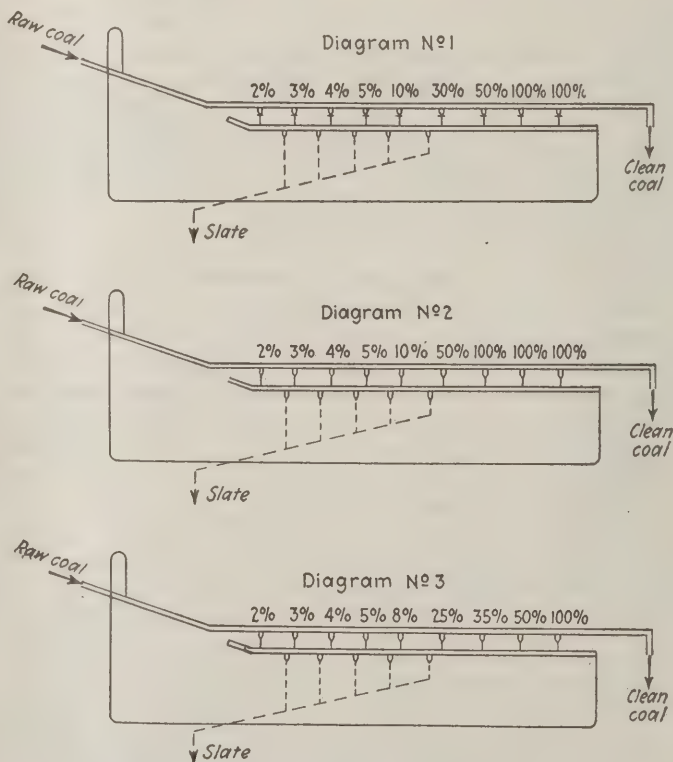


FIG. 4—FLOW SHEETS FOR THREE KINDS OF COAL

The coal of which Diagram 1 is the flow sheet is of normal character. The sheet marked Diagram 2 is for cleaner coal and diagram 3 is for a dirtier coal than the other two. Only one box in the last case discharges clean coal, only two in the first case and three in the case of the cleanest coal of all.

tween the pure coal, which is light, and the pure slate, which is dense. Moreover, whenever the composition of the feed varies, the thickness of the slice of intermediate products, or bone, also varies accordingly, and it is easy to realize that this forms a layer preventing the purer coal from being mixed with the slaty material.

To explain this arrangement more clearly, Diagrams 1, 2 and 3 in Fig. 4 are given to outline the principal conditions which occur in washery practice. These diagrams show also the various percentages by weight of commercially pure coal discharged by the different boxes, depending on the proportion of shale contained in the raw material.

In Diagram 1 the first group of boxes work with a weak upward current of water, and shale with 2 to 5 per cent of commercially pure coal falls through them

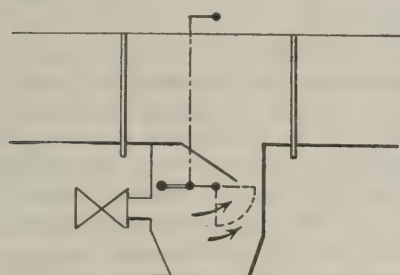


FIG. 5—SEALED CHAMBER FOR LARGE COAL

Large coal requires so big a slot that the trough would empty if no provisions were made to prevent it. So a flap is arranged which opens and closes and so sustaining the level of the material in the trough.

to the rewashing trough. Those of the second group operate without the addition of any water and the commercially pure coal contained in the shale increases progressively from 10 per cent till the last two boxes pass what is practically commercially pure coal.

In this manner the coal delivered at the end of the trough is of the purity needed for marketing purposes. All the apertures in the second trough are supplied with upward currents of water so as to prevent any of the commercial product from being extracted with the slate. Of course, some of the product passing over the end of the second trough contains some bone, but this is of no importance because this product is to be washed the third time.

Diagram 2 shows the method adopted where the feed is cleaner than in Diagram 1. In this case there are three boxes in the upper trough which discharge pure coal. Where, as in Diagram 3, the feed is dirtier than in Diagram 1, only one box in the upper trough discharges pure coal.

It is easy to realize that in all three cases the bone is rewashed in the upper trough and consequently can be entirely extracted as the rewashing permits the re-treating of any products leaving the lower trough. The above considerations apply to the washing of fine coal from 0.01 in. to 0.3 or 0.4 in. in diameter.

In washing coal from 0.3 or 0.4 in. in diameter the principle is similar to the washing of fines. The regulation of the upward current, however, would require too much care, as the slots would necessarily be rather wide to pass the largest particles.

The trough for treating large coal is shorter than is used for fines, because the former is more rapidly sorted than the latter. The whole plant usually consists of one trough fitted with two chambers, the first of which extracts slate and the second discharges a mixture consisting of the bone and some coal. This mixture is elevated to the head of the trough and forms a sort of barrier between the clean coal and the slate, just as has been said occurs in the washing of fines. Where many flat particles of slate are found in the feed it is easy to extract them by the second chamber

with a reduced upward current or with none whatever.

With a device of this character it is possible to wash coal from zero to 2½ in. without any preliminary screening. Fig. 8 shows such a washer. The first trough has two sealed chambers, the first of which extracts pure slate and the second a mixture to be rewashed, as already explained. The trough discharges the clean coal, which passes on to a screen which extracts particles from zero to 0.2 in. in diameter. These are re-washed in one or two troughs fitted with free-discharge boxes. The fines are drained by a special drainage scraper which compresses them and thus extracts some of the water.

That is why, in this case, use has been made of an apparatus known as "*à niveau plein*,"* or sealed type of box directly connected to the boot of a sealed bucket elevator. These boxes are fitted with an oscillating flap, and owing to these provisions the slate is extracted without any loss of water whatever. The flap oscillates between a horizontal position which nearly closes the slot and a more or less inclined position, according to the aperture which the size of the largest particles may require.

In order to prevent such a complete extraction of the slate as would make a break in the bed of slate and let the pure coal pass down, the slot has been replaced by a chamber which works almost like a classifying agent. When the flap opens, a stream of water strikes the slate. The slate drops through the flap but any particle of coal that may be associated with it is driven upward and prevented from falling through the trap. Thus is avoided the suction which has had so undesirable an effect in the operation of a jig. When the flap closes much the same result is attained as by a stroke of a jig (see Fig. 5).

The chambers also have been fitted with a moving vertical flap which makes it possible to regulate the aperture through which the slate is discharged from the chamber (see Fig. 6). With these appliances coal from ¼ in. to 4 in. can be treated.

When the raw coal to be treated is dry, it is often advisable to extract dust from zero to 0.02 in. before washing. This is done by means of a pneumatic dust extractor or by vibrating tables. This extremely fine dust can be mixed wholly or in part with the washed fines. In this way it is possible to prevent the formation of coal slimes.

When the raw coal is wet, it is better to wash it all, regardless of its fineness. If, after washing, the particles between zero and 0.02 in. are clean, it is well to provide means of settling this fine material, large hoppers being provided for that purpose. If, however, the fine particles are somewhat dirty, it is desirable to eliminate them from the washed fines and consequently smaller hoppers will suffice, so that these extremely fine particles will be discharged wholly or partly with the waste water.

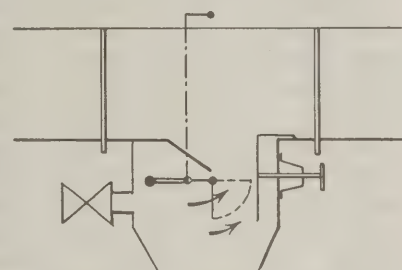


FIG. 6—SEALED CHAMBER WITH VARIABLE OPENING

In this case a wheel is added, the movement of which enlarges or diminishes the aperture.

*Having the opening filled level [with deposited material].

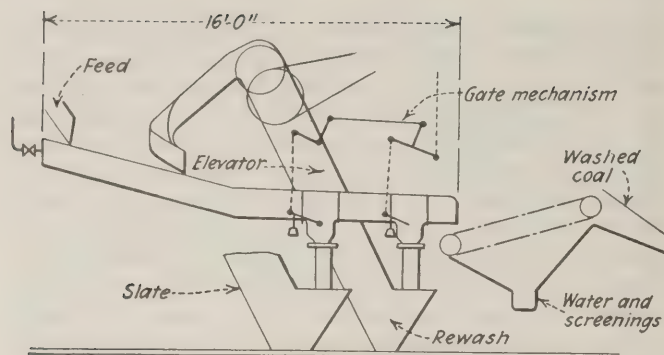


FIG. 7—ARRANGEMENT FOR WASHING COARSE COAL

Here are only two traps, one for slate and one for bone coal. Only one trough is provided, and the bone from the second trap is rewashed with the feed.

Sometimes it is better to settle all the fines in hoppers and before storing them in bins to rinse them with the clear water from the elevator by which the washed fines are conveyed. Provision is easily made for this by fitting the chute with a fine screen on which clear water is sprayed. The slime thus withdrawn is collected in V-shaped hoppers.

THREE PRINCIPLES USED IN WASHER DESIGN

This type of washer therefore is based on the following principles: (1) The raw coal is submitted to the action of a horizontal current of water in a rectilinear trough of which the length, shape and slope are designed so as to provide as perfect a separation as possible. In this the coal progressively receives its primary classification. (2) The heavy particles systematically and progressively deposited on the bottom of the trough are extracted by an extremely simple device which not only removes the slaty material but at the same time assists the primary classification by utilizing upward currents of water, the velocity and direction of which are arranged so as adequately to effect the desired result at each phase of the classification. (3) By treating the heavy discharge of the first trough in a second immediately beneath it, the loss of valuable coal is avoided. Sometimes a third trough is used to rewash the heavy material evacuated by the second.

If there is a change in the quality or quantity of the material to be washed, the rewashing of the bone coal in a closed circuit introduces an averaging of these variables. Thus the cascade battery smooths out irregularities in feed just as the flywheel compensates for the inequalities in power output and outgo.

The bone when being rewashed acts as classifying

agent, making an artificial barrier between the coal and the slate which prevents any of the coal from mixing with the slate and being drawn out into the refuse. By the closed circuit the quantity of bone in the raw feed is supplemented by bone from previous washings and in a short time becomes sufficiently deep to make a layer of bone through which the coal cannot pass at any of the boxes by which slate destined for the rockpile is drawn.

The advantages of this type of washer are a reduction of the percentage of carbon lost in the slate, a reduction in the quantity of slimes to be handled, less capital investment, less power consumption (for a jig will require 2 hp. per ton-hour capacity and a Rhéolaveur only 1 hp.), greater efficiency, a saving in water circulation and consumption, less attendance and labor and lowered upkeep cost.

In conclusion the method of determining the character of coal to be rewashed may be reviewed. A series of liquids are prepared of different specific gravities, as, for example, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7. A sample of dried coal is weighed. It is then put into the liquid of a specific gravity of 1.7. What sinks is dried, weighed and burned to ash. What floats is put into the next liquid in the series, which has a specific gravity of 1.6. What sinks is dealt with as before. The float is successively put into the whole series of liquids and from the liquid at a specific gravity of 1.3 both sink and float are dried, weighed and burned to ash.

With the figures thus obtained a diagram can be drawn showing the washability of the coal and the results to be sought. In practice the Rhéolaveur washer will come close to the figures thus obtained.

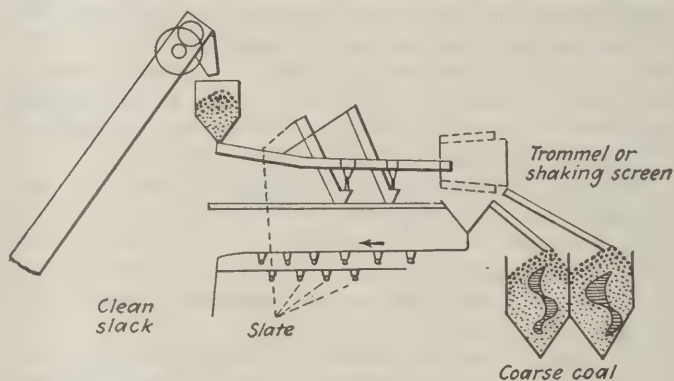


FIG. 8—PLANT TO CLEAN COAL UP TO 2½ IN.

The coal, cleaned over two traps, one for slate and one for bone, passes to a trammel. The coarse coal goes to storage bins, and the fine coal is rewashed by a cascade battery like that shown in Fig. 2.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of October

Ports	Railroads	Cargo	1923 Fuel	Total	Cargo	1922 Fuel	Total	Cargo	1921 Fuel	Total
Toledo	Hocking Valley	4,275,580	128,024	4,403,604	2,820,504	81,750	2,902,254	4,079,150	107,350	4,186,500
	N. Y. C.-Ohio Central Lines	1,123,196	34,856	1,158,052	631,551	18,225	649,776	1,027,438	29,667	1,057,105
	Baltimore & Ohio	2,491,822	73,702	2,565,524	2,483,345	64,600	2,547,945	2,354,369	72,016	2,426,385
Sandusky	Pennsylvania	2,733,993	87,399	2,821,392	2,165,807	80,493	2,246,300	1,552,971	45,076	1,598,047
Huron	Wheeling & Lake Erie	1,316,228	51,762	1,367,990	299,292	12,684	311,976	1,491,595	42,905	1,534,500
Lorain	Baltimore & Ohio	3,113,444	170,299	3,283,743	1,214,512	68,567	1,283,079	2,393,742	97,034	2,490,776
Cleveland	Pennsylvania	1,625,999	179,898	1,805,897	784,011	77,677	861,688	1,990,664	86,325	2,076,989
	Erie	691,679	30,286	721,965	238,475	9,127	247,602	359,981	12,782	372,763
Fairport	Baltimore & Ohio	741,256	69,056	810,312						
Ashtabula	New York Central	2,964,539	233,635	3,198,174	1,073,415	68,697	1,142,112	1,064,824	59,124	1,123,948
	Pennsylvania	1,859,006	81,373	1,940,379	1,134,222	71,730	1,205,952	2,213,665	72,753	2,286,418
Conneaut	Bessemer & Lake Erie	2,446,562	214,030	2,660,592	1,153,334	46,733	1,200,067	1,362,601	18,258	1,380,859
Erie	Pennsylvania	596,461	78,816	675,277	159,461	60,739	220,200	979,869	61,103	1,040,972
Totals		25,979,765	1,433,136	27,412,901	14,157,929	661,929	14,818,951	20,870,869	704,393	21,575,262

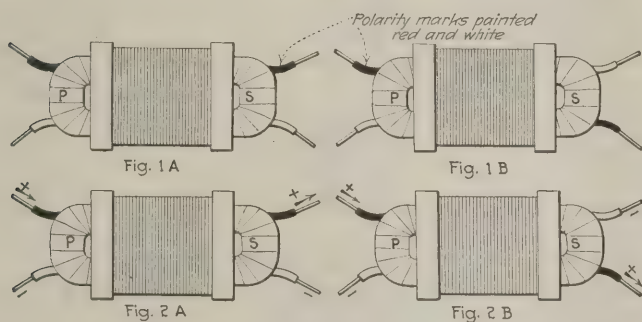
Compiled by Ore & Coal Exchange, Cleveland, Ohio: H. M. Griggs, manager.

Connections Between Meters And Transformers*

Instantaneous Polarities of Terminals—Properly Connecting Meters—Tracing Instrument Cable Wires—Following Circuit in Complicated Diagrams

MUCH confusion often results when endeavoring to properly connect meters and instruments to electric power circuits; especially is this true on switchboards using the same instrument transformers for meters and relays. There are several methods of checking these connections but many of them are so elaborate that they are impractical for everyday use. When wiring up wattmeters and watt-hour meters it is necessary that the current and potential coils be connected so that the flow of current at every instant is such as to produce proper direction of rotation or deflection of the meter.

With simple single-phase circuits not using instrument transformers it usually is rather easy to make the proper connections, but when transformers are used on polyphase systems where the meters are wired to the instrument transformers through wires passing through conduits the problem is sometimes quite difficult.



FIGS. 1 AND 2—POLARITY MARKING ON INSTRUMENT TRANSFORMERS

In painting the framework and equipment behind a switchboard it is important to preserve these polarity marks on the instrument transformers; otherwise considerable confusion may result when making changes to the wiring.

One of the simplest methods of checking meter and transformer connections is by following the direction of the currents at a given instant. In order to do this it is necessary to know the instantaneous polarity of transformers, circuits and instruments.

INSTANTANEOUS POLARITY MARKS

With direct current it is assumed that the current flows from + to —; so if the polarity of a piece of apparatus is given the direction of current flow can be determined, and conversely, if the direction of current flow is given the polarity can readily be determined. The same rule holds true in alternating current, although both the polarity and direction of current flow reverse perhaps 50 to 120 times per second, depending on the frequency of the circuit. Therefore, in order to find out the relation of polarity and current flow in alternating-current diagrams, we pick out any particular instant and label the polarity at that instant, the "instantaneous polarity" with a + or —, and label the current at that instant, the "instantaneous direction of current flow," using a small arrow to denote the

direction. In the accompanying diagrams all the + signs may be changed to — and all the arrows reversed, yet the results will be absolutely the same.

Consider for the first case, an ordinary potential transformer. These devices usually have two primary and two secondary leads, and one of each will be painted red or white. The diagrams will appear somewhat like Figs. 1A or B. Since the primary *P* consumes power, if it is assumed that the polarity mark is +, then the direction of current at that instant will be as shown by the small arrows in Figs. 2A and B. The secondary *S* is acting like a generator of power, so with this polarity mark + the direction at that instant will be as shown by the little arrows on the secondary side. The same method may be expanded to a complete diagram and take the form of Fig. 3, which shows a potential transformer connected to a voltmeter.

MARKS ON WOUND PRIMARY TRANSFORMERS

When the current transformers contain a wound primary, thus having a total of four leads, the polarities are just the same as for a potential transformer. Many current transformers, however, have a hole through which a line wire may be passed to form the primary. These transformers will have a white or red spot painted on one side of the transformer at the end of the hole, thus denoting that at the instant when the current flows through the line wire from the polarity marked side to the opposite side, then the secondary current will leave the polarity marked lead and flow to the opposite lead. Fig. 4 shows the relation between polarity marks and current flow in this type of transformer.

Examining the instructions furnished by the manufacturer, a wattmeter diagram may be found similar to Fig. 5, and in order to most easily and correctly connect this in the circuit, it should be marked with the instantaneous polarities and direction of current flow. Assuming that the right-hand wire is + at a particular instant, then the small arrows in Fig. 6 will indicate the direction of current flow at that instant in both current and potential windings. Note that this manufacturer places polarity marks on the opposite ends of the transformers. If these polarity marks do not occur in the diagrams furnished, it may be assumed that these marks are both on the same end. Thus if Fig. 5 did not designate polarity marks, the instantaneous directions of current flow would be those of Fig. 7 rather than Fig. 6.

MAKING TWO-PHASE CONNECTIONS

Two-phase circuits may be treated exactly like two single-phase circuits, whether they employ four wires or three. If the two phases employ a common wire, then it may have two sets of arrows to show the current flow. These need not interfere even if pointing in opposite directions, as that condition simply means that the wire is carrying only the difference of two currents and does not interfere with the polarity or instantaneous markings in the least.

Three-phase circuits are also marked by assuming the polarities at any instant. There may be twelve distinct sets of instantaneous directions of current flow in a three-phase circuit, any one of which will work correctly, but for the sake of uniformity the instant usually assumed is when the current is flowing toward the load in the two outside wires and returning in the middle wire or neutral.

*Abstract of article by Victor H. Todd, engineer, Westinghouse Electric & Manufacturing Co., in *Power*, Sept. 11.

Consider first the manufacturer's diagram, Fig. 8, which is for a polyphase wattmeter. It is assumed that the outside wires are + and the middle wire —.

through the current coil of the wattmeter, which must correspond to the same phase as the potential coil, then over through the oil-switch trip coil, through the common wire and the ammeter back to *F*. In a similar manner, starting at *E*, the circuit is through the other current coil of the wattmeter, the other trip coil, ammeter and back to *F*. It will be noted that there is a common connection between the common connections of both the current and potential transformers, but this is for protective purposes and is usually grounded and does not carry any current in normal operation.

Many times wiring must be run in conduit, as the transformers may

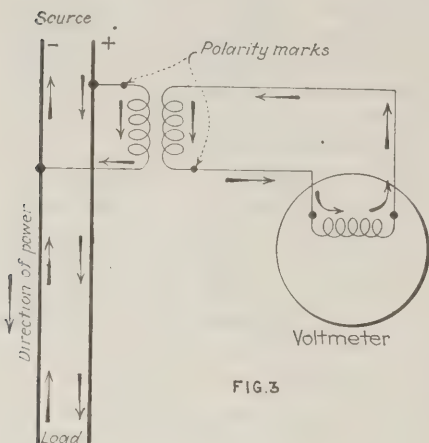


FIG. 3

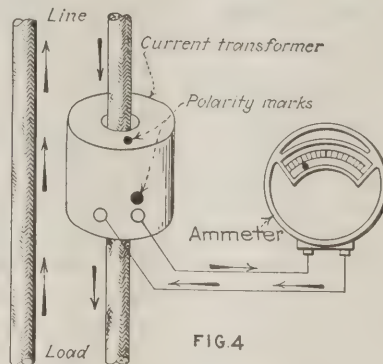


FIG. 4

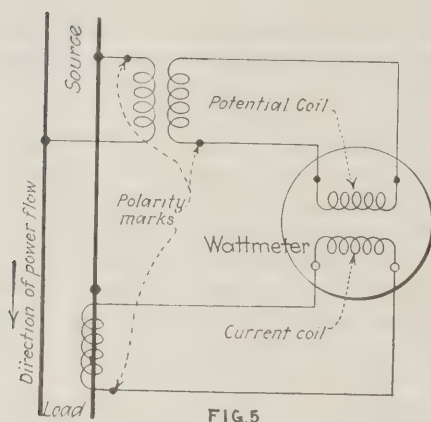


FIG. 5

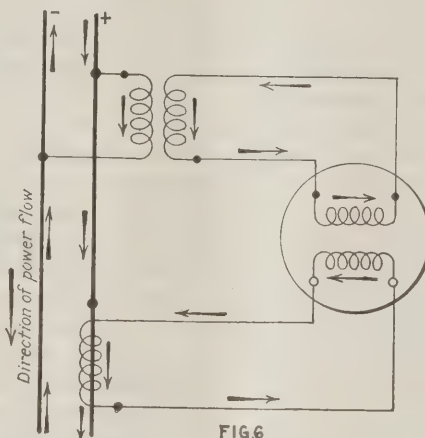


FIG. 6

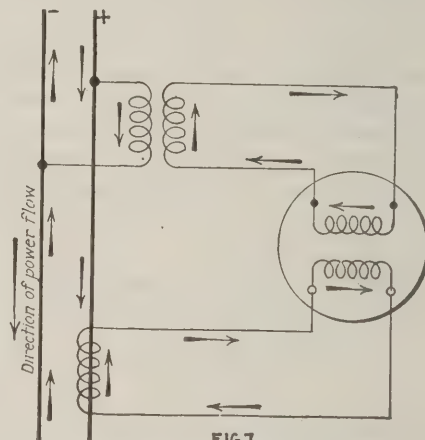


FIG. 7

FIGS. 3 TO 7—SHOW RELATION BETWEEN POLARITY MARKING AND METER CONNECTIONS
 Fig. 3—Instantaneous direction of current flow in a potential transformer. Fig. 4—Instantaneous direction of current flow in a current transformer. Fig. 5—Diagram for single-phase wattmeter and transformer connection with polarity marks indicated. Fig. 6—Same as Fig. 5, with instantaneous direction of current flow indicated. Fig. 7—Instantaneous direction of current flow when polarity marks are not given

Then the instantaneous directions of current flow are as indicated in Fig. 9.

For the foregoing simple cases, perhaps other systems of connection identification could be devised to work as well, and in fact the experienced instrument man would often not even require a diagram to hook up a meter correctly. But the greatest application of this system lies in laying out wiring diagrams for switchboards where perhaps ammeters, relays, power-factor meters and other devices may be all connected to the same transformers. Then the checker will set before this complete switchboard wiring diagram and, starting at the polarity mark on a transformer, follow the line through its maze of wiring, putting a little arrow at short intervals as he proceeds, until finally the line thus diligently followed ends at the opposite side of the transformer.

COMBINING INSTRUMENTS AND RELAYS

As an example of this consider Fig. 10, which is a diagram of an alternating-current panel with a wattmeter, ammeter and oil switch. For the potential circuit, first start at *A* and the line goes through the fuse, potential coil of wattmeter, fuse and back to *B*. Again starting at *C*, the path is through the fuse, other potential coils, fuse and back to *B*. Starting at *D*, of the current transformers, the path must ultimately come back to *F*. Therefore, from *D* the circuit is

be located at considerable distance from the switchboard or instruments. In such cases it is preferable to run two wires from the current transformers and make the common connection at the meter rather than at the transformers. A wattmeter diagram like Fig. 9 would then take the form of Fig. 11, where the wires are shown entering the conduit at the transformers and leaving at the meter.

Care must be used in identifying the wires as they enter and leave the conduit. One way is to ground one wire to the conduit at one end, and then at the other end pick out with a magneto, bell and battery or megger, the wire that gives a circuit through the conduit. Mark both ends with paint or tags so they may be easily distinguished. Then ground the next wire and identify it at both ends, and so on. This process is rather a long drawn out one, and there is always the danger of getting the markings mixed, which everyone familiar with this class of work knows. Furthermore, if the devices are disconnected, then it is a case of seeing that the wires are properly marked so that they may be connected up again correctly, and this is always a source of trouble. To overcome this difficulty, it is becoming general practice to use different colored wires for connections between transformers and meters.

Perhaps the easiest and best way to identify meter and instrument wiring whether it be in conduit or not.

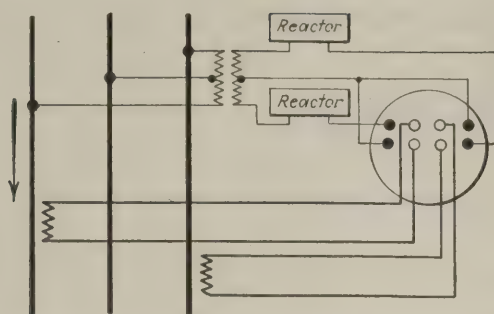


FIG. 8—MANUFACTURER'S DIAGRAM FOR POLYPHASE WATTMETER CONNECTIONS

For construction purposes polarity markings must be followed consistently.

is to use wire with various-colored insulations. Cables may be obtained with either 2, 3, 4 or 7 different colored wires under one covering. For polyphase wattmeter work it is best to employ a 4-wire cable for the current and a 3-wire cable for the voltage. Many firms use 7 conductors for this, but often the potential transformers are located at some distance from the current transformers, thus entailing considerable skinning of insulation and waste of cable.

Now if a polyphase watt-hour meter is to be connected to transformers with the wiring in conduit, the diagram would appear like Fig. 11, where the instantaneous polarities, directions of current flow and colors of the wires are clearly marked.

This marking has been standardized by a large central station, and when meter wiring is encountered, every meterman can tell at a glance just which wires are potential and which are current; which wires feed and which return; and in this way it is easy to connect the meter correctly, and if one were connected wrongly, it would soon be detected.

In Figs. 8 and 9 reactors are shown in series with the potential coils of the wattmeter. The only time resistors are used in series with the potential circuit of a wattmeter or watt-hour meter is when the potential

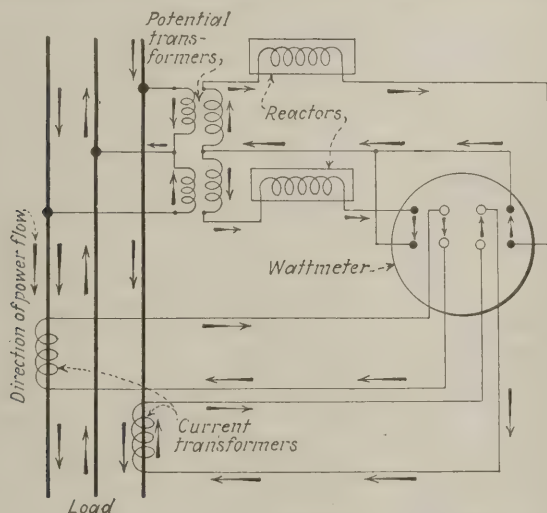


FIG. 9—SAME AS FIG. 8 BUT WITH INSTANTANEOUS DIRECTION OF CURRENT GIVEN

This is how the checker's diagram shows the instantaneous directions of the currents.

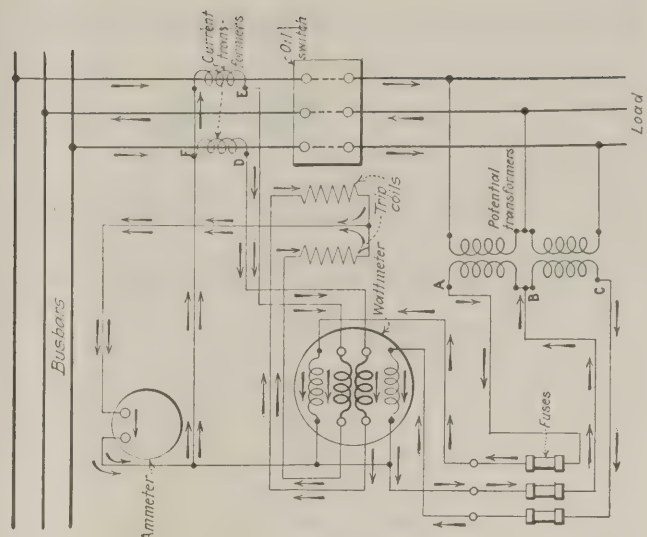


FIG. 10—INSTRUMENTS AND TRIP COILS CONNECTED TO SAME TRANSFORMERS

By starting at the transformer terminals each circuit may be followed and checked back on itself.

circuit of the meter is free from inductance, as in the dynamometer type. Meters of the induction type have high inductance in the potential circuit, consequently must have a reactor in series to cause the

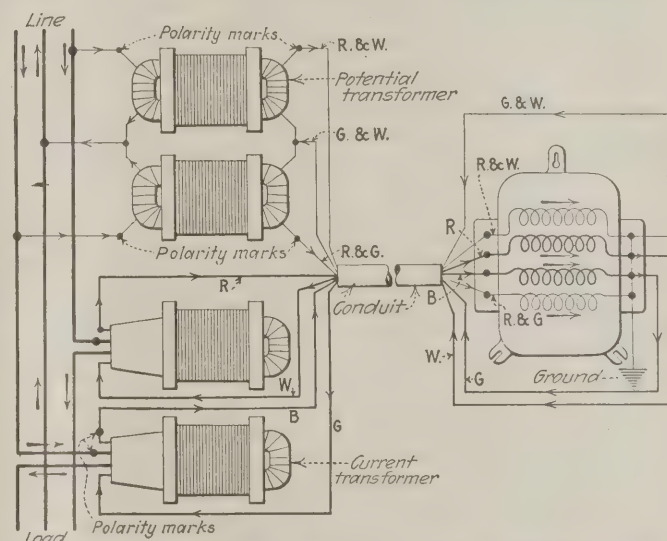


FIG. 11—SHOWS USE OF MULTI-COLORED CABLE FOR CONNECTING UP METERS

R. = red; W. = white; B. = black; G. = green; R & W = red and white; R & G = red and green, and G & W = green and white.

current to lag sufficiently to give 90-deg. displacement between the current and potential fluxes. A resistor would tend to throw the potential current in phase, and the meter could not be calibrated on varying power factors. The meter and reactors are calibrated as a unit and must not be confused with multipliers. It is impractical to build a meter with a reactor multiplier, as such a reactor must have exactly the same characteristics as the potential circuit of the meter, and this is done only in rare cases.

Practical Pointers for Electrical and Mechanical Men will be found on pages 859 and 860; Problems in Underground Management on pages 861 and 862

News of the Industry

Pinchot Drafts New Plan and Compact To Regulate Anthracite Industry

Two Governors and Nine Delegates at First Conference Lukewarm to Scheme—Solution in Pennsylvania's Hands, They Say—Proposed Legislation Nearly Ready—To Meet Again Dec. 13

Governor Pinchot of Pennsylvania has sent to the governors of thirty states using anthracite a copy of the proposed compact of the states, suggested at the conference of the representatives of twelve states at Harrisburg, Nov. 26, together with the complete proceedings of that meeting. Within a few days he will forward to the same governors a copy of his proposed federal legislation, which, with the co-operation between states, provided for in the compact, he says, will bring about regulation of the anthracite industry and a reduction in retail prices.

As suggested at the first coal conference of the state executive, Governor Pinchot fixed Dec. 13, at 2.30 p.m., as the time for the next conference.

None of the representatives at the first conference displayed any enthusiasm relative to the compact. Governor Silzer of New Jersey and Governor Preus, of Minnesota, opposed it, as did the representatives of other states, on the ground that Pennsylvania should declare the coal industry a public utility, repeal the anthracite tax and the miners' certification law.

The Pinchot plan, the Pennsylvania Governor said in his letter transmitting the compact draft, is new and he added that it seems to him to be "sound tactics to try a new way," for at least it can be said "that it has not failed already." The plan is legally good, he said, and in his suggested plan he cited numerous instances of compacts between states and many court decisions to prove their validity. As a part of uniform control the compact will "have more effect than such legislation has ever had before," he wrote.

The points stressed by the Governor in his letter were that under the compact the coal business would be declared a public utility and this would be the basis from which two co-operating commissions would work to regulate the industry and finally to fix prices, among other things. There would be a joint commission of five members, if the United States does not ratify the compact, and of seven, if it does.

The compact also provides for a Pennsylvania Coal Commission which would consist of the Pennsylvania member on the joint commission—the compact providing that the anthracite state

be represented—who would act as chairman, the chairman of the Public Service Commission and the Attorney General of Pennsylvania.

The Pennsylvania commission would regulate the anthracite industry within

Governor Pinchot Outlines His Proposed Compact as Follows:

"The proposed compact will be an exercise of the constitutional powers of the states and of the United States.

"It conforms to established practice illustrated by a host of examples from 1784 to 1923.

"It will be identical legislation by the contracting states, which no one of them can repeal.

"It will insure unity of administration under this legislation, thus pooling the legislative and administrative power of the contracting states.

"If Congress so chooses, it will add to the pool the legislative and administrative power of the federal government over interstate commerce.

"If not, it will at least make co-operation by the federal government possible by giving it only one state authority to deal with.

"It will remove a doubt whether production by itself is a public utility which Pennsylvania alone can constitutionally regulate.

"It will insure investigation and publicity by an agency of the consumers as to all these stages of the business and as to mining in addition.

"It will insure the benefits of regulation to consumers by applying the regulation to every stage of the business from the mine to the consumer."

Pennsylvania in co-operation with the joint commission and the federal government. The joint commission would have power to fix prices after investigation and publication of facts. Its price-fixing power would commence after the sale of coal at the mines or after the coal leaves the mines. It would be expected to provide efficient service to the consumers, to prohibit discrimination, to provide equal distribution and would have power to pool profits and coal delivered. It would fix standards of size and quality, license dealers and otherwise regulate the trade.

In his draft of the compact Governor Pinchot outlines the proposed compact as follows:

In addition to Governors Pinchot, Silzer and Preus the others at the conference of Nov. 26 and the states they represented were: Major H. P. Sheldon, Vermont; Cyrus Locher, Ohio; James A. Hamilton, Connecticut; E. C. Hultman, Massachusetts; J. J. Rutledge, Maryland; George H. Webb, Rhode Island; J. R. A. Hobson, Virginia; W. E. Snide, Michigan, and Dr. F. J. Monaghan, New York.

Treadway Advises Repeal of Anthracite Tax

In a statement issued Nov. 28. Representative Treadway, of Massachusetts, called on Governor Pinchot to summon the General Assembly in special session to repeal the "\$8,000,000 tax levied against citizens of other states" using anthracite. "If a sufficient number of people," Mr. Treadway said, "continue telling Governor Pinchot where the first great fault lies, namely, at his own door, the fact may eventually permeate his brain. Unless he promptly sees the drift of the current, instead of impotently trying to row upstream against public opinion, he soon will find himself and his state laws in the eddy of stringent federal legislation."

Must Submit Rate Sheets to Mine Committee

The Anthracite Board of Conciliation, meeting in Philadelphia, Nov. 30. decided that all operators of the hard-coal fields must submit copies of their rate sheets to the mine committee at each colliery. This was provided for under the last agreement but in some cases owners of collieries have declined to permit sheets to be removed from the colliery office, asking that the mine committees go over the details at the office.

**SUMMARY OF RATES PAID TO COMPANY MEN IN ANTHRACITE MINES UNDER DATE OF
APRIL 1, 1923, AS REPORTED BY U. S. COAL COMMISSION**

Summarizing the outstanding features in the analysis of rates paid 53,159 company men under date of April 1, 1923, it is found that the significant range in rates varies from 27 to 71c. an hour. The bulk of the wage earners, approximately 88 per cent, received between 51 and 71c. an hour. Of the 10 per cent who received less than 51c., a little over three-fourths were boys.

Of the adult workers receiving 27 to 71c. per hour, 95 per cent received between 51 and 71c. A further refinement of the rates paid this 95 per cent shows that 19.1 per cent received between 51 and 53c. an hour, 5.5 per cent between 53c. and 55c.; 8.9 per cent between 55c. and 57c.; 5.9 per cent between 57 and 59c.; 15.6 per cent between 59c. and 61c.; 18.2 per cent between

61c. and 63c.; 6.1 per cent between 65c. and 67c.; 9.7 per cent between 67c. and 69c. and 0.3 per cent between 69 and 71c.

A comparison of rates in the three coal-producing regions shows that the inside workers in Schuylkill region received somewhat higher rates than similar employees in the Lehigh region. On the whole the inside employees in the Wyoming region received the lowest rates. In the case of the outside workers the highest rates are paid to the employees in the Wyoming region, the next highest in the Schuylkill and the lowest in the Lehigh region. There existed a differential between the rates paid inside and outside men which amounts to 8.1c. per hour in favor of the inside day men.

Pay of Anthracite Company Men Ranges From 27c. to 71c. an Hour

**Report of Coal Commission on Hard-Coal Wages Shows Significant
Variation in Earnings—Inside Workers in Schuylkill Region
Better Paid Than in Other Two Fields**

Wage rates in the anthracite industry are the subject of a report by W. E. Fisher, released by the U. S. Coal Commission last week. The report was prepared early in the summer and made available to the anthracite operators and miners during their wage negotiations. It was available also to Governor Pinchot at the time he granted the miners a 10-per cent wage increase.

Mr. Fisher's summary of his findings on hourly rates paid the company men, which constitute 60 per cent of the hard-coal workers, is given in full in the box at the top of this page. It is pointed out that the men employed as blacksmiths, carpenters, firemen, machinists and electricians at the anthracite mines work practically a full time year, and hence no attempt was made to compare their rates of pay with those of similar occupations in the building trades.

It is noted that the hourly rates in the Schuylkill region are higher than in the other two regions, and that irrespective of occupation or of region there is a differential of 10c. an hour in favor of the inside day men over the outside men. Mr. Fisher says, however, that "a weighted average lowers this differential to 8.1c. an hour in favor of the inside men."

"A presentation of the rates paid to tonnage men has been considered practically impossible," says the report. "As already explained, the contract miners and their laborers are piece workers. The units of work for which payment is made vary not only in the different coal fields but also from colliery to colliery, and even within different sections of the same colliery." The different methods of mining have necessitated different methods of wage payments.

The report studies the trend of wage

rates in the anthracite industry from 1901 to 1923 and summarizes the detailed studies by showing that the relative wage rates of anthracite contract miners have increased from 100 in 1902 to 213.6 in 1923, prior to Sept. 1.

The lack of uniformity and the wide variation of rates is shown in an elaborate series of statistical tables accompanying the report.

It was on the basis of this study by Mr. Fisher that the Coal Commission, in a report to the President on Aug. 23, 1923, following its unsuccessful effort to bring the miners and operators together for a new contract, said:

"The Commission reiterates its finding that there are inequalities and injustices in the present wage scale, not only in the entire anthracite district but even in individual localities and mines. It quotes for your information the following facts as found by its investigators, in proof of this statement:

"In one district, company miners are now paid fifteen rates in twenty-two mines and in another district thirty-eight different rates in sixty-five mines, the hourly wage ranging from 59.4c. to \$1.02. Similarly in the same districts, an outside occupation, like carpenter, may have thirty-seven different rates in twenty-two collieries, with a range of from 52.5c. to 72.7c. an hour, while in the other districts the maximum rate for the same job is 90c. and \$1. Similar variations in wage rates for the same job are found throughout the anthracite region, the same mine paying five, six, or even seven different rates for outside laborers.

"Even with the piece workers or tonnage men, the contract miners and their laborers, the rates paid in different mines cannot be directly compared. In one mine there is separate payment

for each item of additional work, such as setting props and laying sheet iron, while in another mine in the same district, payment for these items is included in the car or ton rate for coal mined and loaded. These differences in tonnage rates may also involve marked inequalities inherited from the more or less haphazard arrangements of rates which prevailed twenty years and more ago. And the marked differences in annual earnings of these miners are in part traceable to differences in rates. In the same mine, miners working the full year range in earnings from \$1,698.14 for 282 days to \$6,414.64 for the same number of days. In another mine, a miner earned \$4,471.88 in 283 days, while another working 5 days more, earned \$1,897.50. Or stating it in another way, the same earnings for different miners in another mine may represent as much as 53 days' difference in working time. Obviously, any flat percentage increase in rates would only further widen the spread in earnings of men rendering similar service.'

"Other instances might be supplied, but it is not necessary for the purposes of this report. They will be found in the special report on Wage Rates in the Anthracite Industry.

"The origin of these inequalities is found in the 1902 rate structure, which was without any scientific basis, since at that time wages and rates varied from mine to mine and even from working place to working place within the same mine. These different bases of pay and innumerable rate differentials then in force were crystallized in the 1903 award; and successive percentage increases have served simply to accentuate and increase the inequalities. The inequitable conditions surrounding this complex wage-structure are manifestly unfair to the individual mine workers, and the recognition of this led the Commission to make its recommendation above quoted."

Effective Dec. 1, D. E. Gelatt was appointed general coal freight agent of the New York Central R.R. with headquarters at 466 Lexington Avenue, New York City. The position of coal traffic manager was abolished.

Trade Commission Takes Up Madeira-Hill Case

Dec. 3, the first day of the hearing before the Federal Trade Commission in the Madeira-Hill case, was taken up largely with a review of the coal situation leading up to the specific events to be considered later. F. R. Wadleigh, formerly Federal Fuel Distributor, testified as to the location of the various coal fields and of the negotiations in connection with the voluntary establishment of fair prices.

E. S. Felton, former chairman of the Pennsylvania Fair Practices Committee, testified that prices suggested by that committee during the anthracite strike as reasonable for different sizes of coal were arbitrarily set, but neither Madeira, Hill & Co. nor any other producers were compelled to abide by the prices fixed by the Federal Trade Commission.

The anthracite situation is a matter of chronic worry in New England, the commission was told by Eugene C. Hultman, Fuel Administrator of Massachusetts. There is a permanent shortage of hard coal, he declared.

Electrical Engineers Meet In Anthracite Field

The Lehigh Valley Section of the American Institute of Electrical Engineers held its last meeting at Pottsville, Pa., Nov. 16 and 17. Considerable more interest has been given to meetings held in this region due to the importance attached to the electrification of mining equipment.

On Friday evening a dinner and business session was held at the Schuylkill Country Club. C. A. Grenidge, chief engineer of the J. G. White Company, explained many details with reference to the new Pine Grove power plant. Another speaker was William H. Lesser, electrical engineer of Madeira, Hill & Co., who spoke on the subject of electrification of the coal mines and gave records showing the progress of the work and the benefits derived in lower costs, higher efficiency and flexibility resulting therefrom.

Urge Dake for Coal Chief of Commerce Department

No selection for the position of chief of the Coal Commodity Division of the Department of Commerce has been announced at the time of this writing. It is understood that the names of J. D. A. Morrow, C. P. White, C. P. Starr and W. M. Dake, Jr., were suggested in this connection, but it has been ascertained that neither Mr. Morrow, Major Starr nor Mr. White is in a position to accept the place. Their other activities are such as to preclude their acceptance of the position even were they willing to make the financial sacrifice which would have to be incurred were any one of them to take the position.

It is not known whether or not Mr. Dake would accept the position were it tendered to him. Nevertheless he is be-

No One Held Culpable for Orient Explosion

The coroner's jury, after an inquest over the death of two men killed in explosion of Orient No. 1 Mine, West Frankfort, Ill., Nov. 26, held nobody culpable. The evidence showed that the examiner had approved the place three hours before the blast. A small roof fall meantime released a pocket of gas, which was ignited by the open flame lamp of one of the men who climbed over the fall. The thirteen injured men are all expected to recover. Damage to the mine was negligible. A 50-ft. barrier enclosing the panel in which the explosion occurred and a water-soaked haulage-way out of the panel neck combined effectively to stop spread of the blast.

ing urged strongly for the place. Objection to his appointment was raised in certain quarters on the ground that he formerly had been connected with the Federal Trade Commission. The report to that effect was without foundation. Mr. Dake never has been connected in any way with Federal Trade Commission activities. He is a mining engineer and his experience has been largely on the operating side of the industry.

Immigration Conference to Be Held in New York

The National Industrial Conference Board is arranging a conference on immigration policy to be held Dec. 13 and 14, 1923, at the Hotel Astor, New York City.

The Per Centum Limit Act of May, 1921, with subsequent amendments, which regulates the influx of most of the immigration to the United States, will expire by statutory limitation on June 30, 1924. Extension or modification of this act or substitution of a new law by Congress is therefore necessary.

This National Immigration Conference will give interested persons, in their individual capacity or as representatives of organized groups of society, an opportunity to express themselves on this important problem.

A cordial invitation is extended to all organizations dealing with economic and social problems to appoint delegates and to call the conference to the attention of their members in order to obtain their individual attendance and interest. The National Immigration Conference offers opportunity for co-operation in a most valuable public service.

Anthracite Rate Hearing On in Washington

Examiner Butler reopened the Interstate Commerce Commission's hearings on anthracite freight rates in Washington on Dec. 3 with a proposal to open to New England and North Atlantic states the soft coal produced in southern West Virginia.

C. J. Goodyear, traffic manager of the Pittsburgh Coal Producers' Association, testified that Pennsylvania could furnish all of the coal required as a substitute for anthracite in this territory. He further declared that it would be a waste of transportation to make rates from southern West Virginia that would provide for carrying coal all rail across the bituminous fields of Pennsylvania to New England.

Hoover's Year Book Is Out

Hoover's Commerce Year Book is off the press. It is a companion volume to the annual statistical abstract, which for years has been a standard reference book. The Year Book interprets figures instead of merely setting them forth.

Business is a great network of inter-related activities. The most effective conduct of any one of them requires a knowledge of trends in other trades. These are furnished in the Year Book. The initial volume covers the calendar year of 1922 and the first half of 1923.

A condensed summary of the broad conclusions based on the figures contained in the book follows:

"The year 1922 was one of marked recovery in industry and business, but agriculture still lagged in recuperation. The special impulse toward recovery, aside from the cyclic swing from acute depression, undoubtedly lay in the shortage of construction during the war and the stimulation given to other industries by the activity of the building and construction trades in the period which followed the war's close. Production of manufactured goods was one-fifth greater in 1921 and only slightly less than in the boom years of 1919 and 1920.

"The increased demand for goods led to an advance in prices, though far less sharp than the preceding drop from the abnormal levels of the war and the immediate post-war years. Wholesale prices for 1922 averaged only a trifle higher than for 1921, but the general index at the close of the year was 13 per cent above that at the beginning. The low prices of farm products during 1921 had been one of the contributing causes of the general depression of business. The prices of these products rose nearly 20 per cent during 1922, and this advance helped in considerable measure to restore the buying power of the great agricultural community and thus to promote general prosperity.

"The one important element in American business to fall off in 1922 was export trade, which declined both in value and in volume, as compared with 1921."

Effort at State Coal Control a Fizzle Is Washington View

Abortive Meeting of Governors Seen Merely as Part of Pinchot Political Program—Belief Is That Pennsylvania Would Dodge Anthracite Regulation but Continue to Milk the Industry

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

The effort of Governor Pinchot to obtain concerted action among certain of the states, looking to the regulation of the coal industry, is regarded in Washington as having been a fizzle. The failure of such a large proportion of the Governors invited to attend is as significant, it is held, as the inability of the meeting to agree on a program.

The tendency in Washington is to regard the meeting simply as a step in Governor Pinchot's political plans. Anyone with a grain of political sense, it is contended, must have known in advance that the meeting could not attain its ostensible objective. It did obtain wide publicity for dispatches associating Governor Pinchot's name with an effort to regulate the coal industry, and called attention again to the fact that he has declared war on the anthracite operators.

There is some amusement occasioned by the unexpected turn affairs took when it was suggested that the Pennsylvania Governor possesses all the authority necessary to impose regulation upon the anthracite industry. As one man put it, the Governor was bumped in the face with his own boomerang.

HARD TO GET JOINT STATE ACTION

The meeting accentuated anew the great difficulties of obtaining joint action on the part of individual states. Theoretically the states collectively possess all the powers of the federal government, but with Legislatures meeting at different times, with different political parties in control, and with the inertia which characterizes so many state administrations, there is little likelihood of getting results, even on a proposal as popular in states consuming hard coal as is the regulation of the anthracite industry.

Just at this time many bituminous operators are laying emphasis on the contention that the federal government does not have the power to regulate their business, particularly where sales are made at the mine. In that connection the thought is expressed that the day may come when they would prefer federal to state regulation. In the case of the railroads there was determined opposition to federal regulation. There was a feeling that the states would be more liberal to them. When the separate commonwealths really got into action, the railroads soon found that federal regulation was much to be preferred to state regulation. The activities of the state railroad commissions recently were referred to as being

"pestiferous" by a spokesman for the railroads.

In so far as anthracite is concerned, however, it is apparent that neither Pennsylvania nor Governor Pinchot has any desire to undertake the regulation of the production of anthracite coal. The expense of such an undertaking would exceed by many times any saving which might result to consumers in Pennsylvania. Moreover there would be objection to action which might interfere seriously with the functioning of one of the state's most important industries. The attitude of the people of Pennsylvania would be to pass the buck, in the matter of regulation, to the federal government and continue to milk the industry for heavy taxes.

Congress again is in session. It will be interesting to note whether the trend of sentiment in that body is toward the Federal Trade Commission-Interstate Commerce Commission type of profiteer-chasing regulation or toward the Department of Commerce-Department of Agriculture type of voluntary returns.

The failure of Governor Pinchot's meeting, however, will accentuate the impracticability of attempting regulation by the states and will be pointed to as evidence that the only alternative is federal regulation. Activity on the part of the coal trade in opposition to any form of federal regulation simply would play into the hands of the regulationists, many think.

Shipping Board Bids Show Upward Tendency

Bids were received and opened Nov. 28 by the U. S. Shipping Board at New York City, for furnishing and delivering alongside vessels, New York harbor, 2,300 gross tons of either Pool 9 or Pool 71 bituminous coal, delivery to be made Dec. 5. The following bids were received: Seiler Coal Co., \$4.91 per ton; Penn Fuel Co., \$5.09; Seaboard Fuel Co., \$5.31; H. B. W. Haff, \$5.60; E. Russell Norton, \$5.32; M. F. Shea, \$5.49; Dexter & Carpenter, \$5.22; Imperial Coal Corporation, \$5.67; Rhodes Fuel Corporation, \$4.80; W. A. Marshall & Co., \$5.35; Commercial Coal Co., \$5.44; B. J. Lynch Coal Co., Inc., \$5.69, and Knickerbocker Fuel Co., \$5.50. On a basis of net ton f.o.b. mine the bids received ranged from about \$1.57 to \$2.36, as compared with \$1.02 to \$1.97 submitted on Oct. 25, when bids were received for furnishing and delivering 1,800 gross tons of similar quality coal.

Soviet Coal Industry

Ten months of coal production in Russia are reported by the *Russian Review*, published by the Russian Information Bureau at Washington. During that time 9,734,259 net tons, or 539,100,000 poods of coal was produced. In July 153,500 men were employed who produced 50,800,000 poods, or 917,270 tons. This figures just a little less than 6 tons per man per month, or 72 tons per man per year. The fluctuation in the number of men between 133,600 in December, 1922, and 161,300 in June of the present year was due to insufficient and irregular payment of wages, agricultural work, etc.

Budget Increase to Geological Survey and Mines Bureau

The budget submitted to Congress on Monday by the President carries \$1,909,573 for the Bureau of Mines and \$1,805,272 for the Geological Survey. This represents an increase of \$139,873 over the amount appropriated for the current fiscal year in the case of the Bureau of Mines and an increase of \$135,082 in the case of the Geological Survey.

The amount recommended for the conduct of the work of the Bureau of Mines on investigation as to the causes of mine explosions and as to methods of mining having a relation to safety is \$359,768. This is \$33,232 less than the amount appropriated for the current fiscal year.

The sum of \$262,300 is asked for the investigation and improvement of mine-rescue and first-aid methods. This is an increase of \$51,300 over the amount appropriated for the current fiscal year. In addition, the budget approves the expenditure of \$40,000 for the purchase of an additional mine-rescue car.

The budget carries \$138,280 for fuel testing. This is \$2,280 more than was appropriated last year.

The budget recommends the expenditure of \$333,722 by the Geological Survey for its work falling under the technical heading of "geologic survey." This represents an increase of \$33,722.

The amount recommended for mineral resources reports is \$136,734. This is an increase of \$12,484. An increase of \$3,000 is allowed for the investigation of the mineral resources of Alaska, bringing the total for that purpose to \$78,000.

"THE ENGINEER'S SIDE OF THE COAL QUESTION" will be the subject of an address by Dr. George Otis Smith, Director of the U. S. Geological Survey, at Lehigh University Dec. 7. While in Bethlehem he will address the Thursday Evening Club of that city on "Independence in Coal."

Miners' Union Less Belligerent as Old Wage Agreement Nears End

Heavy Coal Stocks Above Ground and Idle Mines Believed to Presage Less Excessive Demands—Situation More Favorable to Consumer Than Preceding Last Strike

With the approach of the first of the year, attention in the coal industry is turning to the new wage agreement. While the United Mine Workers have had little to say as to what demands they will make, it is apparent that they are not particularly belligerent. With 76,000,000 tons of coal above ground; with 10,000,000 tons more at the head of the lakes than in any other year and with half the union mines down thus early in the winter, there is certain to be less insistence on increased operating expenditures. Such expenditures could do nothing more than close other mines and divert further business to the non-union fields.

BUSINESS CONDITIONS FAVORABLE

There is a tendency to compare the existing situation with that which preceded the last strike. There are some resemblances, but in the main the situation is importantly different. The inclination of the market is in the same direction, but it has not gone so far. The state of general business is much better. Between 10,000,000 and 11,000,000 tons of coal is being produced weekly, whereas production during the corresponding period preceding the last

strike was running some 3,000,000 tons lower. Relations between operators and mine workers are nothing like as strained as they were then. There is not the same tendency to cut wages in the non-union fields.

While the demands of the mine workers cannot be forecast, it is apparent that the differences which will arise at the forthcoming wage conference will not be of the same pronounced character as were those preceding the present agreement. The consensus of opinion is that there will be no strike and that the conferences will not be the occasion for any great amount of uncertainty among coal consumers.

Mine Fatalities Dwindle In October

Death Rate from Accidents Falls from 2.79 to 2.64 per Million Tons of Output

Accidents at coal mines throughout the United States during October, 1923, resulted in the death of 153 employees, according to a report by the U. S.

Bureau of Mines. With an output during the month of 57,895,000 tons the fatality rate was 2.64 per million tons mined, whereas in September it was 2.79, and in October last year it was 3.83. Of the 153 fatalities during the month, 129 occurred at bituminous mines indicating a rate of 2.62 per million tons, and 24 occurred at anthracite mines, in Pennsylvania, indicating a rate of 2.75. In October last year the bituminous rate was 3.90, and the anthracite rate was 3.48.

The total number of fatal accidents at all coal mines in 1923 to the end of October was 2,059, representing 3.79 fatalities per million tons, as compared with 1,443 fatalities in the corresponding period last year, representing a rate of 4.08. The bituminous rate for the same ten-month periods fell from 3.89 to 3.54, a reduction of 9 per cent, and the anthracite rate declined from 5.75 to 5.26.

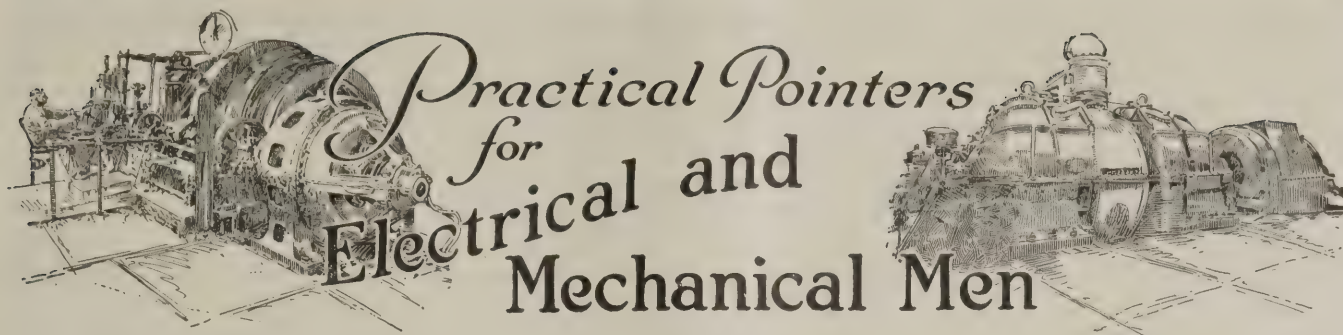
Comparing the record for the first ten months of 1923 with the corresponding period last year, the reports show a reduction in the frequency of deaths from falls of roof and coal, haulage, explosives, and electricity, and an increase in the number of deaths due to explosions of gas and coal dust, as indicated by the following rates per million tons of coal produced:

	1922	1923
Falls of roof and coal.....	2.015	1.776
Haulage.....	0.758	0.654
Gas and dust explosions.....	0.362	0.592
Explosives.....	0.190	0.160
Electricity.....	0.187	0.131

Coal Mine Fatalities During October, 1923, by Causes and States

(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground											Shaft				Surface						Total by States					
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	4		5										9								1					10	10
Alaska.....																										0	0
Arkansas.....																										0	1
Colorado.....	1	1	1	6									9													9	0
Illinois.....	3		6		2								11													11	13
Indiana.....	2					4							6													6	6
Iowa.....	2												2													2	1
Kansas.....	2												2													2	1
Kentucky.....	3		2	1									7													8	13
Maryland.....	1							1					1													1	1
Michigan.....																										0	0
Missouri.....	1												1													1	1
Montana.....																										0	1
New Mexico.....	4												4													4	1
North Dakota.....																										0	1
Ohio.....	5		3										10											1	1	11	18
Oklahoma.....																										0	10
Pennsylvania (bituminous).....	15		5		1			1		1			23						1					1	24	42	
South Dakota.....																										0	4
Tennessee.....								1					1													1	4
Texas.....																										0	1
Utah.....	1												1													1	4
Virginia.....	3												3													4	3
Washington.....																								1	1	1	1
West Virginia.....	18	1	6					2		1			28								1			2	3	31	40
Wyoming.....		1								1			2													2	3
Total (bituminous).....	65	3	28	7	2	5		6		2			121						1		2		1	4	8	129	176
Pennsylvania (anthracite).....	17		2	2		1							24													24	31
Total, October, 1923.....	82	3	30	9	2	6		6		3			145						1		2		1	4	8	153	
Total, October, 1922.....	86	25	40	9	1	12		11		2			190	1		1	2	4	2				1	9	12		207



Keep Belt Efficiencies High Lest Heavy Losses Result

Just a short time ago I was in a plant where a steam engine drove a main shaft by means of a belt, the shaft running through a wall and carrying power into an adjoining room. From that shaft a second line shaft was driven, and so on to the farthermost end of the room. I did not count the number of belt trains, but am sure there were at least eight and perhaps ten of them. In all my experience with belts I do not remember seeing as glaring an example of wasted power as I saw in this plant.

Assuming the efficiency of each unit drive to be 80 per cent and that the number of units or trains is 10, we must multiply 0.80 by itself ten times to get the efficiency of the complete system. In other words, the over-all efficiency of the drive from end to end is less than 11 per cent, which is surely too low an efficiency to sanction, these days.

One of the machines driven by the sixth train required about 20 hp. for its propulsion. After six trains it is easy to compute the efficiency of the transmission line to be about 25 per cent. The power generated by the engine to drive this machine was therefore 80 hp.

Now, if a rope drive had been installed from the engine direct to this machine it would have been possible to attain a much higher efficiency than 25 per cent. Let us assume then an efficiency of 80 per cent could be effected with a rope drive of this kind. The power required of the engine would

therefore be only 25 hp. In other words, the power saving would be 55 hp.

Another way to surmount this evil is to install group drives. Let the engine drive a generator and then distribute the current to motors scattered here and there over the plant. The efficiency of the generator should be at least 90 per cent and the motor the same. The over-all efficiency of the electric drive will, therefore, be very close to 80 per cent. From one of these motors one can therefore run a belt and get a high ratio of power to the driven machine.

Believing this subject to be important enough to warrant further elaboration I have developed a chart, which is shown herewith. By simply stretching a thread across the chart horizontally from left to right the reader is enabled to determine the over-all efficiency of any number of belt transmissions train, assuming an average efficiency for the units.

Above the chart is shown a train of ten belt units, beginning with a driven pulley. This is shown only to explain the chart more clearly. Above each column is a figure giving the number of units in the train up to and including that column.

For example, let us determine what are the efficiencies at the various points where the unit efficiency is 80 per cent. The dotted line drawn horizontally across the chart shows the answer at the points of intersection with the various columns. It will be noted that the columns at the extreme left and right

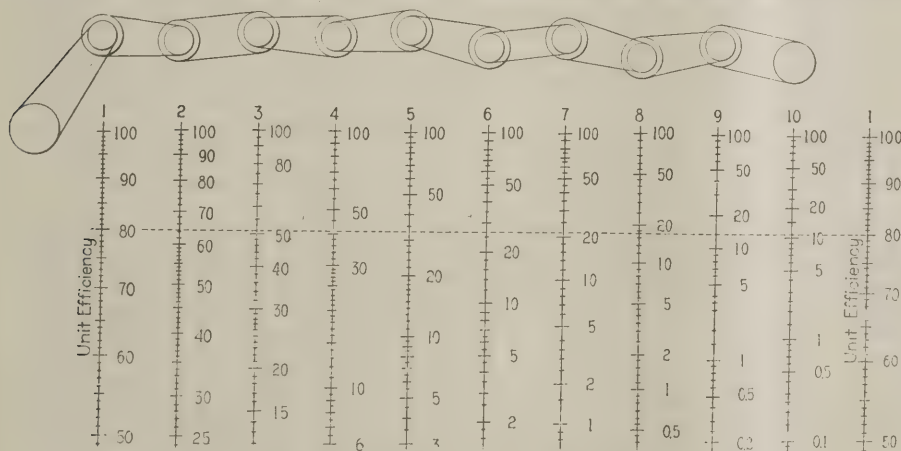
are both marked "1". They are identical, to insure an accurate horizontal line. Thus where the unit efficiency is 80 per cent, connect the 80 and the 80 in these two columns as shown.

At the end of the second unit it will be noted that the over-all efficiency is 64 per cent; at the end of the third unit, 51 per cent; at the end of the fourth unit, 41 per cent; at the end of the fifth unit 33 per cent, and so on. At the end of the entire train of ten units, the over-all efficiency is very close to 11 per cent.

This chart shows another interesting thing with regard to efficiency: The higher the efficiency in a unit the higher the over-all efficiency. Thus if 100 per cent efficiency were attainable there would be no loss from one end of the train to the other. With 98 per cent, which is attainable with carefully aligned shafting, properly treated belts, high-class bearings, proper lubrication, etc., it is possible to transmit 80 per cent of the initial power through the train of ten units. But where the unit efficiency is as low as 50 per cent the over-all efficiency is only one-tenth of one per cent. That is, if 1,000 hp. were delivered by the first pulley only 1 hp. would "get through."

Power leaks away at a surprising rate where efficiencies are low. If belt trains are necessary, and if much power is transmitted, make the efficiency of each unit as close to 100 per cent as possible.

W. F. SCHAPHORST,
Mechanical Engineer.



EFFICIENCIES OF BELT SYSTEMS

This chart shows the power transmission efficiency of any number of belt units. The example shows that if the efficiency of each unit is 80 per cent, the second belt delivers 64 per cent of the original power, the third belt 51 per cent, and so on. The tenth belt delivers only about 11 per cent of the initial power put into the system.

Calculating the Fan Drive and Horsepower on the Air

What is meant by the expression, horsepower produced on the air by a mine ventilating fan?

In fan drives there is first of all the horsepower of the driving machine, which usually is slightly greater than the horsepower delivered to the fan because the driver should not be overloaded and some reserve capacity always is desirable. Then again, there is the horsepower taken by the fan, which always is greater than the horsepower delivered by the fan. The horsepower on the air is the rate at which work is actually put on the air—that is, the power put into the fan minus the losses.

For example, what is the horsepower producing ventilation when the volume of air circulating is 60,000 cu.ft. per minute and the water gauge 3 in.?

The basic formula for horsepower is, 1 hp. equals 33,000 ft.-lb. per minute. Since 1 in. water gage is equivalent to 5.2 lb. per square inch, and 3-in. water gage is equivalent to 15.6 lb. per square inch, then the formula for the horsepower on the air is

$$\frac{60,000 \times 15.6}{33,000} = \text{roughly } 29 \text{ hp.}$$

Here the horsepower on the air is a little less than 29 and if we assume a fan efficiency of 70 per cent the horsepower to drive the fan will be about 42. The driver will therefore have to be capable of developing at least 42 hp. continuously.

Maintaining Trolley Wheels And Eliminating Troubles

Being a "trouble shooter" for an electrical contractor, I am naturally interested in the letter of Frank Parker, mine foreman at New Castle, Ala., which appeared in *Coal Age*, Nov. 8, stating his experiencing trouble with the trolley wheels used on his Baldwin-Westinghouse locomotive.

It has been my experience that the following troubles are the cause of practically all trolley-wheel sparking: low voltage caused by leaks to ground or too small wire; motors overloaded, bad return, bad contact—that is, the groove may be too wide for the size wire used or the tension of the wheel on the wire may be insufficient; the tension should be from 15 to 25 lb. measured at the wheel. This may be measured by hooking an ordinary spring balance to the harp and pulling downward.

The scale should be read just as the wheel leaves the wire. If in this case the harp does not line properly with the wire, it can be loosened and turned with a pipe wrench. Moisture, sleet or ice will cause sparking, of course. The last-named reasons are not to be considered for mine operation and Mr. Parker states that there is no moisture in the mine where he is experiencing trouble.

I would like to give a few points on the care of trolley wheels. They should be oiled about every 35 miles, which will save both spindle and bearing. There should not be too much side play and a wheel with badly worn spindle or bearing should be renewed. It is not economy to renew a wheel without renewing spindle or shaft, save in exceptional cases.

The stock of repair parts for trolleys should consist of wheels, shafts, cotter keys, bushings, harps and the proper washers, if required. The number depends on the character of service and the number of locomotives operated. It is general practice at the larger mines to keep a spare pole completely fitted with base and harp so that it can be readily substituted for a broken pole, thereby saving a delay.

GRADY H. EMERSON,
Electrician.

Electrical Repair & Service Co.
Birmingham, Ala.

Measuring Voltage and Current In Electrical Circuits

In the generation of electricity it is first of all necessary to produce a pressure called voltage. The unit by which we measure voltage is called the volt, and therefore the instrument by which we measure voltage is called a voltmeter. In measuring the voltage of an electrical system, it is necessary first of all to use a voltmeter designed to read voltages slightly above the voltage of the line. The method of determining the voltage of a line consists of placing the two voltmeter leads between

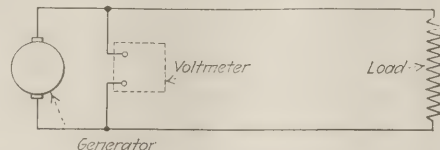


FIG. 1—MEASURING VOLTAGE

The voltmeter terminals are connected directly across the line to measure the line voltage or the potential difference between any two points on the circuit.

the two points where the potential difference, or voltage difference, is desired. Usually this will be between two metallic conductors, frequently being between two copper conductors. This need not always be the case, however, because in some conditions one conductor may be metallic and the other may be through the surface of the earth, commonly known as "ground." In street-railway work and in mine-haulage work the trolley wire is one conductor and the rail is the other conductor, and since the rail has direct contact with the earth we may also say that the trolley wire is one conductor and the earth is the other conductor.

In measuring voltage of a direct-current line, care should be taken to connect the voltmeter in such a way that the deflection of the needle will be in the proper direction. If this is not done, the needle will tend to turn in the opposite direction and may cause damage to the instrument. Direct-current voltmeters have what is called a polarity marking. This marking enables one to determine just which wire or conductor is positive or negative.

We have said that the unit of current is the ampere, therefore the name ammeter has been given to the instrument for measuring amperes. To measure the number of amperes, or rate of flow in a circuit, this instrument must be placed either directly into the circuit so that the current flows directly through the meter, or through a resistance element of known value. When

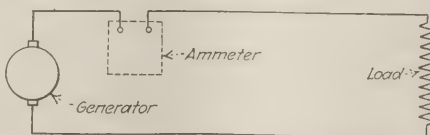


FIG. 2—AMMETER CONNECTION

To determine the amount of current flowing in the line the ammeter is inserted directly into the circuit so that the load current passes through the meter.

this second method is used the ammeter actually is a form of voltmeter and measures the voltage drop or voltage difference between the two ends of the resistance element. In this case the

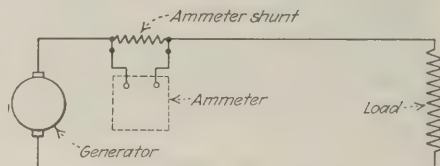


FIG. 3—ANOTHER WAY TO MEASURE THE CURRENT FLOWING IN A LINE

Here the main current passes through a resistance element of known value and the ammeter actually measures the voltage drop across this resistance. The meter, however, is calibrated in amperes and reads direct.

meter is calibrated to read amperes because there is a definite relative between the voltage drop across the resistance and the current passing through it.

City of Vancouver to Go Into Coal Business

Determined to break the monopoly of the Vancouver Island coal producers, the city of Vancouver has decided to enter the coal business, selling to its citizens at cost plus cost of weighing and sacking.

Alderman R. P. Pettipiece, in control of the new department, states that he has an offer of 30,000 tons of coal from the Princeton-Nicola field for \$7.90 delivered or 40c. per ton more sacked. He says the Crow's Nest Pass Coal Co. offers to deliver coal at Vancouver for \$9.35 per ton. This coal has to travel more than 400 miles by rail, whereas the yards are selling Vancouver Island coal, from mines less than 60 miles distant by water, for \$12 per ton.

Publications Received

A.S.T.M. Tentative Standards, 1923. American Society for Testing Materials, Philadelphia, Pa. Pp. 859; 6x9 in.; illustrated. Contains 170 tentative standards relating to a number of different subjects, among which are preservative coatings, timber, insulating materials, timber, coal and coke. Price, \$7 in paper; cloth, \$8.

Biography of Petroleum and Allied Substances, by E. H. Burroughs, Bureau of Mines, Washington, D. C. Bulletin 220. Pp. 230; 6x9 in.

Trade Literature

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has issued a 24-page booklet, entitled **A Material of Endless Possibilities**, containing information about Micarta and the many uses to which it has been put, and indicating the possibilities for other applications. Some of the products for which Micarta is already used are bushings, cord terminals, disks, fan blades, gears, gaskets, handles, insulators, knobs, pinions, pulleys, radio panels, switchboards, telephone apparatus, and washers.

Jeffrey Coal Mine Equipment. The Jeffrey Mfg. Co., Columbus, Ohio. Catalog No. 386. Pp. 130; 7 x 10 in.; illustrated. This book is made up of four sections, No. 1 covering mine locomotives; No. 2, coal cutters, loaders and drills; No. 3, mine fans; No. 4, tippie equipments.

Problems In Underground Management

Fireboss Should Defend His Safety Rights, Receiving Company Aid

Shotfirer Discharged for Refusing to Fire Unsafely Charged Holes—
Miners Will Charge Shots for Others to Ignite Which
They Would Not Fire Themselves

BY W. H. LUXTON
Linton, Ind.

The right not to fire an unsafe shot is an equity of the shotfirer for which he should fight. I recall some years ago a man who was killed as a result of his recklessness in overcharging a hole. Following close on the heels of five or six other men he was hurrying out of the mine. The shot he had lighted proved to be a windy one, and the concussion of the air caught the man just as he was passing through a two-way door, and he was killed. Investigation showed that he had not properly mined his shot, which negligence cost him his life.

Not so long ago a shotfirer was discharged because he refused to fire several shots that could not be considered safe. Miners often drill and charge holes to be fired by a fireboss which they would hesitate to fire themselves. That shotfirer probably owes his life to his refusal to fire unlawful shots.

ASKED TO ACCEPT RISKS

Such is the urgent demand for coal that many firebosses hold their positions because of their willingness to take great risks. One man I know was told by a friend when firebossing in a gassy mine that he probably would be "let out" because he was too careful. Up to that time the records showed that no one had been burned by gas in that section of the mine. The fireboss finally left because the officials at the mine failed to co-operate fully with him in demanding safety.

Within a month or two thereafter, one poor fellow was blown into the sump and his buddy was injured by a car being blown upon him by a local explosion of gas in the place in which both men were working. Soon after that another explosion occurred in the same mine, causing much damage to the workings. Fortunately, no lives were lost.

If mine officials would share the burdens and responsibilities of their firebosses and shotfirers the work would not be unreasonably hazardous. The operator often may be well pleased to have the shotfirer fire all shots, safe or unsafe, and have the mine in shape

for full operation on the following day; likewise he may be pleased to get a good report on the condition of his mine from the fireboss, but after all he has to pay the compensation if an accident happens and he cannot afford to ask any man to take unnecessary risks or to be complacent as to conditions that may result in an accident.

Are There Any Dangers in Electrical Blasting?

A mine superintendent writes, saying: "Some have suggested changing the system of firing shots in use at our mine. What are the dangers of blasting coal with electricity, provided, of course, compliance is made with the mining law?"

The chief danger in the use of electricity for blasting coal in the mines lies in a faulty installation of the wiring system. The wiring of a mine should always be in charge of a competent mine electrician who is fully acquainted with mining conditions and requirements. Imperfect installation of the wires at any point may weaken the current below what is required for safe blasting.

BEWARE OF SHORT-CIRCUITS

Care should be taken that the wiring intended for locomotives, mining machines, pumps and signaling shall be so located with regard to the shotfiring system that by no possibility can the former energize the latter, even if either should fall on the other. The connection to the surface must be through two switches kept under lock and key, the key for one switch being held by the power-house engineer and the other by the shotfirer. Arrangements must be made that, except when the shots are to be fired, the circuits shall be so broken that no lightning discharge bridging the gaps on the switches can pass a current into the mine. At some mines it has been found that attempting to fire all the shots at once causes those that are delayed to explode into a dust-laden atmosphere.

Methods have been adopted to delay the shots in any series of rooms so that the first shot fired will be in the return current from the other unfired shots and the second in the return current from the others, and so on. Thus each shot will be fired in clear air.

ALL MEN MUST BE CHECKED OUT

There is always the danger that all the men may not be out of the mine when the shot is fired, and a result one or more may be killed. Care should be taken to place the shotfiring cabins where those throwing the switch will be out of danger. Persons also should be prevented from standing near the mine mouth when shots are being fired. Unfortunately, where a mine has a shotfiring system from the surface such as described, the miners are prone to think that as only property is menaced, and as that property is not theirs, they are at liberty to charge their holes at pleasure.

When a portable battery is used for firing, the strength of the battery must be sufficient to detonate the charge readily. Too weak a battery or the use of electric fuses of inferior strength may cause a misfire or start a deflagration in the charge, resulting in a hang-fire, which always is dangerous. The lead wires running to the shots should never be connected with the battery until all other connections are completed and due warning has been given to prevent anyone from approaching the zone of danger. The battery should be locked in a manner that will prevent anyone from meddling with it and the key should be in the possession of the man firing the shots.

Extinguished Carbide Light Nearly Ignites Gas

BY E. S. WADE

Superintendent, Windsor Power House
Coal Co., Warwood, W. Va.

Strange indeed was an accident described at the Panhandle Mining Institute of West Virginia. The fireboss made his round of the workings and found gas in the entry. In consequence he marked this working place as dangerous. On returning on his second round he went to this entry to make arrangements for the removal of the gas. When he got to this point he found the wireman standing near the danger board.

He told the fireboss that he had never seen gas act on the flame of a

safety lamp and that he was curious to see the cap it made.

As there was not much gas in the entry the fireboss consented to take him in with him, so he told him to blow out his carbide lamp. The fireboss started up the entry with his safety lamp, the wireman following close up behind with his extinguished carbide lamp in his hat. About half way up to the face of the entry the wireman stumbled on a lump of coal or a tie and fell forward.

The fireboss being right in front of him the wireman's carbide lamp scraped down the fireboss' right arm, turning the igniter and lighting the lamp. Fortunately the gas was near the roof and not low enough to be ignited. A severe explosion was avoided only by a hair, however, and the narration of the event may serve to warn others against the danger of taking even an unlighted carbide lamp which is generating acetylene gas into the presence of firedamp. It should be remembered that unburned acetylene gas adds combustibility to the atmosphere even if in only minor degree.

Use Suitable Gloves, Caps and Shoes to Avoid Accident

Co-operation between coal companies and mining inspectors is the keynote in the West. There the operators are trying to contrive with inspectors to get the best laws, however stringent, that will prevent accidents. In consequence the Rocky Mountain Coal Mining Institute is taking up the old question of safety and has had three reports from the members if its Safety Committee. That from P. F. Patterson, mine inspector of the State of Wyoming, and G. A. Knox, general superintendent, Gunn-Quealy Coal Co., gives special attention to gloves, caps and shoes. They say: "No habit is becoming more prevalent among miners and other mine workers than that of wearing gloves, principally flimsy canvas gloves, which afford no protection to the wearers and are the direct cause of many hand injuries. If gloves must be worn, and no doubt they will be, as the habit has become well established, they should be made from some heavy material and should fit the hands fairly snugly.

WOULD CHANGE MINER'S CAP

"With the many accidents to the head from falls of roof and coal, it would seem timely to suggest a change in the miner's cap. One made from fiber or light metal in the form of a helmet would seem preferable to those now being worn. Some such caps as these, we understand, are used to some extent in metal mines and their use in coal mines would no doubt cause a decrease in the frequency of certain accidents. It is a known fact that many fatal accidents have been caused by the fall of small pieces of rock that no doubt would not have proved fatal if the miner had been protected by some such headgear.

"Many accidents occur, too, from employees wearing shoes too light for their work, generally discarded dress shoes which afford no protection to the feet. The nature of mine work demands a shoe of heavy and rugged construction. The general wearing of such a shoe would no doubt cut down the number of accidents to the feet. A heavy hobnailed shoe, similar to the trench shoe worn by our troops in Europe, is in general use in the mines of Great Britain and Continental Europe. The shoes which mine workers wear in American mines are little better than moccasins and afford no protection to the feet and cause numerous accidents."

Robert Sneddon, of the Diamond Coal & Coke Co., Diamondville, Wyo., discussing this question, said that at Superior, Wyo., four years ago drivers and track laborers had many accidents from wearing shoes with hobnails in them. The nails destroy the hold the foot has on the car bumper and the men in consequence fall off the trip and are hurt.

It may be added that it is because of the greater danger of slipping when the foot is covered with a resistant sole that sailors go unshod. The hobnails further decrease the hold on any hard, especially a pitching, surface. Still, something may be said nevertheless for better protected feet.

Timber Bill May Be Reduced By Good Judgment

Before long we shall attempt economies in timber that hitherto we have not even considered. Even today the timber bill is one of the harassing problems of the coal producer and worthy of careful consideration. Because we have been wasteful for years is no reason why we should continue to be so, now that timber is becoming scarce.

All permanent timber should be treated with a preservative. Much valuable timber can be saved if the props and timber sets which are broken a short time after setting are reclaimed, the broken ends being used for propping thinner seams, being cut into cap-pieces, wedges or ties or being used for building cogs or chocks.

Hundreds of thousands of good timbers are lost every year in the mines through the carelessness of miners who let them lie in the waste until they are finally buried. A careful watch kept by officials in their daily rounds will do much to reduce the loss of good timber. The timber sent to a working place should be of the proper length, for the miner, if he finds the timber is too long or too short, is likely to throw it into the gob. Emphasis should be laid on the importance of drawing all timber in a systematic manner as the pillar retreats.

In pitching seams the recovery of timber is far more difficult and dangerous than in flat seams, for in such cases the rock from which the timbers are withdrawn is higher up the inclina-

tion than the men drawing it and whatever rock falls may slide down the slope and injure them. Nevertheless, many timbers can be recovered by selecting those posts here and there which have the least weight upon them. A small percentage of recovery of timber on pitching seams makes a marked reduction in costs as the handling of timber to the working faces is an expensive item.

In conclusion, it may be said that one of the best ways to conserve timbers is to establish some standard system of retreating. Thus less timber is used and whatever posts or crossbars are set for protection can be reclaimed before they become rotten, which is not usually done under the methods now general.

Are More Careful of Dust In Europe

John T. Ryan, speaking at the recent Salt Lake City meeting of the Rocky Mountain Coal Mining Institute, said that the regulations in Europe in regard to the handling of coal dust were better than ours. The British require that dust in the mines contain at least 50 per cent of incombustible matter and in Belgium and France not less than 70 per cent.

At the working faces, where rock dust would spoil the coal, water is used to keep down the coal dust. In France, where the mines are worked under concession and the operator shares his profits with the government, the mine inspectors have a word not only in safety but also in operating. The miners are required at these mines to sweep up the coal, and after that is done they water the working place.

In some places the crushing plants are underground and the material for crushing is derived from the workings themselves. The usual way of distributing the dust is to place it in boxes at intervals, possibly 1,000 or 1,500 ft. apart. Compressed air is turned on at night when few men are in the mine, and the dust is spread in a cloud over every exposed surface.

COLOR AN INDEX OF SAFETY

The degree of effectiveness of the dusting can be readily told by the color of the floor, as the dust is white. At some mines this dusting is done once in six months, in others once a year. Some use a car with a small fan operated by one of the axles of the wagon. The fan furnishes the air for blowing out the dust. In Yorkshire a new method of distribution is being tried. A 12-in. pipe is laid, and a fan forces rock dust through it. Ducts at intervals lead into the mine roadways. Properly installed it should be cheaper to operate than a water sprinkling system. In fact it is thought that it can be run for half the cost. In France dusting costs about half a cent per ton and in England about a cent. Rock dusting was essential in Europe, for the mines were too hot to make it advisable to moisten the air by the use of water or steam.

Discussion

How to Mine Seam of Pitching Coal with Heavy Parting

Slate Can Be Blown Down and So Disposed as to Permit Chutes to Be Laid from Coal Face to Top of Car

By J. W. POWELL

Contracting Engineer, Welch, W. Va.

An anthracite mining engineer asks in the issue of *Coal Age* of Nov. 15, p. 742, how timber may be recovered in a bed pitching at an angle of 25 deg. where chambers have been driven up in a 7-ft. seam overlaid by a rock parting 3 ft. thick and covered by a seam of coal, the thickness of which he does not state but which I assume is 4 or 5 ft. He says that the parting slate is blasted down on the retreat and that the top bench is brought back at the same time. It would seem that conditions are ideal for recovering any timber placed during the driving of the chamber.

My method of reclaiming the timber would be as follows: When the chamber has reached its ultimate length, a line of breaking holes should be drilled in the rock parting across the entire width of the chamber and back about 6 ft. from the face. This would enable the miner to get the proper angle for breaking the rock. Plenty of holes should be drilled in this round as the rock does not have a loose end. By thus shooting the rock adequately a clean cut will be insured clear across the face up to the top bench. This is an important requirement.

After all the holes are drilled, the props which stand under the section of parting rock covered by the range of shots should be pulled, which can be done quite readily by using any approved type of post puller. They will not have any great weight on them, being so close to the solid coal face. The total weight in any case will not be more than that of the 3 ft. of parting rock, for the top rock is stated to be solid and to form an excellent roof.

After this section of roof has been blasted another series of holes should be drilled in the parting roof so as to make the total length of roof broken down extend 20 ft. back of the face. All posts then can be pulled with safety, a post puller being used for that purpose, and any that are under too heavy a weight for such displacement can be blasted out by small plug shots set under the foot of the post. This latter it would be quite possible to do in a seam of this degree of inclination.

If the layer of roof above the lower bench was softer than the floor, however, the plug hole should be put above the post. This section of parting rock being blown down, the rock should be graded so that main and wing chutes can be laid to convey the coal in the

top bench to the car in the roadway as it is shot down. Then it will be possible to commence to retreat with the top bench. This top coal, as experience shows, will come down in large lumps as soon as a loose end is obtained and it can be loaded from the top of the fallen rock into the chute or car with little loss of coal. The rock in this way will not have to be removed and this will reduce the cost of obtaining the coal.

How to Save Timber and Time

By A SAFETY INSPECTOR

Welch, W. Va.

Blasting timbers with dynamite may be necessary at times and when the proper precautions are taken it is in some cases the safest method of removing them. It is done quickly and the time saved will often pay for the loss of timber. In general, however, the use of the post puller is much to be preferred, as thereby the post can be recovered in shape to be used again. The improvised battery ram in the form of a long timber swung on a rope is not a desirable way in which to remove timbers. In determining the way to remove a timber the cost of the method must be taken into consideration. That cost may easily exceed the price of new material.

Time costs are too frequently not given enough consideration. In many cases trackmen are required to pull and straighten spikes. It is doubtful economy when we consider the time required to make them fit for re-use.

We should never try to recover material until we are satisfied that it will pay to do so, taking into account the depreciation of the used material. Some companies lose money by abandoning good equipment and supplies. On the other hand, money often is lost in the attempt to recover material, which is then frequently used at a disadvantage because of its poor condition.

Other losses in company work occur when drawing back pillars. Sections of track frequently are taken up and deposited in a place where they will soon have to be moved again. They should be put where they will be out of the way until needed in another place. It may happen that material thrown aside in the manner mentioned will be covered up by a fall and lost beyond recovery.

One often sees places driven where the waste is thrown against the pillar only to be moved again when the rib is drawn back. These and other items occurring in the daily operation of mines may seem mere details, but in most cases they represent the difference between profit and loss.

Should Fireboss Be Examined At the Working Face?

In view of the frequency with which firebosses fail to detect firedamp it is permissible to call attention to the last paragraph of Art. 24, Sec. 4, of the Bituminous Mining Law of Pennsylvania which reads:

"Certificates of qualification of firebosses shall be granted to persons who have given to the Board of Examiners satisfactory evidence of their ability to perform the duties of firebosses in gaseous mines, and who shall have received an average of at least 65 per cent in the examination, and shall also have undergone an oral examination in the presence of explosive gas."

I am informed by candidates who passed the last examination and have received certificates issued by the Board of Examiners, making them eligible for appointment to the position of firebosses in the bituminous mines of this state, that they were not submitted as the law requires to an "oral examination in the presence of explosive gas."

I question whether the papers of these men are valid, for they were not examined in strict conformity with the requirements of the law. This I believe is necessary to render their appointment lawful.

Our old firebosses, who are all certified men, tell me that they were required to demonstrate their ability to detect gas by a practical test in the mine. Naturally, I cannot blame them for questioning the right of these men to appointment—*Superintendent*.

Rapid vs. Correct Way of Calculating Arc

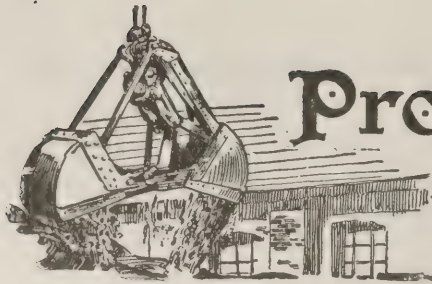
To settle a dispute regarding the correct method of calculating the length of a circular arc, kindly explain the right way of making such a calculation. I want to find the length of an arc of 30 deg. on a circle whose radius is 14 ft. I have been solving this problem as follows: The full circumference of the circle is $2 \times 3.1416 \times 14 = 87.96$ ft. Then, dividing this by the 360 deg. forming its circumference gives for the length of an arc of 1 deg., $87.96 \div 360 = 0.244$ ft. Finally, multiplying this by 30 gives for the length of an arc of 30 deg., $30 \times 0.244 = 7.32$ ft.

Others claim that to solve this problem correctly I should multiply the sine of 1 deg. by 14 and that product by 30, which gives $14 \times 0.01745 \times 30 = 7.329$ ft.

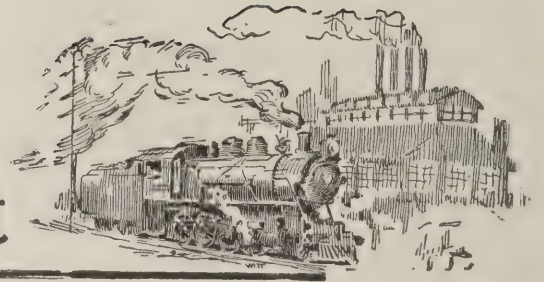
Cambria, Ill.

STUDENT.

Either method gives a result which is reasonably correct though the second method is based on an approximation, for the sine of 1 deg. is not the same as the length of the arc subtended by an angle of 1 deg. Calculated to more places of decimals the results would be more nearly equal than you have shown and the latter method is perhaps a little the more rapid.



Production and the Market



Weekly Review

Recent advances in general industrial activity have not been reflected in the demand for bituminous coal. Inquiries have increased, there is some interest in contracts covering the first three months of 1924 and contract shipments are being increased here and there, but spot sales are on a day-to-day basis. Distress coal can be picked up at bargain prices in every market. The National Association of Purchasing Agents has advised its members to hold to present stocks, to buy for current needs while prices are low, coal plentiful and transportation favorable, and to avoid a general rush into the market.

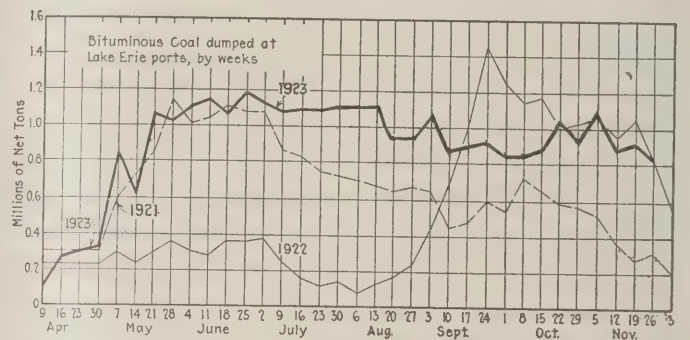
Production of soft coal as well as prices continue to lose ground. Production during the week ended Nov. 24 was around 10,170,000 net tons, an increase of 454,000 tons over the previous, a holiday, week, but a decrease of 555,000 tons compared with the week of Nov. 10. Average prices reached the lowest level for any week of this year, *Coal Age* Index showing 181 as of Dec. 3, a drop of five points from the previous week. The average price was \$2.19. Declines registered in Pocahontas, southeastern and western Kentucky, Clearfield, Cambria, Somerset and Kanawha coals were but partly offset by increases in southern Illinois, Springfield, Clinton and Pittsburgh districts. Lump-coal prices suffered the most with mine-run firm in most fields and screenings erratic.

EXPORT MARKET SHOWS SIGNS OF REVIVAL

Activity in the export market has revived somewhat. Competition between British and American coal is keen, as is shown by one piece of business last week. A New York house sold a cargo of Kanawha coal to the Bordeaux Gas Works under \$5 c.i.f. Inquiries have been received for between 30,000 and 40,000 tons of gas coal for Stockholm, deliveries to extend over next year.

Reduced production in Illinois and Indiana has sent

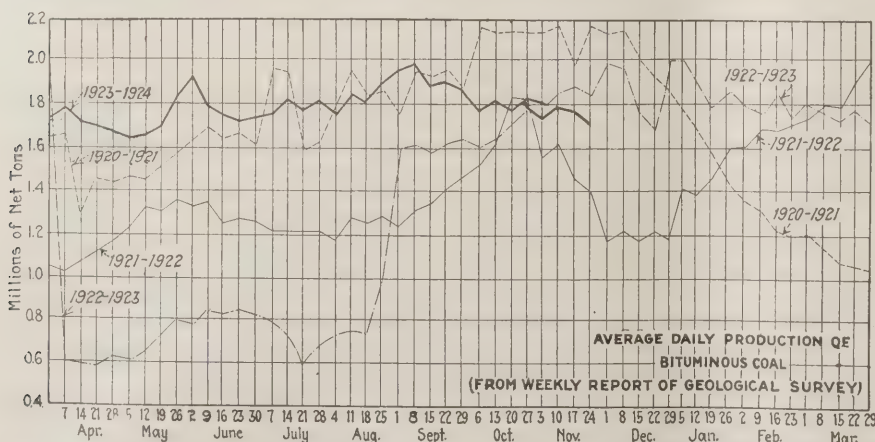
prices for screenings up and the closing of some consumer-owned mines has put the owners on the market for heavy tonnages of steam coal. Working time in the Middle West is decreasing gradually. Little activity is noted in the St. Louis market, except in the cheaper grades of coal handled by retail dealers. The demand for Kentucky coal is going from bad to worse. A better movement is reported out of Duluth, but at Mil-



	Week Ended Nov. 26	Season to Nov. 26
Cargo	776,893	29,067,813
Fuel	38,897	1,561,469
Totals	815,790	30,629,282

waukee the docks are not busy. Trade in Ohio continues dull notwithstanding a readjustment in the circular on smokeless coals. Consumers in New England continue to lack interest. At New York more inquiries were received, including some regarding contracts for the first three months of the new year, but nothing definite regarding prices has been decided.

Anthracite production reached 2,100,000 net tons during the week ended Nov. 24, only 65,000 tons below the high record for the year. It is estimated, however, that production for last week did not exceed 1,800,000 tons, owing to the holiday. More hard coal is being



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Nov. 10	10,147,000	10,726,000
Nov. 17 (a)	11,215,000	9,717,000
Nov. 24 (b)	10,100,000	10,171,000
Daily average	1,683,000	1,695,000
Calendar year	355,050,000	497,901,000
Daily av. cal. year	1,276,000	1,792,000

ANTHRACITE

	1922	1923
Nov. 10	1,897,000	1,967,000
Nov. 17	2,230,000	1,725,000
Nov. 24	2,213,000	2,100,000
Calendar year	44,866,000	86,456,000

COKE

	1922	1923
Nov. 17 (b)	264,000	254,000
Nov. 24 (a)	288,000	260,000
Calendar year	6,601,000	16,695,000

(a) Subject to revision. (b) Revised from last report.

delivered to retail dealers in the East now that the Lake shipments are nearly at an end, and as a result of the easier condition of the market some cancellations of the high-priced coal have been reported.

Midwest Steam Prices Stiffen

The remarkably low point of production in Illinois and Indiana has at last begun to have a real strengthening effect on the price of screenings. Good southern Illinois screenings, which have been running at \$1.40@1.50, have climbed about 15c., although there is no great volume moving at that price because of short-term contracts now being cleaned up at the lower figure. Central Illinois screenings have improved, mainly because the Standard Oil Co., having shut down its Illinois mines, contracted for about all the available Springfield district supply of fine coal at \$1.25 until April 1. The previous price had been around 70c. Indiana Fourth Vein steam sizes also ascended from an average of \$1.35 to \$1.60, and Fifth Vein from \$1 to \$1.25.

The situation in domestic sizes is discouraging. "No bills" in all the larger sizes are accumulating in all fields with no

good prospect ahead of moving them in a hurry. This, coal experts contend, is bound to push steam sizes higher. This development is especially desired by two or three operators who have small quantities of screenings on the ground in scattered parts of Illinois, and by most of the many operators who are trying to fill their low-price contracts as quickly as possible so as to have coal ready for a high-level steam market along toward the end of this month.

Kentucky and Eastern coal has been cutting heavily into the domestic market all through the Middle West and Northwest at prices low enough to give them the edge on trading in spite of their higher freight rates. Shutdowns in some of those competing regions, however, are expected soon to reduce the volume of this coal, so that the price will ascend to a point that will reduce their competitive power. Good eastern Kentucky lump is selling at \$3@3.25 and western Kentucky at \$2.75, and their producers are hungry for markets now that Lake trade is dying. A flood of cheap smokeless mine-run, selling through the Chicago market at \$1.75@2.25, helps materially to keep the domestic market in Illinois and Michigan flat.

Midwest fields, of course, continue to run on flat tires all

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Dec. 4 1922	Nov. 19 1923	Nov. 26 1923	Dec. 3 1923†
Smokeless lump.....	Columbus....	\$6.50	\$4.85	\$4.10	\$4.00@4.25	
Smokeless mine run.....	Columbus....	6.15	2.15	2.10	2.00@2.25	
Smokeless screenings.....	Columbus....	5.75	1.30	1.30	1.25@1.40	
Smokeless lump.....	Chicago....	6.25	5.10	4.50	4.00@4.85	
Smokeless mine run.....	Chicago....	5.60	2.25	2.25	1.75@2.25	
Smokeless lump.....	Cincinnati..	6.55	4.85	4.25	2.75@3.50	
Smokeless mine run.....	Cincinnati..	5.40	2.10	2.10	1.75@2.25	
Smokeless screenings.....	Cincinnati..	5.30	1.35	1.50	1.00@1.75	
*Smokeless mine run.....	Boston.....	7.50	4.40	4.65	4.50@4.75	
Clearfield mine run.....	Boston.....	3.50	2.00	2.15	1.50@2.25	
Cambria mine run.....	Boston.....	4.25	2.60	2.60	2.00@3.00	
Somerset mine run.....	Boston.....	3.85	2.35	2.35	1.75@2.60	
Pool 1 (Navy Standard).....	New York....	5.25	3.00	3.00	2.75@3.25	
Pool 1 (Navy Standard).....	Philadelphia..	5.15	3.00	3.00	2.80@3.20	
Pool 1 (Navy Standard).....	Baltimore....	4.85				
Pool 9 (Super. Low Vol.).....	New York....	4.60	2.25	2.35	2.25@2.50	
Pool 9 (Super. Low Vol.).....	Philadelphia..	4.65	2.30	2.30	2.20@2.45	
Pool 9 (Super. Low Vol.).....	Baltimore....	4.10	2.05	2.05	2.00@2.15	
Pool 10 (H.Gr.Low Vol.).....	New York....	4.95	2.00	2.00	1.75@2.25	
Pool 10 (H.Gr.Low Vol.).....	Philadelphia..	3.95	1.85	1.85	1.75@2.00	
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	3.35	1.90	1.90	1.85@2.00	
Pool 11 (Low Vol.).....	New York....	3.00	1.75	1.55	1.55@1.75	
Pool 11 (Low Vol.).....	Philadelphia..	3.35	1.65	1.70	1.65@1.75	
Pool 11 (Low Vol.).....	Baltimore....	3.10	1.75	1.75	1.70@1.85	
High-Volatile, Eastern		Market Quoted	Dec. 4 1922	Nov. 19 1923	Nov. 26 1923	Dec. 3 1923†
Pool 54-64 (Gas and St.).....	New York....	3.25	1.60	1.60	1.50@1.75	
Pool 54-64 (Gas and St.).....	Philadelphia..	3.55	1.65	1.65	1.60@1.75	
Pool 54-64 (Gas and St.).....	Baltimore....	3.10	1.70	1.70	1.70	
Pittsburgh sc'd gas.....	Pittsburgh....	4.85	2.55	2.55	2.50@2.60	
Pittsburgh gas mine run.....	Pittsburgh....		2.25	2.25	2.20@2.30	
Pittsburgh mine run (St.).....	Pittsburgh....	2.60	1.90	2.00	1.90@2.10	
Pittsburgh slack (Gas).....	Pittsburgh....	3.25	1.05	1.25	1.25@1.35	
Kanawha lump.....	Columbus....	5.75	3.00	3.00	2.85@3.15	
Kanawha mine run.....	Columbus....	3.35	1.85	1.85	1.75@2.00	
Kanawha screenings.....	Columbus....	3.25	1.75	1.80	1.75@2.00	
W. Va. lump.....	Cincinnati..	6.25	3.25	3.15	2.00@3.60	
W. Va. gas mine run.....	Cincinnati..	3.50	1.50	1.50	1.35@1.65	
W. Va. Steam mine run.....	Cincinnati..	3.15	1.50	1.50	1.35@1.65	
W. Va. screenings.....	Cincinnati..	3.00	.85	.85	.90@.75	
Hooking lump.....	Columbus....	5.05	2.90	2.95	2.85@3.10	
Hooking mine run.....	Columbus....	3.00	1.85	1.85	1.75@2.00	
Hooking screenings.....	Columbus....	2.85	.90	.80	.75@.85	
Pitts. No. 8 lump.....	Cleveland....	4.50	2.55	2.55	2.15@3.00	
Pitts. No. 8 mine run.....	Cleveland....	3.20	1.90	1.95	1.85@1.95	
Pitts. No. 8 screenings.....	Cleveland....	2.85	1.05	1.15	1.30@1.50	
South and Southwest		Market Quoted	Dec. 4 1922	Nov. 19 1923	Nov. 26 1923	Dec. 3 1923†
Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@4.00	
Big Seam mine run.....	Birmingham..	2.35	1.95	1.95	1.75@2.15	
Big Seam (washed).....	Birmingham..	2.60	2.35	2.35	2.25@2.50	
S. E. Ky. lump.....	Chicago....	6.10	3.25	3.25	3.00@3.85	
S. E. Ky. mine run.....	Chicago....	4.25	2.25	1.85	1.75@2.00	
S. E. Ky. lump.....	Louisville....	6.50	3.50	3.50	3.00@3.75	
S. E. Ky. mine run.....	Louisville....	3.40	1.85	1.85	1.60@2.00	
S. E. Ky. screenings.....	Louisville....	3.25	.75	.75	.70@.90	
S. E. Ky. lump.....	Cincinnati..	6.50	3.25	2.60	2.50@3.60	
S. E. Ky. mine run.....	Cincinnati..	3.35	1.50	1.50	1.25@1.75	
S. E. Ky. screenings.....	Cincinnati..	3.00	.85	.85	.80@1.00	
Kansas lump.....	Kansas City..	5.00	5.10	5.10	5.00@5.25	
Kansas mine run.....	Kansas City..	3.50	3.50	3.25	3.00@3.50	
Kansas screenings.....	Kansas City..	2.50	2.00	2.00	2.00	

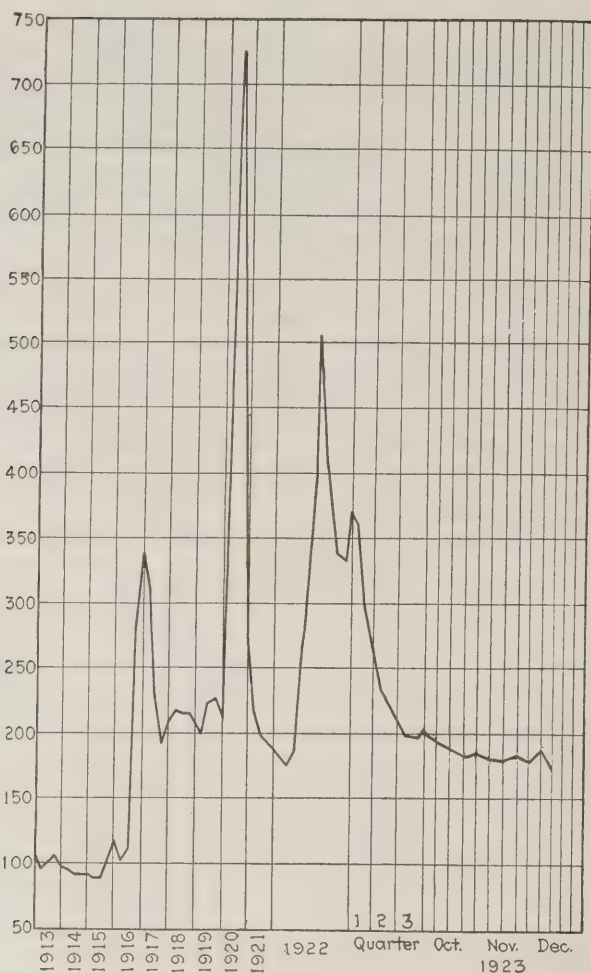
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922		Nov. 26, 1923		Dec. 3, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York....	\$2.34	\$9.00	\$7.75@8.25	\$8.50@10.00	\$8.00@9.25	\$8.50@10.00	\$8.00@9.25
Broken.....	Philadelphia..	2.39		7.90@8.10				
Egg.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Egg.....	Philadelphia..	2.39	9.25@11.00	8.10@8.35	9.85@12.20	8.75@9.25	9.85@12.20	8.75@9.25
Egg.....	Chicago*....	5.06	12.50@13.00	7.20@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Solve.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Solve.....	Philadelphia..	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Solve.....	Chicago*....	5.06	12.50@13.00	7.35@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Chestnut.....	New York....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.25	8.75@9.25
Chestnut.....	Philadelphia..	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Chestnut.....	Chicago*....	5.06	12.50@13.00	7.35@8.35	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Range.....	New York....	2.34		8.25		9.00		9.00
Pea.....	New York....	2.22	7.00@11.00	6.15@6.30	6.40@7.75	6.15@6.65	6.15@7.50	6.15@6.65
Pea.....	Philadelphia..	2.14	7.00@8.00	6.15@6.20	6.75@9.00	6.35@6.60	6.75@9.00	6.35@6.60
Pea.....	Chicago*....	4.79	7.00@8.00	5.49@6.03	6.00@6.75	5.40@6.05	6.00@6.75	5.40@6.05
Buckwheat No. 1.....	New York....	2.22	4.00@5.00	4.00@4.10	1.75@3.50	3.50	1.75@3.50	3.50
Buckwheat No. 1.....	Philadelphia..	2.14	5.00	4.00	2.25@3.50	3.50	2.25@3.50	3.50
Rice.....	New York....	2.22	3.00@3.25	2.75@3.00	1.25@2.50	2.50	1.25@2.50	2.50
Rice.....	Philadelphia..	2.14	2.50@2.75	2.75@3.00	1.75@2.50	2.50	1.75@2.50	2.50
Barley.....	New York....	2.22	1.75@2.00	1.50@2.00	.90@1.50	1.50	1.00@1.50	1.50
Barley.....	Philadelphia..	2.14	1.00@1.75	2.00	1.00@1.50	1.50	1.00@1.50	1.50
Birdseye.....	New York....	2.22		2.10	1.25@1.45	1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Dec. 3	Nov. 26	Nov. 19	Dec. 4
Index	181	186	183	326
Weighted average price	\$2.19	\$2.25	\$2.21	\$3.95

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on 'Prices of Coal and Coke, 1913, 1918,' published by the Geological Survey and the War Industries Board.

around. Working time decreases little by little and there is nothing in December to hope for except a continuous run of blizzard weather. Otherwise nothing much is expected of the market until Jan. 1. Railroad tonnage in most fields is light.

St. Louis Trade Is Quiet

Mild weather continues at St. Louis with a change of about 10 deg. in temperature. This has brought a little activity in retail trade in cheaper grades of coal. Country domestic is quiet and there is no call for country steam. Local wagonload steam shows a little improvement, but carload is at a standstill. Dealers report nothing doing in anthracite, smokeless or coke. With all yards loaded they are waiting for cold weather.

Kentucky Slumps Lower

From bad to worse appears to be the situation in Kentucky so far as demand is concerned. Reduction of general demand for prepared sizes is resulting in still fewer operating mines in west Kentucky, and this is making for slower production of screenings and a better price. Western Kentucky screenings have advanced to 70@75c. for pea and slack and 90c.@\$1.10 for nut and slack, while prepared sizes have remained practically unchanged. Screenings have been

sold down as low as 40c. within the past few weeks. However, mine run is selling at \$1.50@\$1.90 and a top of about \$2, but is moving very slowly due to the oversupplied condition of the screenings market.

Jobbers are generally complaining over lack of demand for coal in quantity in any size, while operators bemoan time lost through lack of sales. The western field doesn't figure more than about 33½ per cent of capacity at this time, and the eastern no better than 50 per cent. The larger mines in some instances are producing a fair tonnage, but companies with several mines are making no effort to operate all their plants.

Northwest Is Full of Fuel

The movement of coal to Duluth took a new lease on life last week, when forty-eight cargoes arrived, of which five were anthracite. Twenty-six are reported on the way, in which are included four of hard coal, and it seems that at least twice that number of anthracite arrivals will be scored before the week is through.

Receipts of soft coal are large. In the event of a strike next spring there will be ample stocks on docks. Should the strike not materialize, there will undoubtedly be some hurried unloading. The industrial demand for soft coal is good but the commercial demand is flat. Public utilities, however, are suffering from lack of water power, and are forced to turn to coal.

The Milwaukee market remains quiet, but the weather is hardening slowly, and dealers are looking for real business soon. The market is glutted with all-rail Pocahontas, and mine run is down 50c. to \$8 for steam and \$9.50 for domestic use. Jobbers report the soft-coal market in general as dumpy, but as yet no shading in price other than in Pocahontas has developed. Cargoes continue to arrive by lake. The docks are full and some of the shipments will be held afloat. The total coal received at the port from all sources during the year promises to break all records.

Minneapolis, center of the war for Northwest markets between rail and Lake shippers, observes the docks stocking heavily preparatory to a strike or to a rate decrease sufficient to let them flood the country with Eastern coal. Hocking and Youghiogheny lump are now \$6 and \$6.50 with pile-run 75c. less on Hocking and 50c. less on Youghiogheny. Illinois and Kentucky shippers strive to maintain their circulars, but cannot in the face of the bitter competition between the various factions.

Western Trade Drones Along

Conditions are little changed throughout the Southwest and West in coal trading, in spite of snowstorms in Colorado, Nebraska and Kansas. These served to stimulate buying a little, both in Southwestern district coal and in fuel from Colorado. However, Kansas mines have not worked better than 60 per cent and there have been no changes in price. Nevertheless the ratio between working time and demand is such that "no bills" at least have not increased.

In Utah winter weather has created some retail business but the demand is easily supplied from small stocks on hand and buying has not been greatly increased. Low production of domestic sizes is pushing the price of slack up.

Price Readjustments in Ohio

Readjustment in the smokeless coal market continues at Cincinnati. Reduced prices for lump and mine-run were shown on the December circular, but New River operators and some brokers undersold these prices. Many of the mines in the Hazard, Harlan, Elkhorn, Big Sandy and southern West Virginia regions which closed early last week on account of the holiday remained closed the balance of the week. A surplus of coal together with unseasonable weather and light demand caused no change in the market. Retail prices receded with mine prices.

Scarcity of slack in the Cleveland market caused an advance in price, due in most part to the cut in production. Otherwise the market is dull and consumers are showing practically no interest. With lake shipments practically ended for this season receipts of bituminous coal at Cleveland increased, resulting in a surplus of coal. Notwith-

standing the present dullness, the trade is optimistic and expects heavier buying with the new year.

A slight increase in the demand for domestic coal was noticed at Columbus, due to colder weather, but it was easily met by the retail dealers, who are heavily stocked, as well as by consumers, who generally have their house bins filled. Pocahontas and splints are in good demand. The dullness extends to the steam-trade demand. Railroad demand is steady, while purchasing agents of large consumers and manufacturers are buying distress coal at low prices. Screenings are in slightly better demand. Many mines are closed and are not expected to reopen until demand is better.

The Pittsburgh coal market continues to show a better tone all around as compared with conditions a few weeks back, but last week there was no further improvement in prices, except in slack. A feature of the market is its failure to yield any on account of the ending of the lake season, when it is normal for prices to go off somewhat for December. Low prices had been reached some time ago, and operators seem to have made such careful provision against being caught with the necessity of selling any additional coal that, if anything, the market stiffened somewhat. Slack is expected to go up to the neighborhood of mine-run price. Steam slack is being quoted at \$1.25@\$.1.30, with gas slack at \$1.25@\$.1.35.

New England's Spurt Over

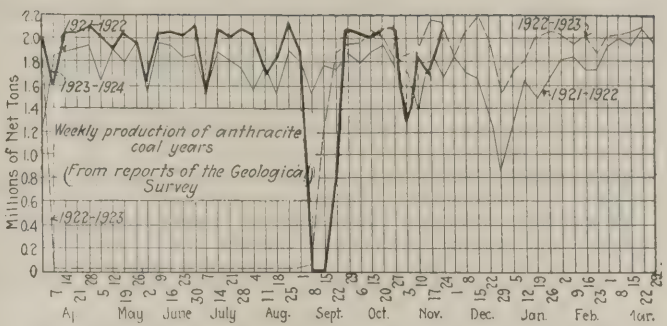
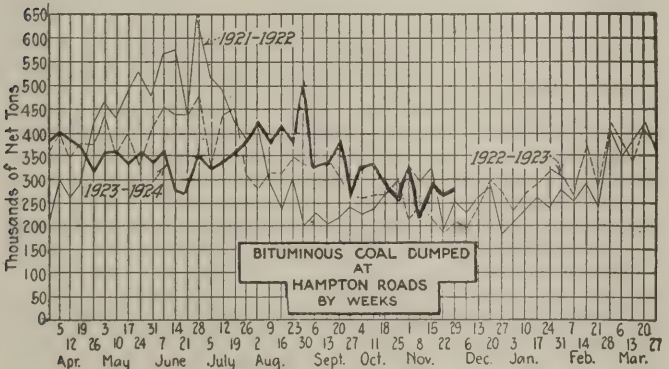
In New England the faint spurt of a week ago has about worn off. Labor troubles on the Virginian Ry. did not prove the hardening factor that shippers hoped, and \$4.75 per gross ton f.o.b. Hampton Roads was the highest price quoted on No. 1 Navy Standard coals. A few sales have been made at \$4.50, and it is probable that these will be duplicated soon unless something unforeseen occurs. Consumers show no greater interest in the spot market than at any time during the past sixty days, and at least one of the smokeless agencies announced a 25c. lower price on month-to-month contracts than during November.

While distributors are asking \$6 per gross ton on cars it is conceded that what few buyers there are can still cover at \$5.25@\$.5.50. There has been nothing to improve inquiry for spot coal and the requirements of those who chose during November to buy at current prices for use early next spring have not been satisfied. There is no perceptible change in all-rail coal from central Pennsylvania. Only the output of non-union sections has any apparent opening even in the more western part of this territory, and quotations are freely made on fair grades roughly classified as Pool 10 at \$1.50@\$.1.60 per net ton, f.o.b. mines.

There is a small volume of bituminous moving from Philadelphia and from New York, but practically all of this is on contract commitments and tends to diminish from week to week.

Consumers Ask About Contracts

A better feeling exists in the New York market for soft coal. Inquiries have increased and some consumers are asking about contracts from January to April next year, and others to cover the entire twelve months. The lack of distress coal was reflected in the opening of bids by the U. S. Shipping Board at New York for 2,300 gross tons of either Pool 9 or Pool 71 coal, the prices ranging from \$4.80



to \$5.69 alongside, a substantial increase over previous offerings. While houses as a rule were not willing to quote prices on contracts for the first three months of next year the opinion was they would range as high as \$3 for Pools 9 and 10. Consumers in Philadelphia are not willing to buy large tonnages, although producers try to impress upon them that the present prices are the lowest possible. Although movement remains in fair volume, shippers say business is as dull as at any time in the past four or five months. It is expected that iron plants will enter the market before the first of the year. Curtailed production following the close of lake shipments has tightened the supply of slack.

Demand at Baltimore for gas and steam coals is running below normal. Lack of demand has affected the smokeless coal market in West Virginia, as well as prices. Wage readjustments in some instances have permitted a resumption of operations in the Upper Potomac and Georges Creek regions. At Birmingham there is considerable dullness and conditions are unsatisfactory. Spot coal is in light demand and mines without contracts are finding it difficult to maintain a short working schedule. The bunkering trade is hard hit by oil competition.

Cancellations for Anthracite Received

Stove and chestnut sizes of hard coal are becoming more plentiful in the East, due to the practical stopping of Lake shipments, causing producers to distribute their coal in other directions. Egg and pea coals together with the steam sizes are available to all buyers. Some cancellations of orders for high-priced coal have been received by wholesale dealers, but so far they have not been in large volume. Like New York, Philadelphia has received better shipments of all sizes, and while they have not been large the demand for chestnut coal is easier. In the absence of cold weather there is no rush for coal. The immediate demand of consumers of hard coal at Baltimore is being taken care of by the increased arrivals. There is a heavy demand for anthracite in Toronto, but with arrivals fairly regular, dealers believe they will be able to supply all requirements. Shipments of hard coal to New England and eastern New York by rail during the week ended Nov. 24, the American Railway Association reports, were 3,646 cars, as compared with 3,455 cars the previous week. During the week ended Nov. 25, according to the Geological Survey reports, 171,975 net tons of hard coal were shipped from Lake Erie ports, making the shipments for the season to date 3,368,287 tons.

Production of beehive coke showed an increase of 6,000 net tons during the week ended Nov. 24 when compared with the previous week, the Geological Survey reports showing an estimated production of 260,000 tons, as compared with 254,000 tons during the week ended Nov. 17. The cumulative production during 1923 to Nov. 24 stood at 16,695,000 net tons.

Car Loadings, Surpluses and Shortages

	Cars Loaded		Surplus Cars		Car Shortage	
	All Cars	Coal Cars	All Cars	Coal Cars		
Week ended Nov. 17, 1923.	991,745	170,875				
Previous week.	1,036,067	190,282				
Same week in 1922.	957,564	200,791				
			All Cars	Coal Cars		
Nov. 22, 1923.	111,797	58,490	1,866		907	
Same date in 1922.	5,306	2,274				
Nov. 14, 1923.	71,119	31,850	3,901		1,169	

Foreign Market And Export News

Welsh Coal Market Shows Improvement; October Exports Increase

Production of coal in Great Britain gained 2,000 tons during the week ended Nov. 17, a cable to *Coal Age* stating that 5,574,000 tons were produced. The previous week's output was 5,572,000 tons.

There has been an improvement in the Welsh market. After a series of delays, tonnage is moving more freely. Shipments are increasing and mine suspensions are less frequent. The tonnage position, however, is not satisfactory owing to the diversion of steamers to the Far East, and also to the Black Sea.

Exporters who sold on c.i.f. terms based upon the freights ruling some weeks ago are in some cases faced with losses instead of profits. Some mines are fairly busy, while others continue to have heavy stocks of coal on hand, and find it necessary to make concessions to buyers to get quick movement. On the whole, the operators are well booked until the middle of January and with the approach of Christmas anticipate growing pressure.

Contract business for 1924 is under negotiation though some consumers on the Continent are inclined to buy on the open market rather than place new contracts at prices above those now in force.

The Newcastle market remains steady but quiet. Most of the mines have sold their output for the rest of the year. There is some easiness for prompt shipment, partly owing to bad weather and delayed arrivals of shipping, but mainly as a result of the difficulty which German buyers are finding in obtaining credits for coal due to be shipped.

French Coal Imports and Exports

There were produced by the French mines, excluding Sarre, during September 3,321,297 metric tons of coal and lignite; 181,648 tons of coke, the independent mines not included; and 264,787 tons of briquets, as compared with 3,405,028 tons of coal and lignite; 180,860 tons of coke, and 263,164 tons of briquets in August. During the same period France imported 2,619,831

tons of coal and lignite, 280,316 tons of coke and 46,374 tons of briquets, while the importations in August were 2,241,157 tons of coal and lignite 274,606 tons of coke and 64,460 tons of briquets.

Exports in September were 156,137 tons of coal, as compared with 187,725 tons in August; 50,944 tons of coke as against 59,976 tons, and 19,536 tons of briquets as compared with 12,545 tons.

Hampton Roads Prices Stronger

Market conditions at Hampton Roads last week continued dull, except that prices showed a little more strength. Despite the strike on the Virginian Ry. a fair volume of coal continued to arrive at Sewall's Point.

Coastwise business was fair with bunkers holding their own. Foreign movement was slow, while the prospects were not bright.

The tone of the market was generally dull, and business was at a lower ebb than is usual at this time of the year. Domestic trade was promising and the prospects for an increase in coastwise movement during December was bright.

Coal and Coke Exports and Imports

During October 400,599 gross tons of anthracite and 1,488,887 tons of bituminous coal were exported from the United States, as compared with 404,999 tons of anthracite and 1,729,425 tons of bituminous coal in the corresponding month of last year. Of the total Canada received 1,247,952 tons, Italy 59,068 tons, France 27,045 tons and Cuba 52,680 tons. There was 77,737 tons of coke exported as compared with 38,613 tons in October of last year.

During the same month the United States imported 40,213 tons of anthracite and 89,059 tons of bituminous coal of which 57,026 tons was dutiable. During the corresponding month of last year there was imported 105,501 tons of anthracite and 1,143,157 tons of bituminous coal. Of the imports last October the United Kingdom furnished 10,277 tons, Canada 57,026 tons, and

Australia 15,334 tons. Imports of coke amounted to 3,815 tons, as compared with 22,880 tons in October of last year.

French Coal Prices Advance

After a strike which continued a few days the workers in the French coal mines were granted increases ranging from 1 fr. to 3 fr. in all Basins, and up to 5 fr. in Lorraine. It is expected that due to the advances in wages the selling prices of coal will advance from 3 fr. to 5 fr. per ton.

Deliveries of coal from the various mining fields are satisfactory, and British exports are normal. Due to decreased activity at the plants demand for industrial coals is slower. Announcement was made that contracts aggregating about 200,000 tons of coal have been placed with American houses.

Export Clearances, Week Ended Dec. 1, 1923

FROM BALTIMORE		
For Canada:		Tons
Dan. SS. Nordkap.....		5,389
COKE		
For Chile:		
Jap. SS. Belgium Maru.....		4,050
FROM HAMPTON ROADS		
For Red Sea:		
Br. SS. City of Auckland, for Perim		2,519
For West Indies:		
Swed. SS. Adolf, for Kingston.....		2,507
Amer. Schr. Dorothy, for St. Stephens		1,117
Swed. SS. Finn, for Port of Spain..		2,477
For Peru:		
Peru SS. Apurimac, for Callao.....		2,798
For Newfoundland:		
Nor. SS. Anna Sofie, for St. Johns..		4,775
FROM PHILADELPHIA		
For Cuba:		
Nor. SS. Bay California, for Havana ...		

Hampton Roads Pier Activities

N. & W. piers, Lamberts Pt.:			
	Nov. 22	Nov. 28	
Cars on hand.....	1,899	1,706	
Tons on hand.....	113,069	100,682	
Tons dumped for week.....	119,592	116,322	
Tonnage waiting.....	10,000	9,250	
Virginian Ry. piers, Sewalls Pt.:			
Cars on hand.....	1,051	667	
Tons on hand.....	64,450	41,550	
Tons dumped for week.....	26,327	40,422	
Tonnage waiting.....		2,300	

C. & O. piers, Newport News:			
Cars on hand.....	1,629	1,217	
Tons on hand.....	81,335	67,290	
Tons dumped for week.....	90,065	100,907	
Tonnage waiting.....	9,510	17,152	

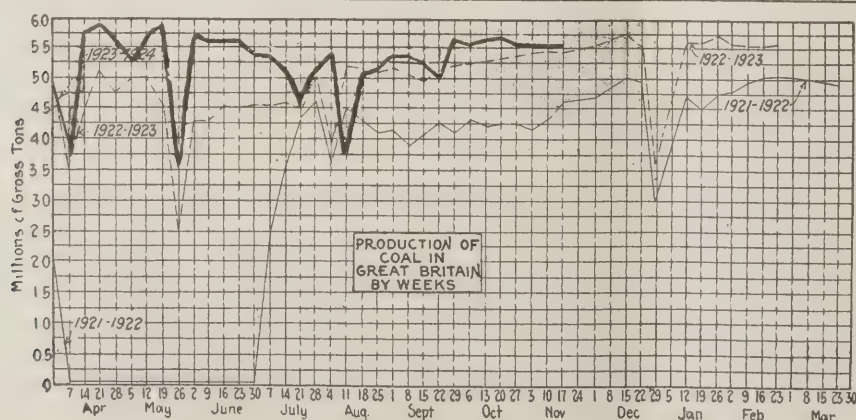
Pier and Bunker Prices, Gross Tons

PIERS			
	Nov. 24	Dec. 1†	
Pool 9, New York.....	\$4.75@ \$5.25	\$4.90@ \$5.25	
Pool 10, New York.....	4.50@ 5.00	4.75@ 5.00	
Pool 11, New York.....	4.40@ 4.75	4.40@ 4.75	
Pool 9, Philadelphia.....	4.85@ 5.10	4.85@ 5.10	
Pool 10, Philadelphia.....	4.00@ 4.65	4.00@ 4.65	
Pool 11, Philadelphia.....	3.95@ 4.00	3.95@ 4.00	
Pool 1, Hamp. Roads.....	4.50	4.50@ 4.60	
Pools 5-6-7 Hamp. Rds....	4.15@ 4.35	4.15@ 4.35	
Pool 2, Hamp. Roads.....	4.15@ 4.25	4.25@ 4.35	
BUNKERS			
Pool 9, New York.....	5.05@ 5.55	5.20@ 5.55	
Pool 10, New York.....	4.80@ 5.30	5.05@ 5.30	
Pool 11, New York.....	4.70@ 5.05	4.70@ 5.05	
Pool 9, Philadelphia.....	5.10@ 5.50	5.10@ 5.50	
Pool 10, Philadelphia.....	4.65@ 5.00	4.65@ 5.00	
Pool 11, Philadelphia.....	4.30@ 4.55	4.30@ 4.55	
Pool 1, Hamp. Roads.....	4.50	4.50@ 4.60	
Pool 2, Hamp. Roads.....	4.15@ 4.25	4.25@ 4.35	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age			
	Nov. 24	Dec. 1†	
Admiralty, large....	27s.6d.@ 28s.6d.	28s.6d.	
Steam smalls.....	18s.@ 19s.6d.	19s.@ 20s.	
Newcastle:			
Best steams.....	25s.@ 26s.6d.	26s.	
Best gas.....	23s.6d.@ 24s.6d.	24s.@ 24s.6d.	
Best bunkers.....	24s.6d.	24s.@ 25s.6d.	

† Advances over previous week shown in heavy type, declines in *italics*.



Traffic News

Advises That I. C. C. Modify Report on Car Distribution

In a tentative opinion by Examiner David T. Copenhafer in the case of the Northern West Virginia Coal Operators' Association versus the Director General of Railroads, the examiner finds that the Interstate Commerce Commission should modify its previous report. The practices of the Director General during 1919 and 1920 in the distribution of coal cars as between mines on the Monongahela and Morgantown & Wheeling railways and the mines on the Pittsburgh & Lake Erie, south of Pittsburgh, and on the Monongahela Division, southwest branch, and the Pittsburgh West End Division of the Pennsylvania R.R., says the examiner, subjected operators of coal mines on the first two named roads to undue prejudice and disadvantage to the extent that the percentage of cars furnished the mines on the latter roads in each instance was less than the percentage of cars the mines as a whole on all lines under consideration would have received had all the system cars placed for coal loading on those lines been distributed equally.

In its original report there was no basis for findings as to the extent of damages. For that reason the case was held open for further hearing. It has developed that the figures upon which the commission's findings were based included numerous privately owned cars, which should not have been included in the distribution.

"The complainant's mines," says the tentative opinion, "were entitled only to such car supply as they would have received had the available cars been distributed equally. With an equal distribution, the mines on all lines here considered would have received 87 per cent and 58.7 per cent respectively, of their orders during the periods July, 1919, to October, 1919, and December, 1919, to February, 1920, inclusive, or 74.3 per cent for the entire period."

Ruling Issued on Indiana Rates

In the complaint of the Indiana State Chamber of Commerce against the Baltimore & Ohio and fifty-three other railroads the Interstate Commerce Commission made a ruling in a decision dated Oct. 31 in which it orders the defendants according as they participate in the transportation "to establish, on or before Feb. 18, 1924, upon notice to this commission and to the general public by not less than 30 days' filing and posting in the manner prescribed in section 6 to the Interstate Commerce Act, and thereafter to maintain and apply to the transportation of coal, in carloads, from mines in the State of Ohio and the Inner Crescent district of Pennsylvania, Maryland, West Virginia, Tennessee, Virginia and Kentucky to points in the Muncie group,

rates which shall not exceed those contemporaneously in effect to Fort Wayne, Ind.; to points in the Peru group, rates which shall not exceed those contemporaneously in effect to Fort Wayne and Muncie and points taking the same rates by more than 5c. per net ton; and to points in the Elkhart group rates which shall not exceed those contemporaneously in effect to the Fort Wayne group by not more than 20c. per net ton."

Indiana industries, coal operators and miners, through representatives in the Indiana State Chamber of Commerce, the Indiana Bituminous Coal Operators' Association and district 11, United Mine Workers, recently argued before the Indiana Public Service Commission that Indiana intrastate coal freight rates on hauls exceeding 30 miles are too high and that the commission's tentative order does not reduce them enough. Railroads hold that the Indiana rates are not out of line.

Record Coal Shipments to Lakes

Up to Nov. 27, according to reports filed with the car service division of the American Railway Association, 30,618,000 tons of coal have been dumped at Lake Erie ports for shipment since Jan. 1 this year, of which 29,036,000 tons were cargo coal and 582,000 tons bunker fuel. This is a larger tonnage than has ever been dumped previously.

By the time the navigation season closes it is estimated that a total of 31,313,000 tons will have been dumped, of which 29,700,000 will be cargo coal and 1,613,000 tons bunker coal. The best previous record was made in 1918, when 29,388,242 tons of both cargo and bunker coal was transported by the railroads and dumped at Lake Erie ports during the entire season.

May Acquire Scotts Run Ry.

The Monongahela Railway Co. is making arrangements to take over the Scotts Run Ry., formerly the Morgantown & Wheeling. Permission has been sought from the Interstate Commerce Commission to make such financial arrangement as the issue of one million dollars in common stock of the Scott's Run Company, which the Monongahela will buy at par. It is understood the new management will make improvements necessary to enlarge the coal-carrying capacity of this road.

Plan New Road in Indiana County

Extensive coal deposits in Indiana County, Pennsylvania, would be opened for development if a new railroad, to be known as the "Conemaugh & Blacklick," is built. Application for a certificate of public convenience has been filed. The proposed line would connect the New York Central at Nant-y-Glo of Heilwood with Johnstown.

Challenges Central Rates in Ohio

Rates of the New York Central Lines on coal shipped from mines on the T. & O. C. division of that system to the Fairfield Paper Co., at Baltimore, Ohio, have been challenged in a complaint filed with the Ohio Utilities Commission.

Association Activities

The Board of Directors and Executive Committee of the **National Retail Coal Merchant's Association** will meet at Hotel Shoreham, Washington, D. C., Friday and Saturday, Dec. 14 and 15.

The **Smokeless Coal Operators' Association of West Virginia** will hold its annual meeting at Washington Hotel, Washington, D. C., on Dec. 13. The principal business will be the election of a Board of Directors to be followed by the election of officers. The meeting will be followed by a luncheon at which United States Senator David A. Reed, of Pennsylvania, will make an address.

The **Wholesale Coal Club** is the newest coal organization in Indianapolis, composed, as the name would signify, of the leading wholesalers of the city. The organization meets once a month, the principal purpose being to get better acquainted, according to Arch V. Grossman, president. H. B. Glover, with the Knox County Consolidated, is the vice-chairman, and Ray Mulvihill, secretary of the Cedar Creek Coal Co., is the secretary.

About 500,000 copies of a digest of the report of the U. S. Coal Commission on retailing coal will be distributed by the **National Retail Coal Merchants Association** as part of a campaign planned by the association to inform the consuming public regarding the fuel situation. At the same time the association will undertake a campaign to enlarge its membership. Officials of the association are highly pleased with the report of the Coal Commission on the retailers. In the words of Joseph E. O'Toole, resident vice-president, "The Coal Commission gave the retailers a clean bill of health, and we want the public to know of it."

Coming Meetings

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

Tug River Coal Operators' Association. Annual meeting Jan. 4, 1924, Bluefield, W. Va. Secretary, C. C. Morfit, Welch, W. Va.

New England Wholesale Coal Association. Annual meeting Jan. 8, 1924, Boston, Mass. Secretary, R. S. Townsend, Boston, Mass.

Engineers' Society of Western Pennsylvania. Annual meeting Jan. 15, 1924, Blue Room, William Penn Hotel, Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

American Wood Preservers' Association. Annual meeting Jan. 15-17, 1924, Hotel Buehlebach, Kansas City, Mo. Secretary, P. R. Hicks, Chicago, Ill.

Northeast Kentucky Coal Association. Annual meeting Jan. 24, 1924, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

Obituary

T. L. Sharpe, aged 69 years, died in Montgomery, Ala., Nov. 21, Mr. Sharpe, together with Wm. Cook, Sr. operated the Black Creek Coal Co., at Nauvoo, Walker County, Ala., and also was interested in mining operations in Kentucky. He had been long identified with mining operations in the Alabama field and was widely known. Interment took place at Demopolis, Ala., his birthplace.

News Items From Field and Trade

ALABAMA

The Paramount Coal Co. is making two openings near Helena, Shelby County, where the company now has one mine in operation. The openings are on property comprising about 250 acres leased from the Tennessee Coal, Iron & Railroad Co. T. S. Abernathy is president and J. M. Donaldson, vice-president and general manager of the Paramount company.

General Wm. L. Sibert, well-known army officer and native Alabaman, has been appointed president of the State docks commission, vice Gordon Crawford, resigned. General Sibert will supervise the building of docks and terminals at Mobile, to which work the state will lend its aid to the extent of \$10,000,000. The salary of General Sibert has been fixed at \$10,000 per year.

COLORADO

A large natural gas gusher was struck near Fort Collins, in the center of the northern Colorado lignite fields recently. This well is one of the largest of its kind in that section, producing approximately 82,000,000 cu.ft. of natural gas per day. It is expected that the Colorado Public Service Company will take this well over and pipe this gas into Denver and surrounding vicinity.

The Boulder Coal Mining Co. has been incorporated in Boulder, Colo., with a capital of \$100,000, by H. Bennett, T. Tison, J. Bertotti, H. H. Parker and R. Moschetti.

CONNECTICUT

In a report sent to Governor Templeton, by the Hartford Chamber of Commerce, Governor Pinchot, of Pennsylvania, is held in part to be responsible for the high price of anthracite. The blame, according to the report, is shared also by the middlemen and operators. The findings are the result of a survey made by the chamber upon request of the Governor. The report says there is nothing that Connecticut, through its Legislature or Governor, can do to alter conditions. The remedy, it says, lies primarily with Pennsylvania, which has a monopoly of the anthracite supply of the country.

ILLINOIS

The recent closing of the two mines near Carlinville, of the Standard Oil Co. presents an interesting phase of coal operation. These mines are models of economy. They worked regularly and yet other mines sold the Standard Oil Co. coal for their refineries below the cost of their own. The only reason for this is that "the rest of the tonnage" which goes to the public is expected to carry the loss sustained on the tonnage shipped to the Standard Oil Co. The Standard mines are down indefinitely.

The Cripple Creek Coal Co. of Galesburg, has leased 1,200 acres of land east of that city and a new shaft will be sunk in the spring.

Due to its ability to buy coal cheaper than it can be produced the Standard Coal Co. has closed two of its mines, one located at Schoper and the other at Berry, throwing approximately 1,000 men out of employment. Officials of the company have declared for some time that coal could be purchased cheaper in the market than it can be mined.

The Wabash R.R. and the Consolidated Coal Co. of St. Louis are still acquiring coal rights to the north, east and south of Taylorville. In the last two weeks of November they added one thousand acres to their holdings. The two now have their coal rights in solid bodies and it is expected that they will both begin mining coal within the next season. The Wabash has 30,000 acres and the Consolidated 20,000, involving a total expenditure of more than \$1,000,000.

The Bissell Coal Co. has changed its name to the Utilities Coal Corporation, Inc., with offices at 810 Ferguson Building, Springfield.

The Burlington Ry. has announced plans for the new freight yards at Willows to cost \$700,000. These yards will have a capacity of 1,000 cars and will be used to facilitate coal shipments. Ninety acres will be taken over for the yards.

Fire on Dec. 1 destroyed the old tippie and coal washer of the Taylor Coal Co. at Herrin.

INDIANA

A stockholders' report of an Indiana coal mine proves that not all coal mines are fizzes even in these trying times. This mine has a capital of \$300,000. The earnings from Nov. 1, 1922, to Oct. 30, 1923, were \$240,000. This mine does not sell its own coal. It is handled through jobbers.

Among the reasons why Indiana mines are 40 per cent shut down and why the other 60 per cent work only half the time, William Mitch, secretary of District II of the United Mine Workers, recently said publicly "there appear to be too many mines and too many miners." John Hessler, district president, said a freight-rate adjustment to give Indiana coal a better chance in competitive markets would help.

Regulations of the State Board of Mines and Mining governing enforcement of mining laws in wagon mines are discussed in an opinion submitted to Cairy Littlejohn, state mine inspector, by Attorney General U. S. Lesh. Under the law, mines employing more than ten men are subject to certain regulations of the board. Mr. Lesh said the fact that fewer than ten men are employed in a mine during part of a year would not protect the owner from prosecution for any violations occurring at the time when the number of employees exceeded ten.

Among the mines which have recently joined the popular custom of closing down are Big Creek Coals, Inc., No. 6, at Grayson; Franco No. 2, at Fautlon, and the mine of the Orchard Coal Co., at Marion. The shutdowns are the result of lack of orders and indefinite in length.

KENTUCKY

A total of \$1,050,000 has been allotted by the War Department for use in continuing the river channel development work in the Louisville district of the Ohio River, and an additional \$950,000 for the Cincinnati district, mostly for lock and dam work.

Barbourville interests have leased a mine at Anchor belonging to the Consolidation Coal Co.

MASSACHUSETTS

Fuel Administrator Hultman in a recent statement says that seventy communities in Massachusetts have received less than 25 per cent of their normal hard-coal requirements to date and calls on shippers to end an apparent discrimination which is assisting unscrupulous speculators to gouge consumers in that state. Mr. Hultman declares that most of the communities listed are small and their situation "gives strength to the claim that small communities and small dealers are being discriminated against."

MISSOURI

The October grand jury, of which W. K. Kavanaugh was foreman, finished its report at St. Louis on the last of November, recommending that the City of St. Louis use a proper standardized form of coal contract on account of some alleged irregularities in the deliveries of coal in 1922. The jury heard a number of witnesses pertaining to 90,000 tons of 2-in. screenings pertaining to, but on which, it is claimed, a large tonnage of screenings as low as $\frac{1}{2}$ in. was shipped. This coal was for the Water Department. An investigation of the books, etc., did not justify indictments, but the jury strongly urged a rearrangement of contract forms.

MONTANA

Work was resumed at the Gilbert-Crawford operation, near Roundup, last March. The mine is electrically equipped throughout. Efforts for the present will be confined to development work, the running of the main entry and the opening of two entries on the east and two on the west side.

NEW YORK

Lucius W. Robinson, chairman of the Rochester & Pittsburgh Coal & Iron Co., announces the appointment of J. Noble Snider, at present coal traffic manager of the New York Central Railroad Co., as vice president in charge of sales, with offices at No. 1 Broadway, New York City. At the same time Mr. Snider announced the appointment of J. M. Nelson as sales agent at Buffalo; J. N. Terrio as sales agent at New York and Charles C. Schaefer as sales agent at Rochester. All appointments became effective Dec. 1.

Alex Bonnyman, chairman of the board of the various Blue Diamond Coal Mining properties, arrived in New York recently after a three months' visit to Scotland and Naples. He was welcomed home by his brother, James Bonnyman, head of the Blue Diamond Coal Sales Co. and formerly a large operator at Birmingham, Ala.

OHIO

The Atwood Coal Co., of Wooster, has been chartered with a capital of \$50,000 to mine coal and deal in coal and kindred products, both wholesale and retail. Incorporators: C. Otis Smith, Francis Zarlingo, Mabel C. Smith, F. M. Vanover and T. E. Steiner.

The operating offices of the Hocking Valley Products Co., large coal operators in the Hocking Valley, have been moved from Columbus to Logan. The sales end of the business has been taken over by the Jay Miller Coal Co.

Robert Farnier, vice-president of the United Mine Workers of Sub-District 5, has resigned, effective Nov. 15. The resignation came as a surprise to the miners in eastern Ohio. The understanding is that Farnier has been offered executive positions at the mines of several of the larger companies operating in the field.

H. C. Howland, formerly with the Packard Coal Mining Co., of Columbus, has been made manager of sales of the Wheeler Coal & Coke Co., of Columbus. W. C. McClanahan, formerly with the Kanawha Valley Coal Co., of Charleston, W. Va., has been employed as a salesman for the Wheeler Coal & Coke Co.

The Maple Grove Coal Co., of Columbus, chartered about six months ago, has just about completed its tippie at a new mine in Harrison County on the Wheeling & Lake Erie R.R., which will be placed in operation soon. The initial production will be about 300 tons daily, which will be gradually increased.

The State Industrial Commission, which has charge of mine activities, has started a campaign to prevent injuries to miners employed in all mining districts of the Buckeye State. The campaign will be largely educational and will be pushed in 33 counties where mining activities are carried on. Jerome Watson, chief of the Bureau of Mines, has interceded with federal authorities to have a federal mine-rescue car sent into the state to be used jointly by Ohio and Kentucky, which will move from point to point showing first-aid measures and safety plans of the federal and state bureaus.

PENNSYLVANIA

R. B. Mellon, of Pittsburgh, president of the Mellon National Bank and a director of the Union Trust Co., has been elected chairman of the Board of Directors of the Pittsburgh Coal Co., which office was made vacant several months ago by the death of M. H. Taylor. Mr. Mellon was elected to the board of directors to succeed his brother, A. W. Mellon, when he was appointed Secretary of the Treasury in President Harding's Cabinet.

The Marion Machine, Foundry & Supply Co., of Scottdale, has just completed a domestic coke preparation plant for the Mahoning Coal Co. at Alverton, near Scottdale. The capacity of the plant is about 300 tons per day.

John Callahan, formerly traffic manager of the National Coal Association and until recently associated with the Morrow-Callahan Coal Co., of Cincinnati, has become sales manager for the Keystone Coal Catalogue and Mining Directory, published by the Keystone Consolidated Publishing Co., of Pittsburgh.

An important coal land deal has been closed in Cambria County in which **John H. Weaver**, of Philadelphia, head of the Nant-Y-Glo Coal Mining Co. and the Monroe Coal Co., becomes the owner of 992 acres of valuable coal land, purchased from T. Stanton Davis, of Ebensburg. The consideration is said to be \$193,280. The deal affects only individual holdings of Mr. Davis and is not connected in any way with the Navy Smokeless Coal Co.'s holdings in the same vicinity. Two tracts are involved, one containing 736 acres and the other 256 acres. The smaller tract brought \$80 per acre while the larger tract brought \$200 per acre. The entire plot lies in Cambria township.

The Hillman Coal & Coke Co. has closed down its Pike mine, near Brownsville, for an indefinite period, and has resumed operations at the Jerome No. 2 mine in the Somerset County smokeless coal field, which has been idle for a couple months past. The Pike mine is in the Pittsburgh seam in Fayette County.

The anthracite companies of Pennsylvania are satisfied with the system of assessing the price of coal at the mines for state tax purposes, Auditor General Samuel S. Lewis said in reply to criticism of the Anthracite Bureau of Information and Samuel D. Warriner, who said that the state places a value on coal in excess of the price obtained for the coal. "The settlement of the anthracite coal tax is no different from the settlement of taxes on capital stock, loans and gross receipts," said the Auditor General. "At times the valuations are accepted by the fiscal officers and then again there are differences that are adjusted after hearing. I know of no differences with any of the coal companies. They have told me they are satisfied. The cards are all laid on the table and the public has been advised regarding all matters connected with the tax collection."

WASHINGTON

The Lisco Coal Co.'s property at Renton Junction has been completely unionized by agreement signed late in November. It is a small mine.

Chain Belt Co., Milwaukee, Wis., manufacturers of Rex chain, transmission machinery and conveying equipment, formerly represented on the Pacific Coast by Meese & Gootfried Co., San Francisco, has established direct factory branches and warehouses in Portland and Seattle. Arrangements also have been made with the Washington Machinery Depot, Tacoma, to carry a large stock of Rex chain and transmission machinery.

WEST VIRGINIA

J. M. Scott, general manager of the B. & O. Ry. stated on Nov. 24 that 32,000,000 tons of coal have been shipped over the Baltimore & Ohio from West Virginia to the Great Lakes this year. This is the greatest tonnage, he said, that has ever been shipped from the coal fields of the Little Mountain state to the lake region.

The R. M. Davis Coal Co., entertained many coal and railroad representatives including transportation and traffic managers of the Baltimore & Ohio, Pennsylvania, the Western Maryland, the Monongahela, Long Island, New York Central and Pittsburgh and Lake Erie railroads at Morgantown, recently. Speakers included Dr. I. C. White, state geologist of West Virginia; former Governor W. E. Glascock, and Thomas K. Maher, of Cleveland, Ohio.

The Laurel Run Coal Co., of Fairmont, has just been organized with a capital stock of \$20,000 with a view to operating in the Fairmont region. Fairmont is to be the headquarters of the company, which was organized by Thomas H. Laulis and James Laulis, of Shinnston; T. F. McIntire, Charles E. Potter and E. C. Frame, of Fairmont.

Harry B. Martin, of the Greenmar Coal Co., of Elkins, has been elected as a director of the newly organized Citizens National Bank, of Elkins.

The West Virginia Supreme Court has held in the case of Wells Goodykoontz and others against the White State Mining Co. that unless otherwise provided, there is an

implied covenant in every lease of land for coal and coking purposes; that the lessee will do nothing and leave nothing undone reasonably necessary to protect the inheritance against waste and destruction resulting from his operation on the land; that unless waived by the terms of the contract of lease, the lessor of land for coal and coking purposes has the right to sub-jacent support for all superincumbent strata of coal and may enjoin removal by the lessee of the mine props or pillars in the subjacent strata until the mineable and merchantable coal in the upper seams has been mined out by the lessee, or by the lessor after the term of the lease has expired; that if under such a lease the lessee has opened a mine in one or more of the mineable seams and has, in violation of his duty, neglected to protect the inheritance, which has resulted in the destruction of any part of the coal unmined, equity will require him to account to the lessor for the damages so sustained by him to the inheritance.

There were thirty-two fatalities in the West Virginia mines in October, all but twelve of which resulted from falling roof and coal. Of the remaining twelve deaths in and about the mines, five were due to mine-car accidents. One man was killed in a motor accident, one in a mining-machine accident and two by electrical shock. Outside the mines, one miner was killed in an accident on an incline and one in an accident in connection with the operation of an electric hoist. Seven of the thirty-two fatal accidents occurred in McDowell County, Logan County coming next with six and Mingo with four. In Monongalia County there were three fatalities and in the counties of Brooke, Fayette, Kanawha, Marshall and Raleigh two each. In the counties of Clay, and Ohio there was one fatality each.

WISCONSIN

The Carnegie and Great Lakes docks, located at Superior, have protested to the Superior City Council against the tax on railroad coals on their docks. They claim that railroad coal should not be considered in the same category as commercial coals. The docks threaten to change their port for storage of railroad coal unless the tax is dropped.

WASHINGTON, D. C.

Dr. Thomas T. Read, supervising mining engineer of the Bureau of Mines, has been awarded a gold medal and a commemorative diploma by the government of Brazil. Dr. Read was the representative of the Department of the Interior with the United States Commission to the celebration of the 100th anniversary of the independence of Brazil at Rio de Janeiro last year, and also was the special delegate of the American Institute of Mining and Metallurgical Engineers and the Federated American Engineering Societies to the International Engineering Congress held in connection with the celebration.

Representative Crampton, of Michigan, chairman of the subcommittee on appropriations for the Interior Department, spent a week recently at the Pittsburgh station of the Bureau of Mines. So that he may be fully acquainted with the activities of the Interior Department, Mr. Crampton has spent a large portion of the interim between Congresses in familiarizing himself with the field work and experiment station work of the various bureaus.

The Bureau of Mines has offered through the Washington University, of St. Louis, two scholarships in mineral economics to mining engineering graduates who have completed some work in economics. These scholarships, valued at \$1,500 yearly, will enable the holders to study for two years at the graduate school of Washington University in Washington, D. C., for a Ph.D. degree in economics. The students will work under the technical guidance of Bureau of Mines engineers.

George S. McCaa, engineer in charge of the Mine Safety Service of the Bureau of Mines, has resigned to enter private employment. Mr. McCaa, who is recognized as one of the foremost research men specializing on oxygen breathing apparatus, developed the half-hour type breathing apparatus for the Navy.

Following its custom of rotating its chairmanship among the Commissioners each year, Commissioner Huston Thompson on Dec. 1 became chairman of the Federal Trade Commission, to serve one year, succeeding Victor Murdock, who has been chairman for the past year.

CANADA

Roy M. Wolvin, president of the British Empire Steel Corporation, has announced the adoption of a pension system for retired employees. It is applicable to all male employees both of the steel and coal departments who have served twenty-five years and have reached the age of sixty-five, and to females who have served the same term and reached the age of fifty-five years, and to any employee who has been fifteen years in the service and in the course of his employment has become permanently incapacitated for further work.

Sir Henry Thornton, head of the Canadian National Railways, stated in Toronto recently that no more cut rates would be offered by the road on Alberta coal for Ontario. The last word has been said in regard to the matter, he said.

A report issued by the Dominion Bureau of Statistics on the coal industry in 1921 states that on Dec. 31 of that year there were 402 coal mines in Canada having an area of 713,434 acres, and 1,433,331 sq. ft. of underground workings. There were 168 stock companies operating 221 mines. The total par value of issued securities was \$138,986,473, of which \$86,727,930 was held in Canada, \$25,879,964 in the United States, \$18,721,941 in Great Britain and \$7,656,638 elsewhere. Capital employed in coal mines at Dec. 15, 1922, was placed at \$140,466,108.

William Sloan, minister of mines, has given notice of two bills that he purposes introducing at the meeting of the Provincial Legislature, now in session. The first is an amendment to the Mines Act, imposing greater penalties for infractions of the act. Thus, for example, the penalty for carrying matches and smoking materials underground will be increased from \$10 to \$100. The other bill, the imposition of a tax of 1c. per gallon on fuel oil entering British Columbia from foreign countries, is meeting with a storm of opposition by oil-burning industries. The tax is being imposed with a view to protecting the coal-mining industry of Vancouver Island against the competition of California and Mexican fuel oil.

Under the provisions of "An act to regulate the sale of coal" the Lieutenant Governor of the Province of Alberta has ordered that every operator in Alberta shall have a registered name for his coal, all coal shipped and sold by the operator shall be under such registered name; that every invoice and shipping bill and a card which shall be displayed on the car door shall state the name of the mine, district whence it is shipped, name and size of the coal and the date of shipping and destination. The regulations also provide that every dealer, wholesale and retail, selling coal produced in Alberta must keep a record of the coal purchased and sold from each mine; that all coal must be sold under its registered name and that an inspector at point of shipment shall have power to inspect any coal for the purpose of ascertaining whether the coal conforms with the bill of lading. Any operator, broker or dealer who violates the law, if found guilty, is liable to a fine not exceeding \$1,000 for each offense or imprisonment for a period not exceeding six months, or both.

The gist of a resolution recently passed by the local union of the United Mine Workers at Phalen provides that the provisional officers of District 26 serve notice on the operators of District 26 immediately to terminate the present contract when it expires on Jan. 15, that no new contract be signed which carries less than a 40 per cent increase in wages to contract workers and \$2 a day increase for datal men; that the conditions pertaining at the different collieries be written in the contract, and that the contract cover the same period as the contract covering the bituminous fields in the United States.

The coal production of the mines of British Columbia during October, 1923, totals 228,293 tons, an increase over the month of September production of 46,659 tons. Of the total production for the month, the mines on Vancouver Island produced 143,020 tons, approximately 63 per cent, and 21,140 tons over the production of last month. The Nicola-Princeton mines produced 22,232 tons, which is an increase of 3,254 tons over last month's production and approximately 10 per cent of the total production. The mines in the Crow's Nest Pass district produced 63,041 tons during October, an increase of 22,265 tons over last month and approximately 27 per cent of the total production. All the mines in the province showed an increase over last month's production.

New Equipment

New Line of Small Vertical Vacuum Pumps

A new line of small vertical belt-driven vacuum pumps known as Type Fifteen, announced by the Ingersoll-Rand Company, 11 Broadway, New York, is expected to be of interest to those who require high-grade standard reciprocating dry vacuum pumps of small capacities. The wide range of sizes and the different methods of drive offer a vacuum pump to suit any need where a high vacuum is necessary. Type Fifteen vacuum pumps will pull and maintain vacuums between 28.6 in. and 29.25 in., depending on their size. In addition to the standard belt design (Fig. 1) each size is built as a self-contained electric motor outfit, using the short belt-drive arrangement or driven through pinion and internal gear. The vacuum pump and electric motor of both the short-belt and gear-driven units are mounted on a metal sub-base, so that they are not dependent on the foundation for correct alignment.

The "Constant-Level" system of lubrication used on these pumps maintains a constant-level of oil, which insures the right amount being distributed to all parts. As in the ordinary splash

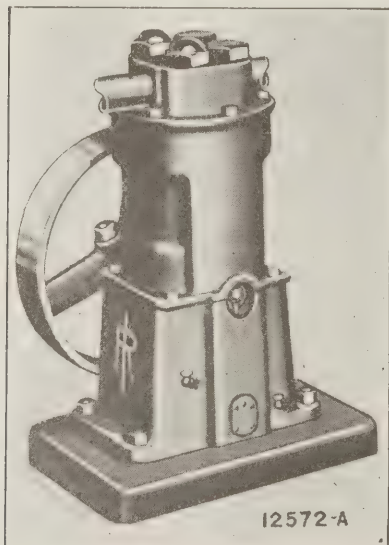


FIG. 1—BELT-DRIVEN VACUUM PUMP

These pumps are made in six different sizes—the 4x2 in.; 5x3 in.; 6x4 in.; and 8x5 in. single-acting pumps; the 10x5 in. and 12x6 in. double-acting pumps.

system, the bottom of the pump base forms an oil reservoir of sufficient capacity for the "Constant-Level" system. The amount of oil in this reservoir is determined by high and low level petcocks. Above the reservoir and directly underneath the connecting rod is a constant-level pan, as shown in Fig. 2, into which the connecting rod dips and distributes just a sufficient quantity of oil for proper lubrication. The constant-level pan is replenished

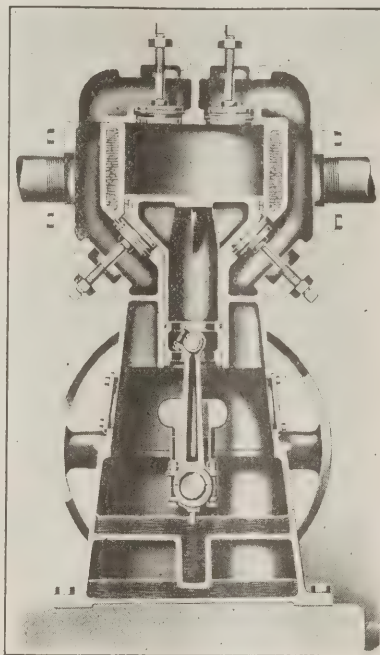


FIG. 2—SECTIONAL VIEW OF NEW VACUUM PUMP

A "constant-level" pan insures proper lubrication at all times, thus preventing scored cylinders and burned-out bearings.

with oil from the supply in the crankcase by a valveless oil pump operated by an eccentric on the main shaft. Regardless of the amount of oil in the reservoir so long as it is somewhere between the high and low level petcocks, this system will function perfectly. The lubrication of small vertical vacuum pumps employing the enclosed crankcase and splash system has often been a source of great concern. The tendency of oil systems has been to feed either too much oil, which will be carried out with the air, or too little, causing scored cylinders, overloads and burned-out bearings.

There are four sizes of single-acting pumps and two sizes of double-acting pumps. The single-acting pumps are

air cooled by means of an annular ring which encircles the cylinder, while the double-acting pumps are cooled by means of circulating water.

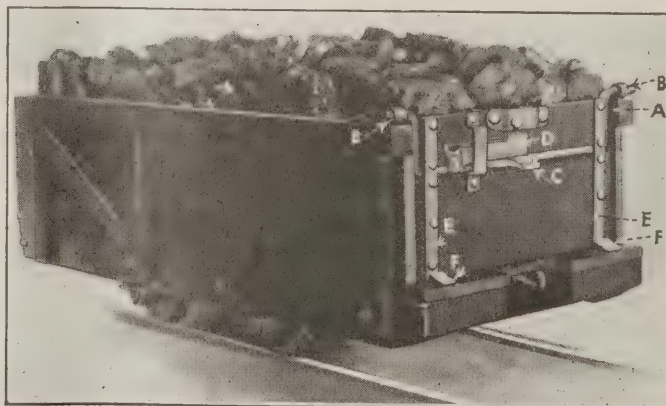
Car Door with an Ample Discharge Opening

When a car door is arranged to swing about a straight round bar joining the ends of the two sides of the car—is in short a simple pivoted, and not a lifting, endgate—the coal piled above the car body cannot get through the opening. Large lumps tend to stick and have to be barred loose, and the other lumps roll over the gate instead of sliding off the bottom, causing unnecessary breakage. Occasionally also coal spills over the side of the chute.

An endgate pivoted on the end of the car, which nevertheless gives an adequate opening for the passage of coal, is installed at the mines of the Legitt's Creek Anthracite Co., Scranton, Pa. It is made and has been patented by the Tubach Mine Car Door Co., of Dushore, Pa.

The pivot bar *A* is not straight. As may be seen in the illustration, it bends down in a U of rectangular form between the two hinges *B. B.* When the door opens the U swings up till upside down, raising the gate clear of the top of the car about 12 in., thus giving an opening through which all the coal can pass without barring.

Nothing remains but to describe the way in which the door is kept closed and is opened. When closed the straps, *E*, which extend below the door, catch in the stops *F*, and these keep the door tight until the handle of the latch or right-angled arm *D* is lifted. That clears the bearing plate at its angled turn, releasing the arm *C*, which forms part of the pivoting bar *A*. This enables the arm *C* to turn and so makes it possible for the whole bar to revolve on the hinges *B*. That being so the bar can rise and the door with it. The door is thus freed from the catches and is swung open and upward by the pressure of the coal. All therefore that is needed is to lift the latch *D* by the handle and tip the car over at the dump. The door then opens itself, and the coal is discharged without barring.



DOOR WHICH BOTH SWINGS AND IS LIFTED

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, DECEMBER 13, 1923

Number 24

The President on Coal

PRESIDENT COOLIDGE did much with coal in four short paragraphs in his first message to Congress. He took a strong position in favor of private management and against government ownership or operation. But private owners, he points out, must recognize the paramount public interest in their business and conduct themselves accordingly. He puts it up to the industry to correct its abuses. He urges as of exceeding importance legislation giving the chief executive wide power over coal in times of national emergency. He strikes a popular chord when he says the cost of coal is "unbearably high," but unless he was saying that wages behind that cost are too high, he was not thinking of bituminous coal. We can see nothing in his message to indicate that the administration sees coal as a subject of major political importance. Congress, and certainly Pinchot, so see it, but the urge, it seems, will not come from the White House.

Without giving a blanket endorsement to the recommendations of the Coal Commission, the President singles out several on which to put his stamp of approval. He leaves to Congress the details with no citation of urgency on any save that of giving the President emergency power. His last words deserve special note: "Those who undertake the responsibility of management or employment in this industry do so with the full knowledge that the public interest is paramount, and that to fail through any motive of selfishness in its service is such a betrayal of duty as warrants uncompromising action by the government."

The Inarticulate Public

MEETINGS convened to discuss coal take on some of the attributes of the attractions at county fairs. The same bunch of side shows, the same merry-go-rounds, the same games of chance move from fair to fair. At the coal meetings the erstwhile Coal Commission, the Geological Survey, the Department of Commerce, and the Federal Trade Commission always are represented. Among the observers at each meeting will be found familiar faces of representatives of the Bituminous Operators' Special Committee, of the trade press, of the anthracite operators and of the United Mine Workers of America.

While this situation brings out joking remarks on the part of those who attend many of these gatherings, they are not losing sight of the fact that these assemblages are significant of the activities in connection with the building up of a public opinion in respect to coal. There are many evidences that the public is becoming better acquainted with that commodity. Debating societies throughout the country are finding coal a fertile field for such discussion. Some student in

each university in the country has chosen coal as the subject of his doctor of philosophy thesis. The newspapers are showing an increased understanding of the fundamentals in the industry. Three years ago it was necessary to put "overdevelopment" in quotation marks and explain what was meant. Today the man in the street is acquainted with a large amount of detail as to the conduct of the coal industry. Progress is slow but it is moving, unquestionably, in the direction of an informed public opinion.

Officials around the Interstate Commerce Commission, for instance, are inclined to attach significance to the fact that the public is not interested greatly in coal because few witnesses appeared at the hearings at which the reasonableness of anthracite freight rates were being considered. They are overlooking the fact that the individual is not prepared to make the financial sacrifice necessary to prepare an argument and present it at such a hearing. If he did go the railroad lawyers would entangle him. The individual consumer of coal is very much concerned in the treatment he is receiving from the industry. These individuals are not organized and have difficulty in obtaining even local or neighborhood co-operation. Nevertheless in the aggregate they constitute a force capable of shackling any industry. The hope of the industry lies in the acquainting of those consumers with an accurate knowledge of the business so that they may not support unsound policies purported to be in their behalf.

Earnings

IT HAS long been the theory that wage rates as between anthracite and bituminous coal should be so pegged that the longer working year of the hard-coal worker would give the same annual earning power as the shorter year in soft coal. That is, anthracite rates have for years been lower than in the union bituminous-coal region. It is now possible to obtain a reliable check on how this theory has worked out, for with the interpretation of the Coal Commission's earnings studies, as published in this issue, we have comparable figures of annual earnings for the major classifications of coal-mine workers.

Contract miners in the anthracite mines in 1921—a normal year—averaged 250 days' work and earned \$1,922 on the average. In the soft-coal regions in 1921—a year of little work—the union tonnage men, including machine men, loaders and pick miners, averaged 134 days and \$1,034, compared with 151 days and \$1,051 at the non-union mines. Even in 1920—a year of high production—the soft-coal tonnage men, who worked an average of 220 days and earned between \$1,750 and \$1,800 on the average, fell behind the hard-coal contract miners. Governor Pinchot last September gave the anthracite tonnage men an increase of 10 per

cent over these figures, thus bringing their average to nearly \$2,200 per year, some \$400 per year above the general average for the soft-coal tonnage men in a good year. With this increase the *average* contract miner in the anthracite region has a higher earning by some \$200 than the *full-time* tonnage worker in soft coal. Before the recent 10-per cent advance the average daily earning of the anthracite contract men was approximately the same as that of tonnage workers in the bituminous-coal mines.

It is on this accounting that the union will base whatever demands it may make next spring for an increase in wages for the soft-coal miners. It is this advantage possessed by the anthracite tonnage men before Pinchot interjected his 10-per cent increase that gives significance to the gratuitous boost of last September. The soft-coal tonnage workers are still further behind. What is more natural than that they will want to overtake the worker in the anthracite region?

Looking at the day worker, we find the opposite picture. Here the earnings of the hard-coal inside man are from \$1.75 to \$2.25 per day less than in the bituminous-coal regions. The hard-coal day worker in anthracite averaged \$1,480 in 1921, against \$1,293 in the union and \$1,125 in the non-union soft-coal mines, but compared with \$1,600 in 1920, a year of better working time. Full-time workers paid by the day inside the soft-coal mines earned \$1,850 in 1920 and between \$1,510 and \$1,600 in 1921. Likewise the outside day men around the bituminous-coal mines, with earnings of from \$1,700 to \$1,875 in 1920, are better off than the same class of workers at the anthracite mines, who with the 10-per cent increase will average about \$1,450.

It were much better that the coal industry correct such irregularities in rates as may have brought about these variations in earning power by peaceful discussion, by that process which the United Mine Workers hug so closely, in name at least, collective bargaining, than that they resort to the strike.

The mine workers alone are organized to give constructive direction to the correction of existing scales. Is the problem too large even for them?

More or Less Domestic Coke

ANTHRACITE finds one of its chief competitors in various kinds of coke—gas or byproduct coke—and may later find it in coke prepared by the low-temperature distillation process. Judging by what has been written and by what some have feared, the anthracite industry has before it some extremely formidable competition, and that without at all belittling the effect of coke on the volume of present-day sales of anthracite.

However, a significant, if somewhat feeble, department of the American Gas Association is the "Complete Gasification of Coal" Section. At the convention of the association in 1921 President Monroe said: "Some of you gentlemen are going to be able to give us a gas from raw coal of 420 B.t.u., and we are going to have no byproducts to handle or sell; nothing but ashes to take away. When you give that to us (and you are going to give it to us within the next five years) the problem of the owner of a gas property will be much simpler than it is today, for now when he makes coal gas he is left with an enormous quantity of coke as

residue, which puts him into a business which takes a far larger annual turnover than his mere gas production."

Unfortunately, according to L. P. Willien, even using oxygen 90 per cent pure he cannot make a gas by complete gasification of his coal that will meet the requirements of the consumer, and such gas would need enrichment with oil. However, the proposition is brought measurably near by the use of oxygen instead of air, and the process of making oxygen is now so cheap that the use of an inferior oxygen looks not entirely impossible. Nevertheless to bring the gas thus made to 500 or 550 B.t.u. would require 2 to 2.75 gallons of gas oil per thousand cubic feet.

Apparently the prospect of making a commercial product with the aid of a little oil or with a somewhat lower standard of thermal value in gas is not so far distant as to make it unworthy of consideration. The coal probably would be first carbonized, then gasified by combustion in the presence of steam and oxygen. Either oil gas will be added or else the coal gas will be sold without enrichment.

In any event only ashes will remain and the position of anthracite will be improved by the removal of coke from the domestic field. To show how oil gas is improved by the use of oxygen of the purity mentioned, gas prepared by the use of air and the Dayton process had 60 per cent of nitrogen and a thermal value of 500 B.t.u. per thousand cubic feet, whereas when prepared by the same process with oxygen 90 per cent pure the nitrogen fell to 4 per cent and the thermal value rose to 1,210 B.t.u.

AS A RESULT of government operation the coal production of Russia has fallen to 72 tons per man per year. To get the tonnage of 1918 with such inefficient operation the United States would need 9,400,000 men. If all the coal-mine workers in the United States were to combine their efforts to getting out anthracite and were to be no better skilled at doing so than the Russian employees of the coal mines we would get less than 50 per cent of a normal year's production of anthracite—no bituminous coal whatsoever. The Russian workmen under their benign government produce one ton of coal every four days. If the United States mines were run like those in Russia and had a production of coal equal to that reached in this country in 1910 it would be necessary for one man in four to be engaged in producing coal. All this is based on information afforded by the Soviet Government.

"BROTHER CHARLEY" BRYAN, Governor of Nebraska, now modestly offers himself for the Presidency, with "soft coal 25 per cent cheaper at the mines" as one of his planks. If he could run a mine so as to do that, five thousand bituminous-coal operators out of a total of five thousand, looking back over the past six months, would like to hire "Brother Charley" to operate their business for them. Possibly he has in mind inviting the country's householders to go down and pick loose their winter's supply. It is fortunate that political gas isn't blackdamp.

EVEN THOUGH HENRY AND EDESEL have gone into coal mining, National Coal Association statistics show there are fewer Fords in coal camps than ever before.



*Loaded Cars Approaching Dumphouse**

Biggest Problem at Lynch Is Haulage of Coal; How Its Large Output Moves to the Tipple

Haulage as Well as Extraction Needs Considered in Planning Layout of Producing Sections of Mine—Standardizing Output Units—Mules and Ponies Used—Grades Too Steep for Battery and Reel Locomotives

THE importance of the Lynch system of haulage is such as to warrant its having first place in any description of that operation. Main headings—by that is meant headings from which the mine areas and their headings are laid off—are being extended not necessarily to pierce the center of the property or to run parallel to either of its gravimetric axes but rather so as to facilitate haulage and to equalize production over the life of the mine, the property being subdivided in a manner that will provide mine areas giving approximately equal tonnage. For this reason we do not find in the Lynch mines on each side one main heading over which all coal comes but rather main headings off main headings, and from these are driven the customary haulageways and room sections which tap the mine areas.

Principal headings are driven as straight as an arrow. In a distance as much as two miles the center line of these principal headings converge or diverge no more than a fraction of an inch. Because of this accuracy in giving sights for projections, a transit set in the mouth of No. 30 mine would cut every spad in a single sight were it not for the varying gradients and the inability of the eye to penetrate that distance.

In the principal haulage roads top is brushed and bottom is lifted to produce a gradient usually of no more than $1\frac{1}{2}$ per cent in favor of the loads. Room headings are graded from haulageway to haulageway successively, as is to be expected, because the coal which

lies between consecutive haulageways is mined out in about two years and the locomotive cannot pick up a full trip from the necks of the rooms lying in the intervening distance.

To simplify matters, I have chosen to describe only the system of haulage in No. 30 mine, which corresponds with that employed in No. 31 mine. By referring to the map of the mine on page 999 it will be seen that the greatest development is in two areas off No. 1 haulage right, which roadway has been driven to its western extremity. Most of the coal to the north or right of this heading has been mined.

No. 7 flat left, which is the barrier heading for the double mine area shown, is one of the main haulage arteries. No. 7 flat left and No. 1 haulage right each is provided with an empty and a loaded track. The development along the main heading is not as great as it is along No. 1 haulage right and consequently one track in it serves for both loads and empties.

The Lynch system of haulage owes its success to a minimizing of interference between trips of loads and of empties. This is obtained not entirely by resorting to individual tracks for travel in opposing directions but by routing and scheduling all trips so that they will be where the others are not, so far as is possible. Further refinement in haulage is obtained by the observance of rules laid down by the management. Thus at crossovers a loaded trip has the right-of-way. Trips on down gradient are given the same preference by trips traveling on the level or on an upgrade. All this applies to main haulage roads.

Wherever possible haulage is directed in loops. The best illustration of this is the route of trips traveling

*Headpiece shows loaded trip coming from No. 30 mine. The mine cars filled with coal go through the rotary dumps and are discharged. They then run to a track and are made up into a trip by a mechanical trip maker and dropped by gravity to the storage track beyond.



Standard and Trial Car

The standard car is the one to the right. As an experiment the shorter, higher car on the left was built at Lynch, the journals being provided with vertical springs to make the car less rigid when passing over low places in the track. The standard car, however, gave better service.

Empties to the rooms driven to the right of No. 7 flat left are delivered through the first room heading on that side directly from No. 1 haulage right. But loads coming from this side are directed toward and over No. 7 flat left. After this room heading is closed by the encroachment of the robbed area upon the barrier section, empties will travel over the route taken by the loads. Then switches will be laid to connect the empty track of No. 7 flat left with haulageways right. These switches are shown in place but in reality they have not yet been laid, as the loop now used makes them unnecessary.

Trips are handled in somewhat the same manner in typical single mine areas as in the double mine area just described. Single mine areas are shown by *ABCD* and *AFED* in the mine plan. In these mine areas rooms are located on one side only, so that two tracks in the main headings of these areas are not needed, at least for the present. Loads and empties travel over one track throughout these mine areas.

ONE TRACK WILL SERVE FOR 1,000 TONS DAILY

A production of about 1,000 tons per day from one mine area can be handled over one track in the main heading of that mine area. For a much greater tonnage in a mine area, as in the double-mine area, individual tracks for loads and empties become necessary. Also two tracks will be requisite in the main heading

of a mine area producing 1,000 tons of coal per day when the live workings of that mine section move so far in by as to require the services of more locomotives. This must be recognized, for the mine areas are to be worked to the boundaries for distances of three miles or more.

A single-mine area, which is the one commonly used in the Lynch mines, is preferable to the double-mine area for the reason that it can be ventilated with only one overcast. Where the air splits to the right and left, as it inevitably must in the double area, in accordance with the system of ventilation at Lynch, an overcast is required at every haulageway that crosses the return airways. The general paths of ventilation are such that the air is forced to the advanced workings first and is then made to sweep the goaf line outby.

For gathering loads and distributing empties in room headings and for tramping to and from the tippie twenty-five 13-ton trolley locomotives are provided. During the month of May, 1923, the average daily output for each was 250 tons. The production per day has not yet reached the combined capacity of these locomotives.

Seeing that haulage roads cannot be graded everywhere to favor the loads owing to the rolls in the floor of the Lynch mines, the average daily output during the month of May per locomotive is substantial enough. Especially is this true because these locomotives must

Loading Mine Car in Heading

The top of the car 22 in. above the rail. The body is built so that the bottom is below the axles, the wheels being covered by steel plates. The reader will note the prop always in position in the center of the roadway and the three electric lights on the side of the road.





TRACK LEADING TO DUMPHOUSE, NO. 31 MINE

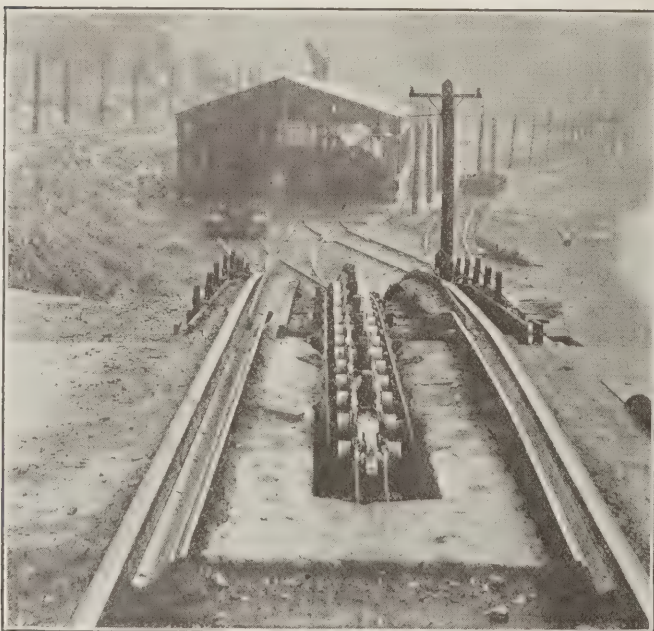
Rotary dump can be seen opposite each track. Roads are periodically cleaned and fishplates tightened.

gather from in front of the room necks and also tram the loads to the tipple.

In a time study the average time of all locomotives in seven mine areas for making a round trip was determined as 81 minutes. When hauling trips of 20 mine cars an average of at least six round trips can be made by each locomotive, allowing ample time for delays.

DO NOT PERMIT LOCOMOTIVE TO BE OVERLOADED

As a general rule no single trip is allowed to have more than 25 mine cars. For long hauls as many as 30 mine cars sometimes are permitted. The company has learned that on short hauls more coal can be pulled by a given number of locomotives when the trips are small and made frequently than can be hauled in trips of maximum size which are continually stalling. Fewer mine cars are needed, for fewer are in transit than is



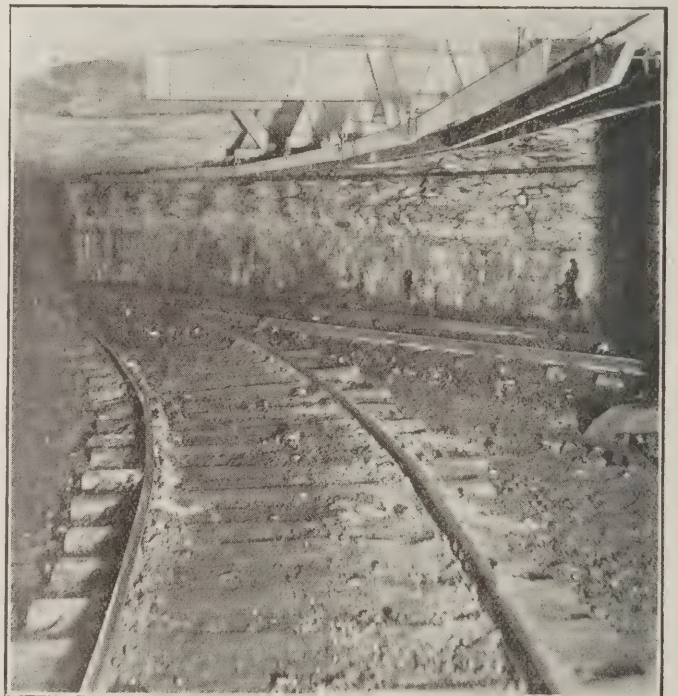
TRIP MAKER AND TRACKS, EMPTY SIDE, NO. 31 DUMP

In addition to the moving dogs on the chain in the middle of the track, dogs on fixed pivots are placed in either side of the roadway, making it impossible for a mine car to break away and run into a car coming from the dump.

the case where large trips are in use, and of course, locomotives need fewer repairs under such circumstances.

A novel system of rating is used at Lynch for stimulating the interest of motormen in the care of their locomotives. Each month on a day chosen at random the chief electrician inspects each motor and gives a percentage rating on its condition. If the rating of any one motorman falls below the average he is censured. Repeated failures are just causes for dismissal. Semi-annually cash prizes are awarded for the best record. This practice creates greater interest in the care of locomotives. Rivalry to excel, however, is a greater incentive than is the cash prize.

Locomotives are inspected and lubricated every night. Motormen are instructed to use an air line for cleaning out motors and other moving parts. For this purpose such a line is located on the empty track on the far end of each trip maker on the empty side of the dump-houses. Locomotive bumpers are cleaned by air three



TROLLEY WIRE AT A TURNOUT FROM MAIN HEADING

The supports are so accurately located that the wire is practically parallel with the curve of the track. The hangers are held by long drift pins which never come loose unless the roof falls.

times each day in order that a sure footing may be provided for brakemen.

Conditions do not favor the use of storage-battery or reel locomotives in these mines, for the rolling bottom prevents them from being used with efficiency. This fact has been confirmed by giving two battery locomotives and one reel locomotive a fair trial. On Feb. 12, 1923, the output of the three locomotives combined was 482 tons. Seven drivers working under average conditions in the mines could produce 500 tons in one day.

The average output per driver for the three sections worked by these gathering locomotives is 76.5 tons per day. Just 6.3 drivers under identical conditions could gather as much coal as the three locomotives. The reel locomotive has given better service than the two battery locomotives. This would indicate that in a non-gaseous

mine a reel locomotive is better suited for gathering than a battery locomotive.

In the Lynch system of haulage no sidetracks are necessary. Mine cars are pulled from the face of rooms onto the room heading by mules, ponies or room hoists. Neither animals nor room hoists pull the mine cars beyond the point in the heading adjacent to the room neck. The utility tram and gathering locomotives gather the mine cars which stand on the entry near the room neck and haul them to the tippie. Consequently the trolley is extended as the heading advances, and power is thus brought to the faces of headings.

Ponies are utilized in places too low for mules. To take care of 64 working places, which is the average number for a single mine section of two room sections, about 12 mule drivers must be employed. Single mules are used for gathering in a few of the places but generally two or three are required, for the rooms are likely to have dips as steep as 6 per cent. The average number of mules handled by each driver in the mines is 2½. The drivers handle an average of 72 tons per shift, both mines being considered in establishing that figure. Where the grades are greater than 6 per cent room hoists are used instead of animals.

In the Lynch mines 75 room hoists are in use, 57 of which are driven by 7½-hp. motors, 18 being equipped with motors of 3 hp. Experience at Lynch proves that for grades from 6 to 20 per cent or more the standardization of hoists to one size, driven by the larger motor, is advisable. A ⅞-in. 6-strand 19-wire rope of plough steel with a length of 500 ft. is used on each hoist. Its average life is 60 days.

TRACK THROUGHOUT IS HEAVY AND WELL LAID

Tracks in principal headings, including barrier headings, are laid with 60-lb. steel and all curves have a 300-ft. radius. Tracks in room headings and cross-haulageways are laid with 40-lb. steel, the curves being struck on radii of 150 and 200 ft. respectively. Room track is of 20-lb. steel. The combined length of the tracks laid with 60 and 40-lb. steel is 37.92 miles. On all haulage wooden ties are used set on 2-ft. centers. In the rooms the ties are of steel and are spaced 3 ft. apart.

The time spent in elevating track on curves is time wasted wherever the speed is no greater than 15 miles per hour. This is the common belief of railroad engineers and of the United States Coal & Coke Co. The elevation is not needed if the track is otherwise correctly laid.

Promiscuous placing of timbers on haulage roads is not tolerated under any circumstances. The general superintendent of the company is consulted regarding cases in which set rules do not apply or, where action must be taken under short notice, the chief mine inspector directs the work. Timbers are never placed where there is any danger of their being knocked loose by derailed rolling stock.

Brake shoes of cast steel have preference over those of wood. They are more effective, are replaced with less labor and have a longer life. Under the severe service in the Lynch mines their life is 8.75 months as against 12 to 14 months in the mines at Gary, W. Va. A man without any assistance can replace a brake shoe of cast steel in 30 minutes.

The Lynch system will give to those who use it a measurable degree of regularity in mining each section

of the mine. The operation will embrace as many sections as are needed to produce a given tonnage. Each is a mine within a mine. To all is allocated a specific daily tonnage (1,000 tons at Lynch) and this is to be maintained until the sections are mined out whether the working places be a half mile or five miles from the tippie. The ventilation that is provided and the haulage roads that are built will last the life of each mine area. Rooms follow close behind the advancement of headings. Stretches of room headings are advanced quickly and as quickly worked out.

As the live workings move further and further away from the tippie, the method of mining does not change, and the same number of working places move away from the tippie, the length of haul becomes greater. Consequently more mine locomotives and haulage attendants are needed. Nevertheless the system of haulage is in no wise changed. Empties are brought to the rooms in the same manner as at the commencement of the mine area. One haulage road carries all the coal coming from the mine area it serves.

Production of Coke in September Declined 248,000 Tons

Production of coke in byproduct ovens continued to decline slowly during September. The total output for the month, was 3,112,000 net tons. The daily output was 103,729 tons, as against 104,402 in August, a decrease of 0.7 per cent. Of the 70 plants, 65 were in operation and 5 were idle. The coke produced was 85.8 per cent of the present capacity of all the plants. Production from beehive ovens also declined. The month's output of beehive coke is estimated at 1,373,000 tons, as against 1,494,000 tons in August. The total output from both types of ovens declined from 4,733,000 to 4,485,000 tons.

The decreased activity in coke manufacture reflected in part a decline in the output of pig iron and steel, in part the settlement of the anthracite strike. These statistics of byproduct coke production are based upon reports to the Geological Survey from all operators of byproduct ovens, including merchant plants and plants engaged primarily in supplying gas for municipalities.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES (a)

(In Net Tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average.....	1,870,000	2,764,000	4,634,000
1918 Monthly average.....	2,166,000	2,540,000	4,706,000
1919 Monthly average.....	2,095,000	1,638,000	3,733,000
1920 Monthly average.....	2,565,000	1,748,000	4,313,000
1921 Monthly average.....	1,646,000	462,000	2,108,000
1922 Monthly average.....	2,374,000	669,000	3,043,000
July, 1923	3,267,000	1,582,000	4,849,000
August, 1923	3,239,000	1,494,000	4,733,000
September, 1923	3,112,000	1,373,000	4,485,000

(a) Excludes screenings and breeze.

To manufacture the coke produced in September required the consumption of approximately 6,637,000 tons of coal, of which 4,471,000 tons was charged in byproduct ovens and 2,166,000 in beehive ovens. The coke industry thus absorbed about 14.4 per cent of the coal produced during the month.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE (a)

(In Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average.....	2,625,000	4,354,000	6,979,000
1918 Monthly average.....	3,072,000	4,014,000	7,086,000
1919 Monthly average.....	2,988,000	2,478,000	5,466,000
1920 Monthly average.....	3,684,000	2,665,000	6,349,000
1921 Monthly average.....	2,401,000	706,000	3,107,000
1922 Monthly average.....	3,411,000	1,056,000	4,467,000
July, 1923	4,694,000	2,495,000	7,189,000
August, 1923	4,654,000	2,356,000	7,010,000
September, 1923	4,471,000	2,166,000	6,637,000

(a) Assuming a yield of merchantable coke of 69.6 per cent of the coal charged in byproduct ovens, and 63.4 per cent in beehive ovens.

WHAT do coal miners earn? This has been, second to none, a controverted point in every flare-up of labor trouble and in every discussion of the coal industry. The rate per ton for digging coal and the rate per hour for company men are recognized as inadequate measures of the mine worker's income, for in the soft-coal mines the irregularity of operations is notable. The year's income pays the bills.

The Coal Commission made the most elaborate study of earnings of coal-mine workers ever undertaken; a study, it is believed more detailed and comprehensive than any ever undertaken for any other industry. The Commission reports, one each for earnings of anthracite and for bituminous coal-mine workers, are a mass of figures, without interpretation. At a recent session of the American Academy of Political Science devoted to coal there

were almost as many interpretations of the Coal Commission's investigation of earnings as there were speakers. One interpretation was authoritative, because it was made by Miss Anne Bezanson, associate director of the Industrial Research Department of the Wharton School, who had charge of this work for the Coal Commission. The article that follows was prepared by her for the Academy but is first published here.

What the Coal Miner Earns

In Bituminous Coal Mines Earnings per Start Are Higher Than in Anthracite Operations—Hard-Coal Miners Have More Opportunities to Work—Labor Turnover Higher in Soft-Coal Industry

BY ANNE BEZANSON

Prefacing her paper Miss Bezanson said:

THE subject of the earnings of coal miners is a large one to cover in a short paper. There are some one hundred odd separate occupations for men engaged in and about the mine of an anthracite colliery. While the number of occupations is somewhat less in bituminous, the diversity of occupation is still very considerable. The U. S. Coal Commission found it necessary to separate forty major occupations in anthracite and twenty in bituminous mines in order to study even

the most important differences in earnings groups. This paper, therefore, can deal only with the most salient conclusions for the main occupational classes. Three things should be kept in mind in using the earnings tables prepared by the Coal Commission:

- (1) The tables as published do not show annual earnings.
- (2) The data were purposely compiled to stress any existing variations in earnings within occupations.

- (3) The scope of the study did not allow time for analysis and interpretation of data at the time of publication.

The earnings tables of the Coal Commission were prepared to show in considerable detail, the relation of earnings to time worked. The earnings for individual employees were grouped in intervals of \$100 for amount received while employed at one mine. Such a grouping was planned to bring out differences in earnings where such differences existed for the same occupation. The figures given are not, therefore, the

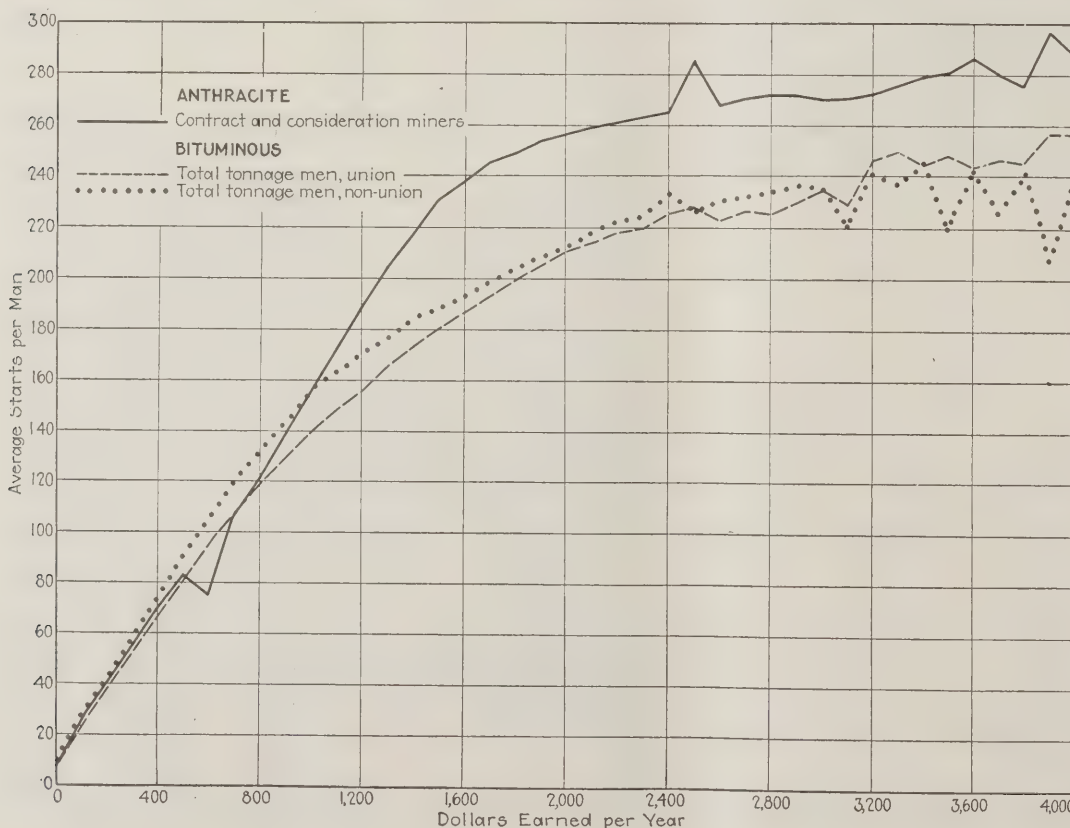


FIG. 1

Tonnage Workers

This diagram shows that tonnage men in anthracite mines work more days per year to get the same earnings as soft-coal miners. Thus in 1921 a hard-coal miner worked 270 days for \$2,800, a soft-coal miner about 230 days. Union and non-union bituminous-coal workers had approximately the same earnings.

annual earnings of any employee who shifted during the year. In attempting in this paper to give summary figures for earnings, I am obscuring the variations upon which the Coal Commission reports tend to lay most stress.

It should be remembered also that the Coal Commission were necessarily occupied with an enormous problem of collection and tabulation. In getting together the mass of data it

was more important to provide the primary facts than to get a few outstanding but over-summary conclusions. Everyone recognizes the necessity of sifting and interpreting statistical data collected in this way. However, the enormity of the task of tabulating earnings material did not leave sufficient time after the tabulation was done for detailed interpretation of all the data. The figures will, therefore, be the basis for

discussion for some time by students interested in careful study of the problems of earnings in coal.

Three facts should be borne in mind, in using the summarized data: (1) That one is obscuring important variations; (2) that the earnings figures must be interpreted in connection with the wage rate, turnover and irregularity studies of the Commission, and (3) that the figures do not give annual earnings.

EARNINGS in the coal industry can be summarized for three major occupational groups: The piece work, or tonnage, occupations in anthracite collieries comprise the contract miners and their laborers; in bituminous mines there are three important groups, *machine miners*, engaged in operating the coal undercutting machines; *pick miners*, engaged in undercutting by pick, and shooting and loading their own coal; *loaders*, engaged in shooting and loading the coal that has been undercut by the machines.

About 28 per cent of all employees in anthracite, and 16 per cent in bituminous work on the surface and will be referred to as *outside daymen*. The men engaged in haulage, maintenance of the way, and regulations of ventilation are generally paid on an hourly basis and are referred to as *inside daymen*.

Earnings of Tonnage Workers Compared.—It is well, first, to consider the relation of earnings for tonnage workers in the anthracite and bituminous industries. The accompanying diagrams facilitate comparisons. They show, for instance, the relation between time worked and earnings of contract miners in anthracite and of all tonnage workers in bituminous coal. Fig. 1 compares the time worked in a year with

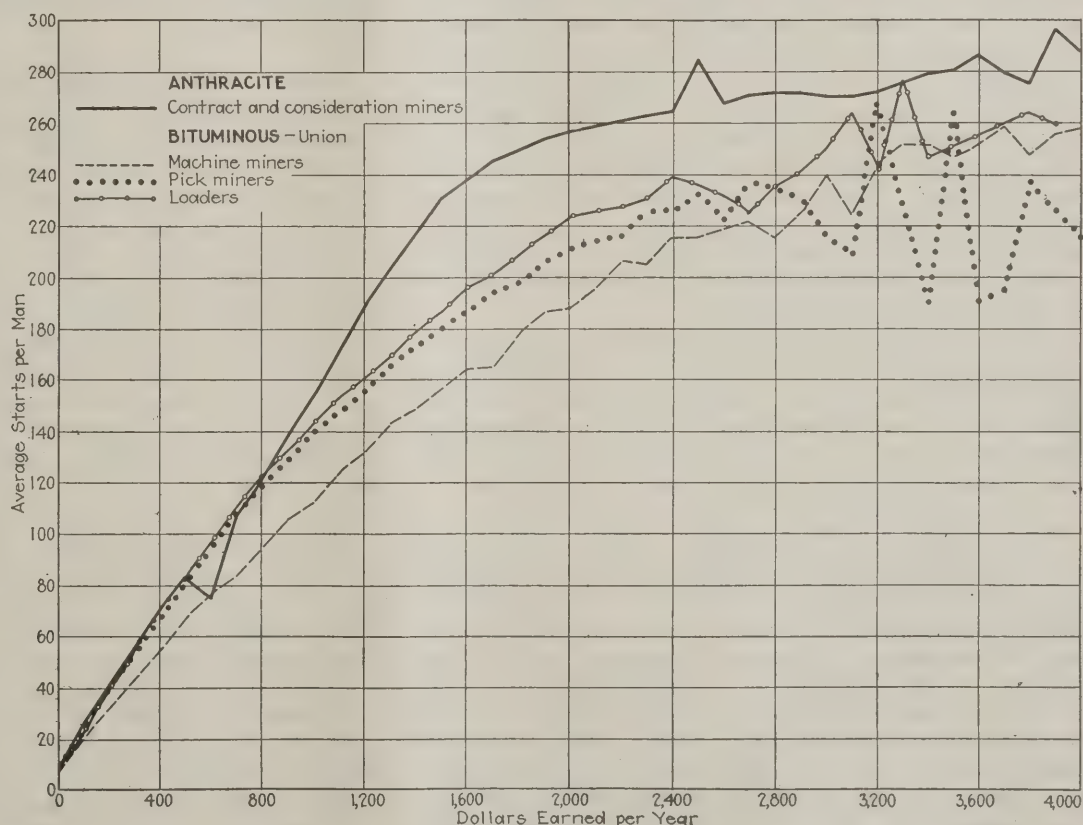
dollars earned by contract miners, non-union tonnage men and union tonnage men. The curves show striking differences in the number of days worked to make the same annual earnings. It is apparent that for earnings up to \$800 per year, the time worked by union tonnage men and anthracite contract miners is almost identical. Above \$800, tonnage men in bituminous coal fields work fewer days to make the same earnings as contract miners in anthracite, the greatest difference being found at the \$1,800 division, with a range of 50 days in working time. The similarity of days worked to earn up to \$800 is surprising when compared with the wide difference in time for higher earnings.

One would have expected the bituminous curve to be below the anthracite curve throughout. Two causes account for the discrepancy; first, the turnover is higher in the bituminous group. This means that a relatively large number of men in the bituminous industry remain only a few days on the payroll of one mine. The earnings tables indicate that men do not make normal earnings in the industry until they have been a considerable time in the employ of one mine. The weighting of the bituminous curve with this group of short service workers tends to increase the time worked and brings the curve closer to the anthracite curve. The

FIG. 2

Union

Up to about \$3,000 per year union machine men make higher earnings for the same days worked than loaders or pick miners. Loaders and pick miners earn at about the same rate. Above \$3,000 per year pick miners make the most per day worked.



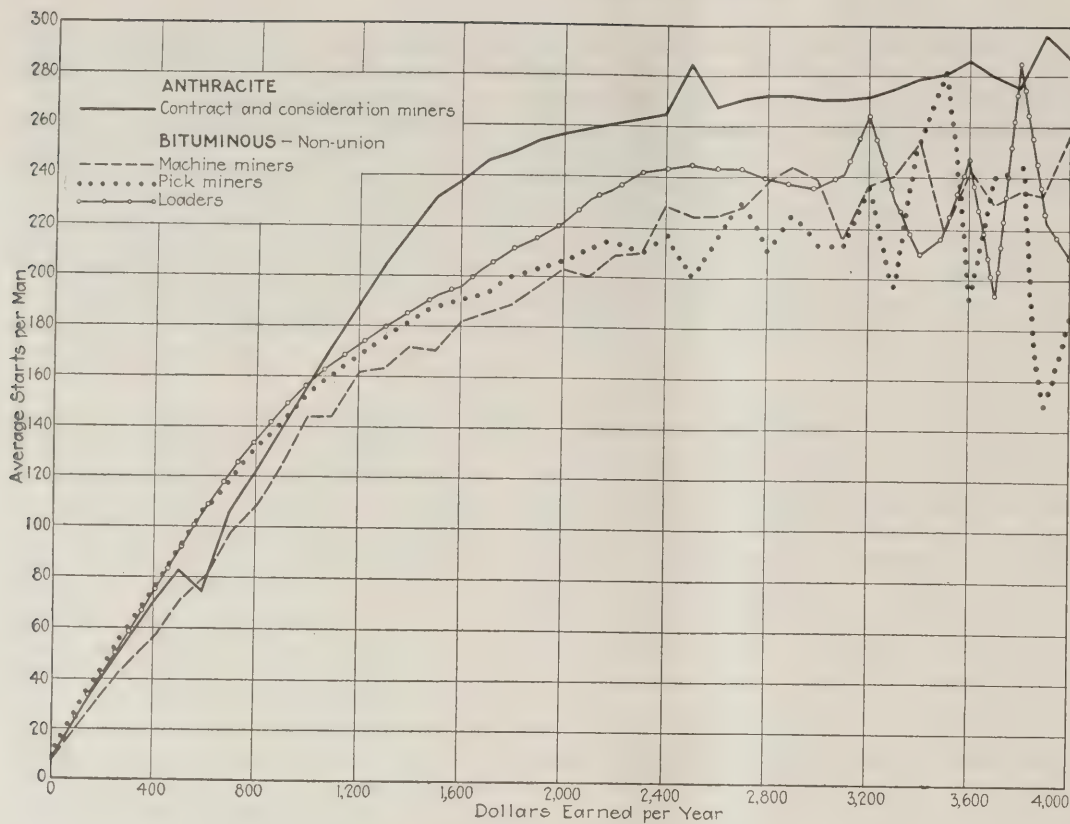


FIG. 3

Non-Union

Non-union tonnage workers earning above \$1,000 per year work fewer days than anthracite miners did in 1921. Above \$2,400 per year pick miners in the non-union fields have the higher rates of pay. Below \$1,000 there is little difference in rates of earning.

second cause is of equal importance; namely, that the average length of start is shorter, if considered throughout the year for all mines, in the bituminous coal industry than in the anthracite field.

Turning to the curve of tonnage men in the non-union field, it is apparent that to earn up to \$1,000 per year, tonnage men work more days than either anthracite or union bituminous-coal mines. Attention is directed to the earnings above \$3,000, showing non-union men working fewer days for the same dollars as the union area. Here, however, the number of men involved is inconsiderable. The important stress in this comparison should be put upon the space between the curves for days worked in anthracite and bituminous coal.

It is notable that anthracite contract miners who earned \$3,200 worked but ten days more than those earning \$2,000. This indicates a rather wide variation in the opportunity for earning among men working almost an identical number of days. The comparison also indicates clearly that earnings per start are higher in bituminous than in anthracite.

Figs. 2 and 3 show the earnings for separate tonnage occupations in the bituminous coal mines. Pick miners and loaders in the union group earn at about the same rate, while machine miners have higher daily earnings and work fewer days for the same annual total throughout than either loaders or pick miners.

Big Earnings in Anthracite.—This comparison, however, disregards the number of men involved in the industries. The only factor that has so far been considered is the number of days worked to make a given unit of earnings. When one takes into account the number of men involved, the anthracite industry makes a more favorable showing, since the opportunity for employment is greater. Figs. 4 and 5 show that the bulk of contract miners earn above \$1,000, whereas in the bituminous-coal industry more of the tonnage men have low earnings than high, and the curve slopes off

gradually, containing fewer men as the higher earnings groups are reached. The anthracite curve, on the contrary, decreases gradually in the number of men involved in each interval to \$1,000, and then begins to increase, reaching a high point at about \$1,800 to \$1,900. Even if the year 1920 is taken for the bituminous-coal industry, instead of the inactive year of 1921, the curves show the same general outline, although the numbers of men making the higher earnings are then more significant. This raises the question of the actual average earnings.

Average Yearly Earnings in 1921.—What then, is the average number of starts made by contract miners? What was the average annual earnings in 1921? How do these earnings compare with annual earnings for all tonnage men in bituminous mines? For the year 1921 the average time worked by contract miners in anthracite was about 250 days. The average earnings for that year was between \$1,900 and \$2,000—to be exact, \$1,922. The union soft-coal miners averaged about 134 days in 1921, a year of inactivity; non-union men made a somewhat better showing, with 151 days. The average earnings for tonnage men in both union and non-union groups was between \$1,000 and \$1,100—to be more exact, the figure was \$1,034 in union and \$1,051 in non-union mines.

Average Yearly Earnings in 1920.—The average days worked in 1920 were 219 for union soft-coal tonnage men and 221 for non-union tonnage men. This gives average earnings of \$1,750 to \$1,800 in the year 1920 among bituminous-coal tonnage men. It should be noted that the average starts made are about thirty less (roughly one month) than the average starts for anthracite miners in the year 1921, with a difference in earnings of \$156 in favor of the anthracite contract miners. It is understood that all these comparisons in anthracite are made for a period before the present 10

per cent increase in rates. It should be understood, also, that these are not the average earnings of full-year men but a figure which is based on all tonnage workers. The figure for earnings of full-year workers in anthracite is not available. In bituminous mines the average earnings of full-year employees is about \$400 higher than the figure for average earnings of all employees, or about \$1,425 to \$1,450 for tonnage men in 1921 and \$2,025 to \$2,075 in 1920.

Contract Miners' Laborers.—Contract miners' laborers in the anthracite industry should not be compared with any of the occupations in the bituminous-coal industry. They work for the miner, and are paid a proportion of the miner's gross earnings. This group shifts more than any other men in any part of the coal industry. Too few of these laborers remain on the payroll of any one mine throughout the year to give a figure upon which to base annual earnings. The figures as collected by the Coal Commission show earnings of miners' laborers of \$1,200 for about 200 days' work. There is no reason to think that this is the average working time of contract miners' laborers, since there is a real shortage of laborers and little time is lost in shifting from job to job. It should certainly be fair to take the average days worked by contract miners, and the average daily earnings of the laborers which is \$5.87, and arrive at a figure of income which gives \$1,468 for the year 1921. This is, however, an estimated figure, and is not arrived at by the careful calculations upon which the other figures are based.

At this point I may say that the average earnings in this paper are net earnings derived from the tables published by the Coal Commission, as are the average days worked. The figures were then checked by using the average daily earnings found by the Wage Rate Section of the Coal Commission and the number of employees involved were checked with the turnover figures. This makes three sources for verifying the

final conclusions, and it is fair to add that the computations agree very closely, there being a difference of only a few cents in the daily earnings as computed from the data from these different sources. Averaging the earnings of contract miners' laborers and contract miners gives an average earning for all tonnage workers in anthracite mines of about \$1,780 in 1921 for an average working time of 250 starts.

A further summary comparison is possible in connection with the earnings of tonnage men. When weight is given to the number of men in each \$100 interval of earnings an average earnings figure per start of \$7.75 to \$8 is obtained for anthracite contract miners and all unionized bituminous tonnage workers, there being a difference of only 4c. per day in the average earnings per start for these two groups in 1921. In the non-union field the average earnings per start is about 75c. less than in either anthracite or bituminous coal, falling between \$7 and \$7.25 per start.

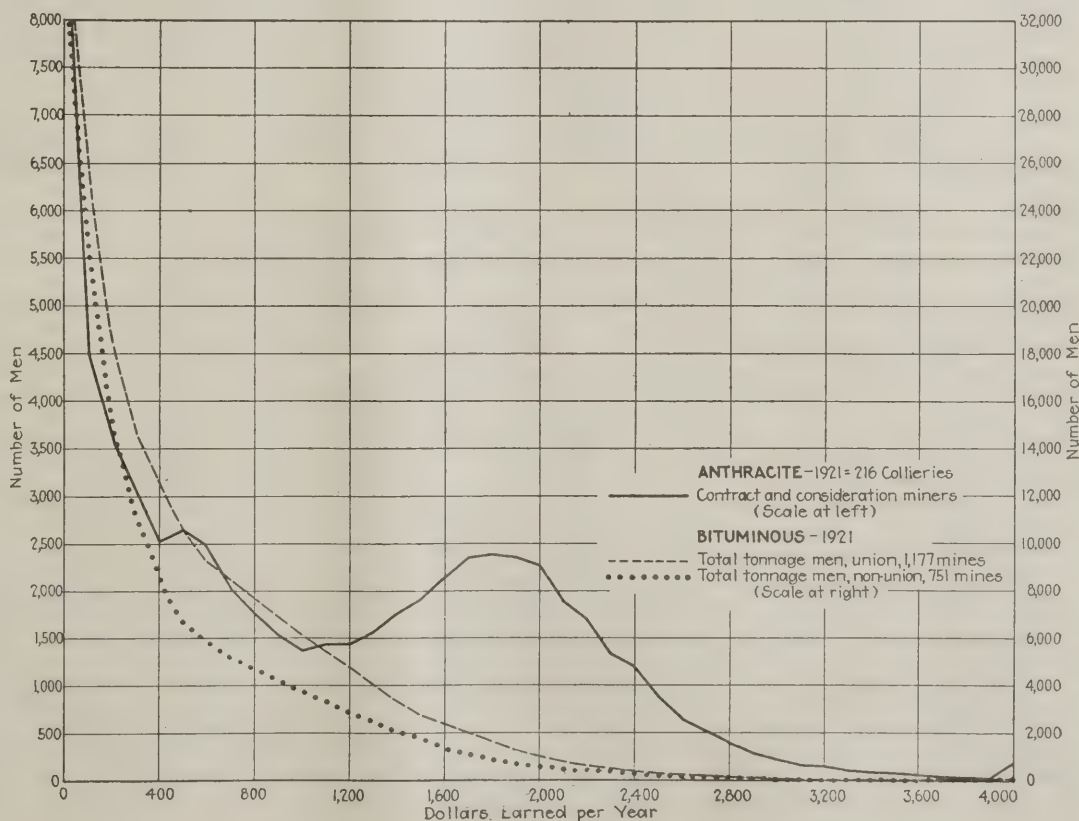
In the discussion up to this point, the earnings of the men engaged in actually mining coal have been covered. The tonnage group constitutes almost three-fifths of all employees in bituminous and slightly over two-fifths of anthracite employees. The remaining employees are divided into outside and inside day occupations. The employees paid by the hour normally work more days in a year than the tonnage workers.

Earnings of Outside Daymen.—No comparison should be made between anthracite and bituminous coal for outside day occupations, taken as a whole. The anthracite industry is equipped with elaborate facilities for preparing the coal for market. The proportion of outside employees used in washing, breaking and sizing the coal is very much greater than any group of workers outside a bituminous mine. Besides, 11 per cent of all outside day workers in anthracite are slate pickers, mainly boys. There is no comparable group of workers around a bituminous-coal mine. If one excludes boy

FIG. 4

Earnings in 1921

Comparing anthracite with bituminous coal in 1921, this diagram shows that proportionately more hard-coal tonnage men make high earnings than do soft-coal workers. The "hump" in the curve between \$1,600 and \$2,000 shows that hard-coal miners make uniformly higher money than soft-coal miners.



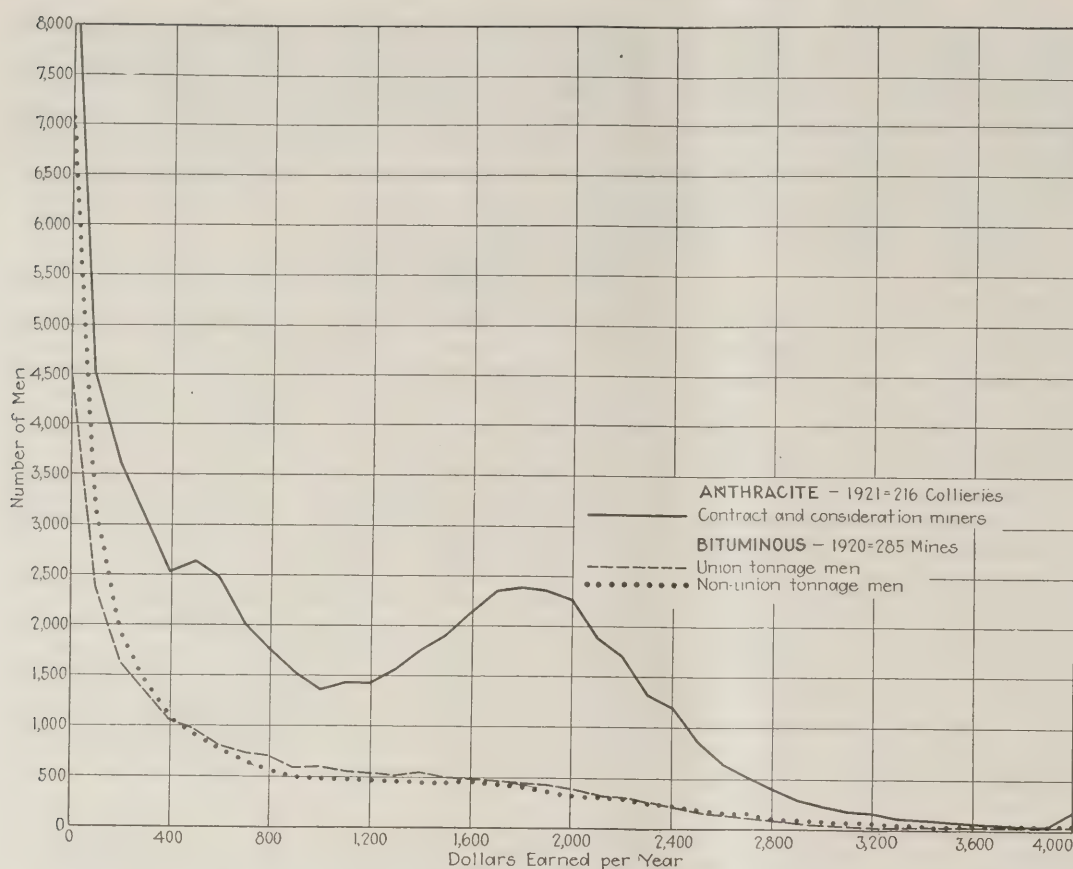


FIG. 5

1920-1921

Comparing hard-coal tonnage men in 1921 with soft-coal in 1920, this diagram shows again the high percentage of anthracite workers making the high earnings. Union and non-union bituminous-coal tonnage men range about the same.

employees, and takes all outside workers in anthracite in the year 1921, the average eight-hour days worked per man was about 293. The average earnings was about \$1,320.

In the bituminous-coal industry outside union workers averaged \$1,445 in 207 days; non-union workers averaged about \$1,200 in 218 days. The year 1920 gave more opportunity for employment of daymen. Outside workers averaged \$1,850—\$1,875 for union and \$1,700—\$1,750 for non-union workers. It will be seen that even in 1921 outside daymen made higher earnings in the bituminous coal than in the anthracite industry, and in 1920 the difference was as great as \$400 to \$500. It should be recalled that one is here comparing the year 1920 in bituminous with 1921 in anthracite. The comparison, however, is a fair one, since the year 1920 is only six days above the average operation of the bituminous-coal industry for the last twenty years and the year 1921 was an average one in anthracite. The occupations are, however, widely different.

Earnings of Inside Day Occupations.—Inside day occupations are higher paid than are those for outside employments. The union mines averaged 175 eight-hour days for inside men in 1921 with average earnings of \$1,293. The inside non-union men averaged about 189 days with average earnings of about \$1,125. Inside men in anthracite averaged about 290 eight-hour days with average earnings of \$1,480. It will thus be seen that the inside worker in anthracite made somewhat higher earnings than the inside daymen in either union or non-union bituminous-coal mines, but his working time was 100 days more than either. In 1920 the earnings of inside daymen in the bituminous-coal industry was about \$1,600.

The figures already given for daymen include all short-service men. If full-year employees alone were considered and all inside and outside day employees

grouped, the average earnings in the bituminous-coal industry would be about \$1,850 in 1920 and \$1,570 to \$1,600 in the less regular operation of 1921.

Perhaps the separate occupations can be more easily compared by the average daily earnings of a selected group of well-known occupations. The content of work covered by the same name is not necessarily identical between fields or even within fields and it will be remembered that the opportunity for employment is not the same in the two industries. Yet in so far as any comparison can be made, these are indicative of the earnings of an eight-hour day in the various fields.

Average Daily Earnings in Fifteen Day Occupations in Anthracite and Bituminous

Occupations	Anthracite	Bituminous—	
		Union	Non-union
<i>Outside</i>			
Blacksmith.....	\$5.35	\$7.57	\$6.36
Carpenter.....	5.27	7.14	5.94
Engineer.....	4.98	7.29	5.97
Fireman.....	4.76	6.95	5.41
Stableman.....	4.28	6.07	5.07
Laborer.....	4.26	6.55	4.58
Miscellaneous.....	4.38	6.74	5.37
<i>Inside</i>			
Bratticeman.....	\$5.19	\$7.42	\$5.96
Doortenders.....	3.18	4.48	4.26
Drivers.....	4.67	7.47	6.22
Pumpman.....	5.10	7.14	5.53
Timberman.....	5.89	7.52	6.26
Track layers.....	5.22	7.35	6.09
Laborers.....	4.92	7.16	5.08
Miscellaneous.....	4.96	7.41	5.99

Looked at in a broad way there was in 1921 a surprisingly balanced relation between the average earnings per start by contract miners in the anthracite industry and the tonnage workers in bituminous coal. When the whole year is considered the anthracite miner earned more by reason of more continuous operation; thus relatively about four times as many anthracite workers earned above \$1,200 as bituminous-coal tonnage workers.

The real difference in the industries is found in the earnings of daymen. Here there is a difference in daily earnings of roughly \$1.75 to \$2.25 a day in favor of the bituminous worker. Even with this difference the inside day worker earned about \$200 more in 1921 in anthracite than in bituminous coal by reason of more opportunity to work.

In the case of outside workers the annual earnings as well as the daily earnings were lower in anthracite than in bituminous coal.

In 1921 contract miners in anthracite averaged about \$1,922, making 250 starts; contract miners' laborers in the same working time would earn between \$1,465 and \$1,470. During the same year inside daymen in anthracite had about 40 eight-hour days more opportunity for employment and averaged \$1,475 to \$1,500, while outside daymen by working an average of 3 more days than inside men earned \$160 less. When boys are excluded from this outside computation the yearly earnings of outside men fall from 8 to 8½ per cent lower than those of inside daymen. Judged from the point of view of spending power the contract miners' laborers are in about the same position as the inside daymen in anthracite, owing to the opportunity of the latter for earnings when the mine is idle.

The real problem of earnings in the coal industry is due to the wide fluctuations above and below the average; variations due in part to mining conditions. For this problem attention must be given to the detailed reports published by the U. S. Coal Commission on rates and earnings.

GOVERNOR PREUS, OF MINNESOTA, has been quoted in the press as predicting that public sentiment would force Pennsylvania to bring about some effective regulation of the hard-coal business. Governor Preus believes the State of Pennsylvania should declare coal a public business, as was done with elevators in Minnesota.

Production of Bituminous Coal Producers Classified By Size of Output in 1895, in Net Tons

	Over 500,000	100,000 To 499,999	50,000 To 99,999	10,000 To 49,999	Under 10,000	Total
Alabama	4,389,486	953,474	266,360	434,411	33,725	6,077,456
Arkansas	698,196	0	0	17,000	19,200	734,396
California	0	0	0	66,603	8,850	75,453
Colorado	1,471,667	1,082,696	114,487	332,068	65,909	3,066,827
Georgia	0	260,998	0	0	0	260,998
Illinois	4,283,583	6,985,355	2,984,092	2,408,092	925,506	17,587,039
Indiana	0	1,929,523	1,368,941	556,985	86,489	3,941,938
Indian Territory	0	1,098,800	0	30,500	5,303	1,134,603
Iowa	0	1,714,736	1,009,112	937,406	275,245	3,936,499
Kansas	954,827	1,560,449	291,209	245,291	121,694	3,173,470
Kentucky	0	1,078,848	226,435	233,277	29,220	1,567,780
Maryland	2,636,291	1,059,580	67,299	20,401	5,282	3,788,853
Michigan	0	0	0	99,554	10,240	109,794
Missouri	0	582,431	501,996	458,327	194,727	1,737,481
Montana	501,627	197,200	107,700	51,798	11,250	869,575
New Mexico	0	630,692	0	69,526	7,461	707,679
North Carolina	0	0	0	19,400	1,500	20,900
North Dakota	0	0	0	20,160	15,437	35,597
Ohio	1,164,613	6,141,477	2,750,832	1,958,863	420,746	12,436,531
Oregon	0	0	58,025	11,200	4,460	73,685
Pennsylvania	18,798,118	20,230,975	5,811,705	4,288,863	250,234	49,379,895
Tennessee	0	809,199	759,525	218,388	54,225	1,841,337
Texas	0	283,932	0	182,433	11,340	477,705
Utah	0	352,165	0	58,403	15,175	425,743
Virginia	890,365	0	132,274	295,113	11,515	1,329,267
Washington	0	975,074	85,688	106,410	20,878	1,188,050
West Va.	574,351	5,523,183	3,244,606	1,825,317	71,712	11,239,169
Wyoming	1,382,393	583,480	218,450	36,870	13,588	2,234,781
Total	37,745,517	54,034,267	19,998,736	14,983,070	2,690,911	129,452,501

a From records now available. United States Geological Survey reported 135,118,193 net tons in "Coal in 1895."

From U. S. Coal Commission Report on Engineering and Management.

Advantages of Centrifugal Pump For Coal-Mine Drainage

Recent Developments—Comparing Centrifugal and Reciprocating Pumps on Basis of First Cost and Operating Cost — Economies of Automatic Operation

By GUY V. WOODY

District Manager, Allis-Chalmers Mfg. Co.
Wilkes-Barre, Pa.

IN DETERMINING whether a centrifugal or reciprocating pump should be purchased for a particular pumping condition, a mine operator or his engineers must carefully consider several factors. These factors vary greatly for the different classes of mining. This discussion, however, will apply to the application of the two types of pumps as used in the anthracite mines as there is undoubtedly more water handled per ton of material taken out in the anthracite mining region than in any other. As a rule, also, the water handled has a higher degree of acidity than encountered elsewhere.

Much has been done within the last ten to twelve years in perfecting the centrifugal mine pump for handling acidulous mine water. Along with this development the designer has been able to greatly increase his efficiencies until at the present time there is not the marked difference in that regard which formerly existed between the two types of pumps. Operating efficiencies of 70 per cent at 1,000 g.p.m. and 80 per cent at 3,000 to 4,000 g.p.m. can be obtained with centrifugal mine pumps at the present time. The centrifugal mine pump also has evolved from a fairly complicated piece of machinery with diffusion vanes to a simple unit without diffusion vanes and few moving or wearing parts.

To answer the question under discussion the following approximate figures are interesting:

Type of Pump Material	PUMP DATA	
	Horizontal Duplex Cast Iron, Cement-lined	8 in. 6-Stage Centrifugal Bronze
No. of pumps in station.....	2	2
Capacity of each pump, g.p.m.....	1,500	1,500
Head in feet.....	600	600
Pump efficiency, per cent.....	85	75
Combined efficiency, per cent.....	78	69
Kw. input to driving motor.....	217	246
Kw.-hr. per year for ½-time operation.....	950,000	1,078,000
INITIAL COSTS		
Cost of pumps.....	\$28,000	\$9,000
Cost of motors and control apparatus.....	6,000	5,000
Cost of pumproom.....	8,000	2,500
Cost of foundations.....	500	200
Cost of installing.....	1,200	300
Total initial investment.....	\$43,700	\$17,000
OPERATING COSTS FOR HALF-TIME OPERATION AT 1½c. PER KILOWATT-HOUR		
Interest and depreciation at 15 per cent.....	\$6,560.00	\$2,550.00
Yearly cost of repairs.....	2,400.00	600.00
Yearly cost of labor making repairs.....	1,400.00	200.00
Yearly cost of power.....	14,250.00	16,170.00
Yearly cost of operators.....	5,480.00	5,480.00
	\$30,090.00	\$25,000.00

From the above it is apparent that on the assumption of a power rate of 1½c. per kilowatt-hour and of half-time operation, the centrifugal pumping units undoubtedly should be purchased, as they indicate a saving of approximately \$5,000 per year. We can readily see that as the capacity of units increased for a larger station, with increased efficiency of the centrifugal pumps,

Abstract of Paper presented at the Open Forum of the American Mining Congress Convention held at Milwaukee, Wis., Sept. 24-29, 1923.

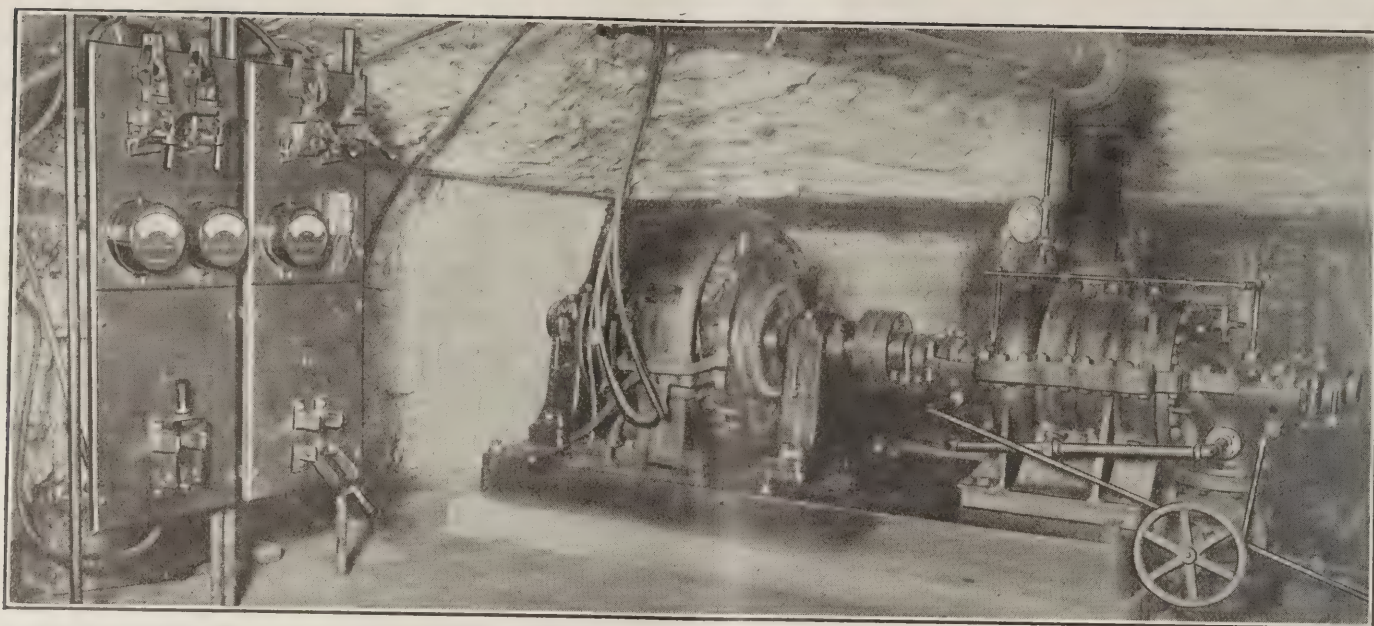


FIG. 1—FOUR STAGE BRONZE PUMPING UNIT

A unit is driven by a 225-hp. direct-current motor which pumps against a 350-ft. head.

the operation cost would be even more in favor of the centrifugal pump. The converse of this is true, i.e., as the units grow smaller, the reciprocating type begins to gain in favor until when a point of 750 g.p.m. is reached it is probable that the reciprocating pump, especially at high heads, is the more economical.

The results of the above tabulations would, of course, not show the centrifugal pump so favorable if the power costs were higher and the units operated more hours per year. To show this the following operation costs, based on three-quarter time operation and 2½c. per kilowatt-hour, show that the centrifugal pump is favored by an operation cost of only \$2,235 per year instead of over \$5,000 per year on the first-mentioned basis.

One question has often been brought up when discussing the comparative operation of centrifugal and plunger pumps: "What is the average efficiency of these two types of units over an operating period of five or ten years?" We can answer this only by saying that if both types of pumps are kept in repair and are given the amount of attention that they should have, their relative efficiencies will remain about the same. Many

operators of both types of pump, however, state that the reciprocating pump under moderately high heads increases in slippage and therefore decreases in efficiency faster than the wearing rings on the centrifugal pump reduce the efficiency of this type of pump.

The amount of foreign material in the water as well as the acid content of the water has an important bearing upon the reduction of efficiency, but whether this reduces the efficiency of one type of pump any faster than it does the other type is not evidenced by any data which has come to our attention. We might add that the low heads per stage and extra wide wearing rings, which are now a part of the design of centrifugal mine pumps, have done much to lower the internal leakage and to maintain the efficiency.

OPERATING COSTS FOR THREE-QUARTER TIME OPERATION
AT 2½c. PER KILOWATT-HOUR

Interest and depreciation at 15 per cent	\$6,560.00	\$2,550.00
Yearly cost of repairs	2,400.00	600.00
Yearly cost of labor making repairs	1,400.00	200.00
Yearly power cost	35,600.00	40,395.00
Yearly cost of operators	\$5,480.00	\$5,480.00
	\$51,440.00	\$49,225.00

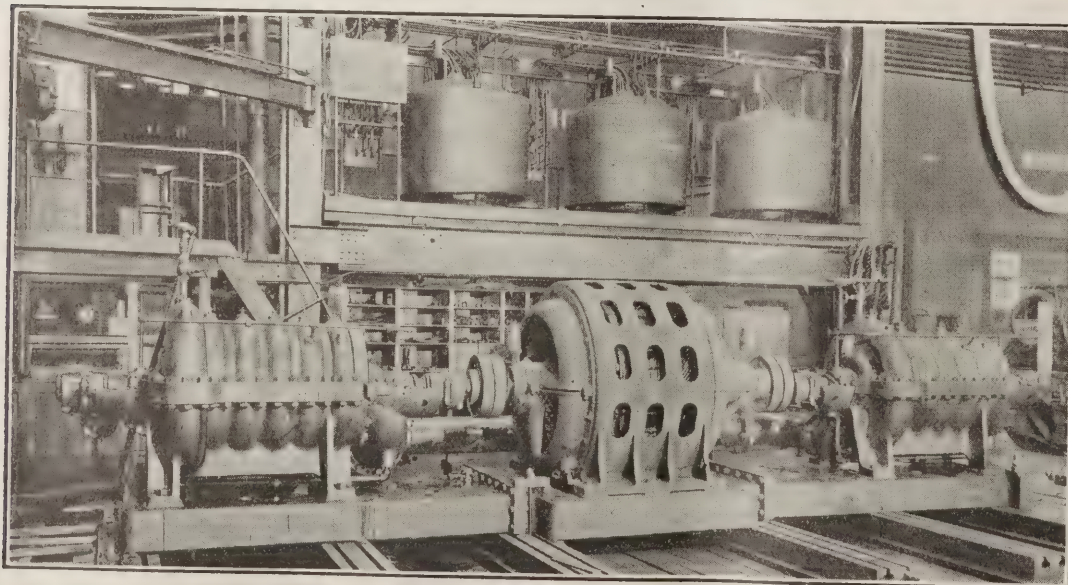


FIG. 2

Pump For High
Head

This pumping unit is divided into two separate pumps. This usually is done so as to avoid the necessity of unusually large casings.

Another point which many believe is in favor of the centrifugal pump, especially on units having a capacity of 1,000 g.p.m. and more, is their size. This likens a centrifugal pump to the mobile artillery of the army in that it can be quickly moved to places of emergency. This often is important to the mine operator.

For the foregoing reasons it is the opinion of many pump users that each centrifugal pump problem should be figured out on a basis somewhat as mentioned above, taking the actual factors which enter into the particular installation under consideration. In general, however, it would appear that for pumps having a capacity of 1,000 g.p.m. and over, with heads up to 700 or 800 ft., the centrifugal pump would be the more satisfactory type of unit to install. At capacities under 1,000 g.p.m., particularly at the higher heads, one would be inclined to favor the reciprocating type of unit. At the low heads, however, at these smaller capacities, this probably would not hold true and centrifugal pumps could again be economically applied.

A few general rules which should be set down as standardized requirements of centrifugal mine pumps handling acid mine water containing more or less grit or silt, are: (1) All parts coming in contact with the water should be made from a so-called acid-resisting bronze. Two different mixtures of bronze should not be used in the same pump. (2) Low heads per stage should be maintained, these heads approximating 100 ft. In fact, low heads per stage necessitate a design of moderate pump speeds. (3) No dowels, screws or washers should be used on the interior of the pump to hold any parts in place. (4) A type of gasket packing should be used which will prevent acid water from attacking the steel bolts holding together the top and bottom half of the pump casing. Shaft sleeves should be so designed and packed as to prevent water passing through joints and attacking steel shafts. (5) Moving and stationary parts, separate from the pump casing, should be kept to a minimum and all parts should be heavy in section so as to compensate for excessive wear.

Another point which perhaps does not enter into this particular discussion, but which is important, is the automatic priming and operating of all types of pumps. Complete automatic operation of centrifugal pumps has recently been perfected, thereby effecting a saving in the labor cost of pump operators that will amount to something more than \$5,000 per year per station. Smaller size reciprocating pumps have been operated without attendants by automatic starters, the starting and stopping of the pumps being accomplished by float valves. Until recently, however, it was not deemed feasible or even possible to apply automatic starting

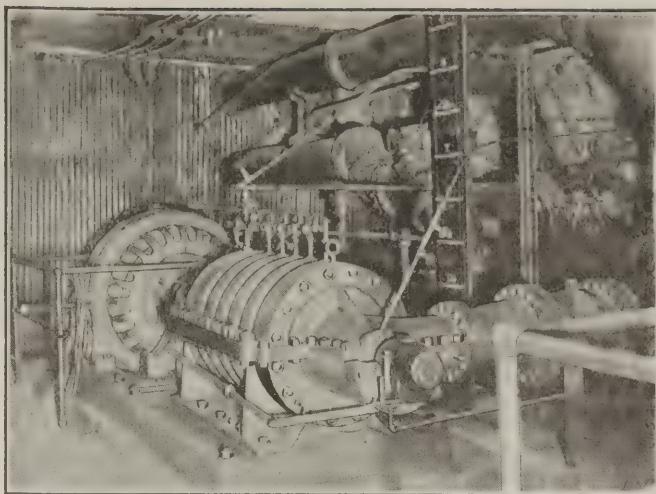


FIG. 3—A 10-IN. SIX-STAGE UNIT

This pump has been in operation since 1915 at a mine of the Lehigh Coal & Navigation Co.

and stopping to centrifugal pumps where the sump from which the centrifugal pump took its water was below the level of the pumproom floor. Most of the earlier centrifugal pumps were installed with foot valves on the suction line and were primed by filling the column pipe to a level above that of the top of the pump, thereby making sure that the pump would take its water. These foot valves gave considerable trouble and later steam and air ejectors were used, and at a still later time recourse was had to motor-driven vacuum pumps. Where air is available and where pump operators are on duty the use of an air or steam ejector is a simple and satisfactory method for priming.

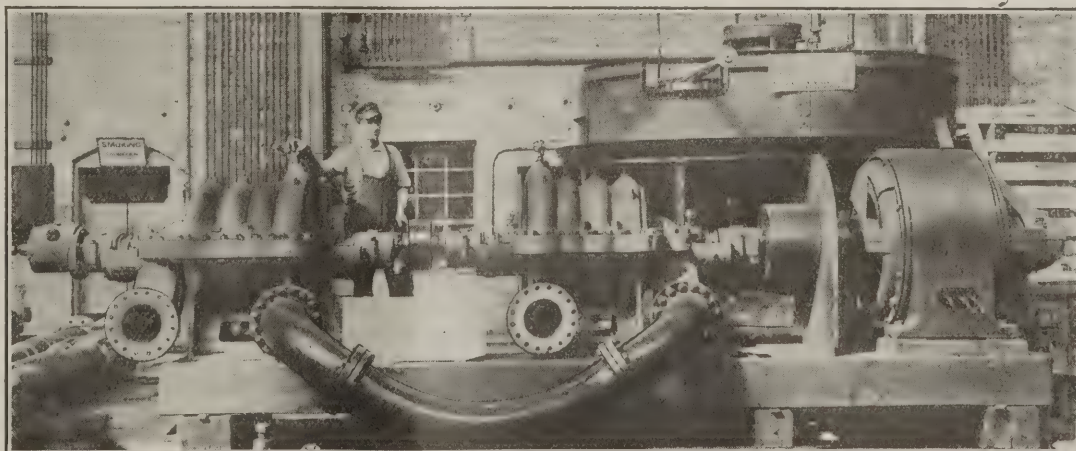
Due to certain labor conditions, in the anthracite field particularly, it is necessary that the pump operators work in three shifts. This increases the cost of this class of labor to a considerable amount and since "necessity is the mother of invention," a new scheme has been developed and put into use on centrifugal pumps which makes it possible to dispense entirely with the pump operator.

The operation of the automatic centrifugal pumping outfit is as follows: A motor-driven vacuum pump controlled by a float switch in the sump is used for priming the centrifugal pump. Vacuum regulators, pressure regulators and bearing thermostats are used and connected in such a manner as to give ample protection to the pump and motor. The motor is protected against hot bearings, excessive overloads, failure of power and the pump against excessive suction lifts, air leaks, lack of priming or broken discharge lines.

FIG. 4

Heavy Duty Pumping Unit

Where the water is very acidulous and gritty the pumping head per stage usually is less than 100 ft. This pump is used on an 800-ft. lift.



Proud of Their Product Welsh Operators Sell on Reputation



With Few Exceptions, Scrupulous
Attention Is Given to Quality of All
Shipments—Radical Labor Element
in Evidence—Overwhelming Senti-
ment for Nationalization of Mines

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

BECAUSE of its quality, there never has been a time when Welsh coal has been a drug on the market. There have been many times when it has been sold at a loss, but the price never has gone so low that the loss would not have been greater were production to have been suspended entirely. The operators in the Welsh field believe they have the best coal in the world, and they have sold that idea to a large number of buyers in many countries. The coal of southern West Virginia is the only product which they will admit approximates the value of their own. Their trade names have become widely known. In their foresighted way of preserving the reputation of these coals, the collieries which have built up the reputation of these names pay scrupulous attention to the quality of all shipments.

There are, of course, some unscrupulous shippers in Wales who take advantage of any emergency to forward dirty or poor-quality coal. This practice, however, has brought about a bitter feeling against such shippers, who by their action injure the reputation of all coal from Wales.

As a result of the abnormal situations which have occurred and recurred since the beginning of the war, a considerable number of irresponsible speculators have fastened themselves on the British coal industry. They are the source of great annoyance to the responsible and established companies. They frequently make lower bids than the market justifies, in order to get business. They think nothing of failure to deliver if they cannot get the coal, and as they have little or no financial responsibility, the foreign purchaser has no redress. The effect, however, is to injure the reputation of the field generally and to inflict serious losses on responsible coal concerns, since they are forced at times to meet prices being quoted by the "fly-by-nights."

RADICAL ELEMENT NUMEROUS IN SOUTH WALES

Labor in south Wales is regarded as being much more radical than in any other of the thirteen coal-producing districts in the British Isles. This in turn calls forth a more radical counter-policy, so that the operators in that section are reputed to be less conciliatory than in other fields. Even in south Wales, however, the union is highly conservative as compared with many of the district organizations of the United Mine Workers of America. To this generalization at least one exception must be made. British labor overwhelmingly favors nationalization of the coal mines. Frank Hodges, secretary of the miners' federation of south Wales, is highly educated, and, as is said over there, has "letters after his name." His ability is recognized universally, as is that of most of the labor leaders, district and national. As in America, the leaders among the operators are no match for those who have come to the top among the workers.

In that connection it may be mentioned that the union in Great Britain feels that it has a very sympathetic friend in John L. Lewis, who is much admired by labor in the British fields. "Why shouldn't he be friendly to labor over here?" one man said to me. "He has a good British name: 'L' for London; 'e' for England; 'w' for Wales; 'i' for Ireland, and 's' for Scotland."

As in America, the conservative leaders have difficulty in keeping the rank and file from plunging blindly after some radical agitator. They are somewhat like a certain shepherd, to use an example cited to me on the floor at the coal exchange at Cardiff. This shepherd was taking his flock across a swift channel on a ferryboat. He stooped over to tie his shoe and was butted heavily by the flock's ram. This so angered the burly shepherd that he grabbed the ram by the horns and threw him overboard. No sooner had the ram hit the water than the flock began to follow. Most of the sheep were lost before the remainder could be prevented from following their leader.

In certain instances, labor in Great Britain has shown just as little judgment in following certain self-constituted leaders, but, being Anglo-Saxons, the tendency to do unsound things is nothing like so marked as is the case in the United States. The conservative leaders have their men much better in hand and do not have to resort to as much demagoguery as do the conservative labor leaders in America.

MUCH OF MINE TIMBER IS IMPORTED

Labor in the Welsh field lost heavily this year because of a series of foolish strikes, much like strikes in our building trades over jurisdictional awards. There was no quarrel between the men and the operators, but the Miners' Federation and Craftsmen's unions staged a bitter conflict. This stopped production just at a time when coal prices were high and, in addition, ran up the cost of operation so that the men lost heavily in wages and diminished the profits in which they share. There never has been a strike in south Wales during which the men abandoned the pumps. Such action would cause incalculable harm in mines of such great depth and in a formation which is hard to hold at best. Extensive timbering must be done. Most of the props must be imported. France and Finland have been the chief sources of supply but now Nova Scotia is supplying a material part of the requirements.

As a consequence, props are very expensive, but the expenditure for them has been greatly reduced under the profit-sharing wage. This item is cited by operators as one of the best examples of the benefits following a real interest on the part of the workers in the profits of the operation.

Next week Mr. Wooton will describe how the British wage agreement of 1920 worked.

The Miner's Torch

The Mine Foreman: An Imaginary Book Review

NO SUPERINTENDENT can read this book without saying to himself, "I wish I had a foreman like that fellow; I'd be able to leave the job once in a while and really enjoy myself." Time was when the average foreman took entire responsibility for the inside of the mine just as the man we have been reading about, but somehow we don't find many that can measure up to that standard now. Those who do, get promoted to superintendent's jobs very quickly just as the hero of the story did, but they don't have to trust to luck nor save the manager's daughter from a mob to get there.

Even though we don't run across such animals every day it's interesting to read about them. The description of his encounter with two dissatisfied miners in different sections of the mine who were made happy on promises of new places as soon as possible and then simply allowed to remain idle a few days and change places with one another unawares is almost too ridiculous to be true, and yet we can all recall mine foremen diplomatic enough to pull such stunts successfully.

It's almost possible to look at a map of the workings of any mine and tell whether the foreman in charge is of that type because it takes such a foreman to get all of the rooms worked and to keep all of the headings driving. I have been furnished with many a laugh listening to foremen trying to explain why blocks of coal had to be left on certain headings in their section of the mine and then getting them to compare notes with other foremen who were able to control their miners so that no blocks of coal *had* to be left.

Perhaps if the mine foremen who are able to get all of their rooms worked could expect some special recognition because they have helped to conserve our natural resources, the figures used as representing the average recovery in tons per foot acre for different localities might be revised upward considerably.

The author does not suggest that his mine foreman could have been happier nor would his services to his company have been more valuable could he have looked forward to special recognition or larger rewards, but we must remember that he was interested only in giving us the picture of a mine foreman appearing as the hero of a romance, and a discussion of motives and rewards has no place in romantic writing.

The author of the book does show convincingly, however, that the life of the average mine foreman can be used as narrative matter furnishing interesting reading, but as I finished the book I found myself wondering if the life of a mine foreman holds much of interest to the man who is actually living the life and if not, who worries about it. At any rate the book put me to thinking and any book that puts people to thinking deserves to be passed on to our friends.

This space will be occupied by the author of "Extracts from a Superintendent's Diary," which ran in "Coal Age," June 20, 1914, to Aug. 26, 1916.

Mine Institute Discusses Coal Baking and Slope Belts

Education, Compensation and Administration Also Considered—Devolatilized Coal as Substitute for Anthracite—Short Shafts Not Justifiable

BY ALPHONSE F. BROSKY

Assistant Editor, *Coal Age*, Pittsburgh, Pa.

SLACK will be moved in a slow market by converting it into carbocite and selling that product in competition with anthracite, provided the plans of a large company in Illinois producing 5,000 tons of slack daily reach entire fruition, said R. D. Lamie, of Huntington, W. Va., in discussing low-temperature distillation at the meeting of the West Virginia Coal Mining Institute, held at Huntington, Dec. 4 and 5.

Mr. Lamie supplemented in his remarks the paper delivered in Clarksburg to the same organization June 13 and published in *Coal Age* Aug. 2, p. 171. After reviewing other processes of low-temperature distillation Mr. Lamie declared that carbocite seems destined to compete with domestic sizes of anthracite.

Asked by W. E. Fohl and Thomas F. Downing, Jr., whether coal of inferior quality could be satisfactorily used in the carbocite process, Mr. Lamie replied that coal that did not coke is better suited for low-temperature distillation, because gas escapes more readily from it as a result of its non-fluxing property.

Mr. Fohl had in mind coal from the Freeport seam and Mr. Downing bony coal. In reply, therefore, to the latter, Mr. Lamie declared that bony coal was of value for its volatile constituents but that these were not worth the cost of erecting a carbocite plant. He added that the cost of the plant would be greater for the same return in byproducts owing to the presence of the ash in the coal and declared that a 200-ton plant for carbonizing bone coal would cost as much as a 500-ton plant for the carbonization of good coal.

CLASSES BONE COAL WITH OIL SHALE

He recommended that inquiries be made into other methods of recovering gas from bony coal. The residue of bone coal, like that from oil shale, is valueless, for which reason the development of the oil-shale industry will be set back many years, especially if high-volatile coals, so much better suited to low-temperature distillation, are extensively subjected to that process and thus adequately supply the market. Carbocite, weight for weight, said Mr. Lamie, is worth as much as the coal from which it is derived, and then beyond that there is the value of the byproducts distilled from it.

Carbocite, if it is to be used for large steam-plant purposes, undoubtedly should be pulverized and fed into the boiler furnace in the same manner as raw pulverized coal. It can be made into briquets, the process adding \$1.50 a ton to its cost. Mr. Lamie was not ready to say whether carbocite would compete satisfactorily with oil for steam purposes. Oil is purchased cheaply along the Atlantic and Pacific coasts and in the Southwest but is more expensive in the Middle West.

Adam Crawford in a paper discussed "Safety Organization and Administration," which served to introduce the problem of what should be done with the surplus in the State Compensation Fund.

Mr. Crawford is of the opinion that a portion of the fund should be devoted to the education of miners in

extension schools. Dr. J. J. Rutledge, chief mining engineer of the Maryland Bureau of Mines, thought favorably of the suggestion, for there is no other convenient way of raising money for this purpose. Colonel Downing objected emphatically on the ground that the fund could be used more profitably for the lowering of insurance rates. Diplomatically, Walter Cunningham, of Charleston, smoothed matters by saying, "Let the surplus fund grow." Later the Compensation Commission of the state can lower rates or lend a portion of it to mine owners who are willing to use it for bettering safety conditions at the time; or better still, it can be used for educating miners, thereby increasing their efficiency and decreasing accidents.

It devolved upon R. F. Carson, consulting engineer, of Huntington, to fill the chair of President A. C. Callen, who could not attend because of illness in his family. The chairman, consequently, read the president's address. Because of the meager attendance at the beginning of the morning session, C. B. Snow, president of the Huntington Chamber of Commerce delayed his address of welcome till the opening of the afternoon session, when an address on "The Limitations and Eccentricities of the Beckley Seam" was delivered by C. R. Stahl, who is assistant general manager of the E. E. White Coal Co. of Stotesbury, W. Va. No one present was sufficiently conversant with the Beckley seam to undertake to discuss this paper.

NO JUSTIFICATION FOR A SHALLOW SHAFT

The institute then turned its attention to a paper on "Belt Conveyors and Their Applications for Hoisting from Shallow Seams," presented by Alphonse F. Brosky, assistant editor of *Coal Age*. J. H. Edwards, electrical engineer of the Elkhorn Piney Coal Co., substantiated the statements in the paper relating to the power consumed in hoisting by a slope conveyor. He wondered why a shaft and not a slope was sunk in the shallow cover of a certain Logan County mine, which is 90 ft. deep. From it a 250-hp. hoist raises daily in cages about 1,100 tons of coal. At another mine of the same company, three-quarters of a mile away, where the conditions are exactly the same as at the shaft mine and the same tonnage is produced, a 25-deg. pan conveyor is operating, driven by a 75-hp. motor. Because both these mines are metered the company is in a position to compare relative power consumptions. The shaft mine consumes 1 kw.-hr. in hoisting $3\frac{1}{2}$ tons of coal and the slope mine for the same expenditure of energy hoists $4\frac{1}{2}$ tons, a saving of 22 per cent in power at the slope mine.

William Venable said that a scraper conveyor sometimes is better suited for hoisting purposes than a belt conveyor. Mr. Brosky remarked in reply that the friction between the moving parts and the coal on the pan of the conveyor militated against the efficiency of such equipment. Mr. Venable added that a scraper conveyor was preferable where the distance the coal had to be lifted was short and the slope was steep. As the friction depended on the cosine of the angle of slope, the steep scraper conveyor operated with minimum friction. He referred to an installation in a coal storage yard at Charleston which required only a small motor to lift the coal to a height of about 70 ft., the conveyor in that plant being short and steep. Mr. Brosky related the experiences of the Valley Camp Coal Co. at its No. 1 mine, near Pittsburgh, Pa. There a scraper conveyor is used for hoisting coal up a slope. The company finds that this conveyor is less efficient

than the pan conveyor installed at its Kinloch mine. Seeing that the latter approaches most nearly to the belt conveyor of all those made of metal the efficiency of conveyance by belts is suggested if not proved.

When asked by Mr. Fohl how the cost of slope equipment compares with that of shaft equipment at a proposed mine of the Hudson Coal Co. near Morgantown, Mr. Brosky said that the former figured considerably less than shaft equipment, though the cost of sinking favored the shaft. However, the advantages derived by the use of a slope would give it preference even if the total first cost were more. The proposed mine is to yield 4,000 tons of coal per day from the Sewickley seam which lies at a depth of 275 ft. The slope was chosen in preference to a shaft with 10-ton skips.

TRAVELS 95 MILES TO MINING SCHOOL

In a paper on "Progress of Extension Schools in Mining Communities of Maryland," Dr. Rutledge noted the eagerness with which miners attend classes and the hardships they sometimes endure in so doing. One man travels 95 miles once a week to attend night school, stays over night and returns the following day. His attendance has been 100 per cent since the extension courses were started. When Dr. Rutledge claimed the record for the largest weekly attendance at an extension class in the country, Mr. Crawford, of West Virginia University, claimed a superior record in a single attendance of 104 at a class in Kilsythe, W. Va.

R. J. Stanton, president of the mining institute of the Logan County Coal Corporation at Lundale, W. Va., described the meetings of his organization and the benefits derived from it. All those who desire to learn, from the president of the corporation down to the miner, are admitted to the classes and join freely in discussions of problems arising at the mines of the corporation. Papers are prepared and delivered by various members and outsiders. Prominent speakers often are obtained. He said that F. R. Wadleigh, formerly Federal Fuel Distributor of Washington, D. C., would speak to this institute on Dec. 8. Money shares are sold to the members on a time-payment basis at the rate of five dollars per share per month. The money is invested in secure bonds which pay 6 to 7 per cent interest. This is distributed to the accounts of holders of shares. The institute buys one \$1,000 bond each month, from 200 payments of \$5 each.

"Training Future Coal-Mine Executives" tied technical with practical training and showed how the combination can best be obtained. This paper was delivered by Charles E. Lawall, assistant professor of mine engineering at West Virginia University.

Dean E. A. Holbrook, of Pennsylvania State College, read a paper on "Mine Safety Conditions in the United States," which summarized the work of his committee in investigating this phase of mine operation for the Coal Commission.

The concluding paper was "Factors in Management," by Bill McCoy, of Pittsburgh, who pointed out three requisites for successful management, namely, competency, executive ability and personality. His paper dealt chiefly with the psychology of management.

Institute officers and committees for the ensuing year are: President, J. W. Reed, of Fairmont; Vice Presidents, Thomas F. Downing, Jr., C. C. Morfit, J. R. Cameron, P. C. Thomas and W. H. Cunningham; executive committee, Frank Haas, W. E. Fohl, R. M. Lambie and Edward Knight; Secretary-Treasurer, R. E. Sherwood.

Pinchot Proposes Anthracite Control By Federal Commission

Explains Contemplated Measure to "Progressive" Senators—Borah
Evinces Deep Interest—After Lengthy Conference with the
Governor Senator Pepper Approves Measure

Governor Pinchot, of Pennsylvania, has outlined a bill providing for federal regulation of the anthracite industry through a coal division of the Interstate Commerce Commission. The Governor spent last Friday in Washington explaining the proposed measure to "progressive" Senators, asking them to study it and lend their support with whatever changes may be necessary to increase its effectiveness. Senator Borah seemed especially interested in the bill and expects to introduce it, but with considerable modification.

On his return to Harrisburg, Friday evening, the Governor mailed a synopsis of the measure to the governors of thirty anthracite-consuming states. The proposed Coal Division would work in co-operation with the

police powers of the anthracite-consuming states, which would be pooled according to the provisions of the proposed compact of states, a draft of which Governor Pinchot has already sent to the other Governors. Those two measures combined form the Pinchot plan, which will form the basis of the discussion at the second of the coal conferences to be held at Harrisburg Dec. 13 by the representatives of the states interested.

The Coal Division, as proposed, would consist of three members to be appointed by the President, not more than two of whom should be of the same political party. Each commissioner would receive \$10,000 a year and his term would be for seven years.

Governor Pinchot and Senator Pep-

per of Pennsylvania held a protracted conference on Saturday in the latter's office going over the whole situation involved in the governor's proposed bill. After the conference it was announced from Senator Pepper's office that the Senator would be willing to introduce the bill, that he approved of it in a general way and that he would at least sponsor legislation along the general lines of the proposed bill. It was also stated, however, that nothing would be done until the conference of Governors, called for Dec. 13, is held.

Nine Men Killed by Explosion In Wet, Non-Gaseous Mine

An explosion, thought to have been caused by coal dust, occurred at 4:45 p.m., Dec. 7, 700 ft. from the mouth of the Blackhawk Coal Co.'s mine at Happy, Carr's Fork, Perry County, in the Hazard field of eastern Kentucky. It resulted in the death of seven men and in injuring six, two of the injured dying later and the other four being reported in a serious condition.

A report from Hazard, Ky., stated that there were but thirteen men in the mine, which employs about 100 workers. The rest of the crew had quit for the day promptly at 4 p.m. A faulty or windy shot is believed to have ignited the dust, although it will be difficult to determine the actual cause, as most of those who might know what happened are dead or seriously injured.

The mine is wet as compared with others in the same region, only a small portion of the workings being dry. This makes it difficult to understand how the accident occurred. So far as known it is the first severe explosion the Hazard field has ever experienced, for the coal measures are not gassy. There have been a few men injured or killed from time to time from faulty shots, but the mine officials in general believe that the mines are too dry to be subject to dust explosions.

Reports from Hazard state that the force of the explosion wrecked the office located at the mouth of the mine and, according to some reports, stopped the fans, but it is not clear that they were running when the explosion occurred. John Lewis, Foreman Mullins and others on the outside of the mine quickly formed a rescue party, started the fans and followed fresh air into the mine, finding seven men dead on the floor near one another. Death apparently was instantaneous. The six injured were found near the group of dead.

The mine is a comparatively new one. It was formerly known as the Perciful Gorman Coal Co. and was reorganized about a year ago as the Black Hawk Coal Co. at a time when Kenneth U. Meguire, of the Harlan Coal Co., Louisville, and associates became interested in it. Mr. Meguire is president, and he and Gorman are the principal owners. Mr. Gorman is an experienced mine manager, and some years ago led the rescue party in a bad Tennessee mine disaster.

Pinchot Outlines Anthracite-Regulation Measure

In a statement issued Dec. 7 Governor Pinchot said that the bill to regulate the anthracite industry should embody these provisions:

1. (a) *It should provide for the broadest possible control of anthracite in interstate commerce by a federal commission.*

(b) *Such a commission should probably be constituted a coal division of the Interstate Commerce Commission, composed of three members.*

(c) *The coal division should act not as an administrative court but as a board proceeding upon its own initiative to investigate and regulate the industry.*

(d) *The Coal Division should serve with the Interstate Commerce Commission when coal transportation rates, distribution of coal cars or regulations of carriers affecting the coal industry are under consideration, but otherwise have no jurisdiction over carriers' rates.*

(e) *The Interstate Commerce Commission should have no jurisdiction to review an order or recommendation of the Coal Division.*

2. *The act should declare it unlawful for those engaged in the production and distribution of anthracite in interstate commerce to use unfair practices, to charge unreasonable prices, to create monopolies in or restrain interstate commerce in coal, or to engage in any practice, not in interstate commerce, which causes any unreasonable discrimination against interstate commerce in coal.*

3. *The act should give the Coal Division the broadest possible powers:*

(a) *To investigate and publish the facts in relation to anthracite coal affecting interstate commerce.*

(b) *To make recommendations on any subject connected with the anthracite industry.*

4. (a) *The act should authorize the Coal Division to issue mandatory orders for compliance with its recommendations when the public interest requires.*

(b) *Such orders should be issued only after opportunity for a hearing.*

(c) *Mandatory orders as to wages or conditions of employment should be prohibited.*

(d) *In order to meet constitutional objections the right to fight the price of coal, etc., by mandatory order should be limited to cases where, in the absence of regulation, there exist, or is danger of exorbitant charges and arbitrary control.*

5. (a) *Provision should be made for appeals from orders of the Coal Division to the U. S. Circuit Courts of Appeals, as in the case of appeals from the Federal Trade Commission.*

(b) *Orders unappealed from or affirmed on appeal should be final. They should be enforceable by injunction and through the imposition of penalties.*

6. *Penalties should be provided similar to those in the Packers and Stockyards act of 1921.*

President Coolidge's Recommendations on Coal In First Message to Congress

The cost of coal has become unbearably high. It places a great burden on our industrial and domestic life. The public welfare requires a reduction in the price of fuel. With the enormous deposits in existence, failure of supply ought not to be tolerated. Those responsible for the conditions in this industry should undertake its reform and free it from any charge of profiteering.

The report of the Coal Commission will be before the Congress. It comprises all the facts. It represents the mature deliberations and conclusions of the best talent and experience that ever made a national survey of the production and distribution of fuel. I do not favor Government ownership or operation of coal mines. The need is for action under private ownership that will secure greater continuity of production and greater public protection. The Federal Government probably has no peace-time authority to regulate wages, prices, or profits in coal at the mines or among dealers, but by ascertaining and publishing facts it can exercise great influence.

The source of the difficulty in the bituminous coal fields is the intermittence of operation which causes great waste of both capital and labor. That part of the report dealing with this problem has much significance, and is suggestive of necessary

remedies. By amending the car rules, by encouraging greater unity of ownership, and possibly by permitting common selling agents for limited districts on condition that they accept adequate regulations and guarantee that competition between districts be unlimited, distribution, storage, and continuity ought to be improved.

The supply of coal must be constant. In case of its prospective interruption, the President should have authority to appoint a commission empowered to deal with whatever emergency situation might arise, to aid conciliation and voluntary arbitration, to adjust any existing or threatened controversy between the employer and the employee when collective bargaining fails, and by controlling distribution to prevent profiteering in this vital necessity. This legislation is exceedingly urgent, and essential to the exercise of national authority for the protection of the people. Those who undertake the responsibility of management or employment in this industry do so with the full knowledge that the public interest is paramount, and that to fail through any motive of selfishness in its service is such a betrayal of duty as warrants uncompromising action by the Government.

Does Coolidge Message Mean Regulation, Fact Finding or Voluntary Returns?

Coal Sections Considered Vague—President Doubtful Whether Government Has Power to Fix Prices, Wages and Profits Except in Extreme Emergency—Coal Not to Be Major Issue

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

In so far as it deals with coal, the President's message is ambiguous. It gives the impression that he is not in favor of regulation except during extreme emergency, but there appears to be great difference of opinion as to the significance of what he said. It indicates that he is doubtful whether the federal government has any power to fix prices, wages or profits, or take similar action in peace times. He does make the clear-cut statement that he does not believe in government ownership. This statement could have been little more than a gesture, since hardly anyone believes in it, and certainly there had been no doubt as to Mr. Coolidge's position.

The message has failed to clear the air. So far as coal is concerned, a state of doubt, of hesitancy and of expectation has existed for three months. There have been rumors of drastic federal action. Then came Governor Pinchot's plan for drastic regulation through the states. In addition there were the pending recommendations of the Harding Coal Commission providing a mild form of regulation. Only a few days ago Senator Smoot, one of the mainsprings of the majority party, pointed to the Coal Commission's findings as justification for his belief that large profits are enjoyed by the coal industry. Some took it to indicate that justification was being provided for an administration effort to bring about regulation.

Within the coal industry there have been two views as to the best plan of procedure. Some, convinced that a storm is coming, urged that a point be conceded and that voluntary returns be made in the hope that this would head off something even less desirable. The other view was to surrender

nothing and be ready to take issue with the federal government at any time so as to determine once for all the exact extent of federal authority.

In such a situation as this it had been hoped that some of the uncertainty, at least, would be removed by the presidential message. Through the mist which surrounds the President's utterance on coal one can discern certain familiar forms, such as intermittency, storage and car rules, but the label on the exhibit cannot be made out, so it still is uncertain whether they spell regulation, compulsory fact finding, or voluntary returns.

There is one very certain deduction that can be made. That is that the administration is not disposed to make coal a major issue. The message certainly strengthens the position of those within the industry who are opposing voluntary reporting. There can be no doubt that the principal pressure in favor of voluntary reports has come from the fear that it was either that or something worse. Now that pressure is much relieved.

It is apparent that the President is not disposed to make a great fight that would have as its object the regulation of the coal industry. Without his influence, those who may have in mind some such plan are certain to recognize that any chance they may have had for success has been weakened greatly. It is known, however, that legislation will be introduced covering all recommendations of the Coal Commission. It is believed that the President would approve of such a measure, but in view of this message, he evidently is of the opinion that Congress has the facts and can decide for itself whether or not legislation presents the best method of dealing with the situation in coal. In this connection, it is of interest that Secretary Hoover, on the day preceding the delivery of the President's message to Congress, indicated in a public address that he had no great faith in the effectiveness of coal legislation at this time.

Three Drown When Water Floods Illinois Mine

The spectacular flooding of the Radium mine of the Aluminum Ore Co. of America, at Belleville, Ill., drowned three men Dec. 6 and gave most of the other 250 men in the mine a race for their lives. The water broke into the mine when an entry was driven too close to an adjoining water-filled, abandoned working. The face broke through and the water rushed in together with a considerable volume of gas. Louis Ambruster, William Lescher and John Evans, all of Belleville, were drowned. Six others were gassed but were carried out and have recovered. Herman Isler, a foreman, won public praise by holding open a door on No. 5 entry in which the break occurred, until all the forty-eight men in that entry except the three, were out.

Midwest Operators Favorably Impressed With Coolidge Message on Coal

Recommendations to Reduce Overhead Costs Strike Responsive Chord—
Continuity of Operation the Paramount Object—Self-Reform
Favored—Removal of Sherman Law Restrictions Necessary

Middle Western coal operators who do a good deal of the thinking for their sections of the industry are ready to admit, almost to a man, that the President's message on coal was an honest and from-the-shoulder document. It said about all a President could be expected to say, with the information that he has at hand. It is evident from their statements to *Coal Age*, however, that they are not looking to President Coolidge for any Moses-like leadership from the coal wilderness.

Dr. F. C. Honnold, of the Honnold Coal Bureau, Chicago, said: "It is notable that the President favors 'greater unity of ownership' and the establishment of common selling agencies, both of which seem to promise some reduction in overhead costs, both in administration of mines and in sales cost. Nothing, however, according to his apparent conviction, even approximates the importance of the continuity of mine operation and the removal of recurrent strikes. And in this particular his viewpoint meets exactly the ideas of the coal-mine operators, but of late years no way has been found to prevent the mine workers' union from ordering discontinuance of work if and when the demands of union leaders were not met.

"It is evident that the President is still hopeful and believes that a commission appointed and properly empowered by the government would be able to conciliate and obtain voluntary arbitration and to adjust any threatened controversy between mine owners and their employees. It is extremely difficult for the operators to understand how such a hope can be justified upon the basis of the experience of the last three years.

"The President's remark that the failure of either management or employees to recognize the public interest or to fail, through any motive of selfishness, to render service constitutes a betrayal of duty and warrants uncompromising action by the government, seems in view of experience, to be a rather vague declaration."

J. B. Pauley, vice-president and general manager of the J. K. Dering Coal Co., Chicago, said: "The President's message is unique and refreshing. It bears the stamp of an honest statement by an honest man, without consideration of political features or personal effect. With that portion which refers specifically to the coal industry there is little opportunity for disagreement, generally speaking.

"The facts about coal are well known. The remedies are not so simple. Many intelligent coal operators, who have spent a life time in the business, would

find it difficult to prescribe such remedies; hence the President could not be expected to do it, knowing the main facts as he does. The laws and Constitution would prevent the application of the natural remedies which would occur to the President, or anyone else, in attempting to solve this complicated problem, but in spite of all this, the message, as it refers to coal, carries a constructive undertone.

"The statement that 'those responsible for the conditions in the industry should undertake its reform' is encouraging and salvation could probably be worked out along these lines, with proper encouragement from the government, without any great prejudice to those involved, if it were possible to eliminate consideration of the political effect, which, unfortunately, is usually held to be of paramount importance."

W. K. Kavanaugh, president of the Southern Coal, Coke & Mining Co., St. Louis, thinks "the President's message is all right, considering the light he has upon the subject. I was particularly interested in his reference to necessary remedies which would encourage greater unity of ownership. The need for conservation in this great basic industry should be made clear to Congress so that possibly it might see the importance of removing the Sherman anti-trust law restrictions as applied to coal."

Dr. C. H. Krause, St. Louis, president of the Fifth and Ninth Districts Coal Operators' Association, declares: "Coal men in Illinois realize and recognize their responsibility to the public as producers of one of the essential commodities; also their responsibility as employers of a large body of American citizens. They see in the President's message an understanding and official recognition of the community of interest between the various elements of industry and a disposition to fairness that should result in the coal industry's working out its own problems equitably."

According to W. L. A. Johnson, Kansas City, commissioner of the Southwest Interstate Coal Operator's Association, "the President's message on coal is a clean-cut, logical statement on the proper solution of the present deplorable condition of the coal industry. If it is crystalized into unbiased legislation in the interest of all factors concerned, it should go far to remedy many existing evils. Operators generally will co-operate with Congress to obtain proper legislation but will resist partisan or unfair legislation that seeks to stifle private enterprise or free and untrammelled management of industry within the limits of constitutional law."

State Treasurer Would Abolish Anthracite Tax

Charles A. Snyder, State Treasurer of Pennsylvania, issued a statement last week relative to the collections for the year ending Nov. 30, 1923, during which period \$64,200,917.44 was received. This sum was \$8,000,000 in excess of the moneys collected for the fiscal year ending Nov. 30, 1922.

Because of this increase, the Treasurer pointed out there is no necessity for the continuance of the anthracite tax or the net profits tax laws on the statutes. The sum of \$62,000,000 of that collected, he said, came from old revenue-producing laws passed prior to 1917, and these laws, if the Auditor General is given additional powers, can produce \$65,000,000 or more a year.

"The State Treasurer contends," the statement read, "that the profits tax and the coal tax should be abolished at the next session of the Legislature, and added powers given to the Auditor General for the closer inspection and investigation of taxes due under old laws."

Rail Coal Consumption Falls Slightly in September

Class 1 railroads of the United States consumed 8,521,000 net tons of coal during September, 1923, as charged to account 394, compared with 8,529,000 tons in the preceding month and 7,856,000 in September, 1922, according to a report by the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first nine months of 1923 these roads consumed 82,299,000 tons as compared with 51,736,000 tons in the corresponding period of 1922. The delivered cost per ton in September last was \$3.31; in September, 1922, it was \$4.83.

Consumption of fuel oil during September was 175,943,000 gallons, compared with 168,868,000 gallons in August and 138,232,000 gallons in September, 1922.

Coal Legislation Hopper

Representative Rogers, of Massachusetts, has introduced a bill in Congress which provides that whenever the President shall find that the public interest requires it, he is authorized to declare an embargo on the exportation of coal to foreign countries, such order to include either anthracite or bituminous coal or both.

Senator Borah, of Idaho, is working on two coal bills, as a result of an exhaustive study of the Coal Commission's reports and recommendations.

A bill setting standards of preparation for domestic coal has been introduced in the House by Representative Luce, of Massachusetts. The bill requires certificates attached to bills of lading declaring that shipments conform to one of the standards provided for. Penalties are provided for making false statements.

It is understood that the LaFollette "radical" bloc is considering some coal legislation but is not yet prepared to announce its purpose.

Union Organizing Under Cover Puzzles Harlan and Hazard Fields

Sudden Walkout When Notice of Proposed Wage Cut Is Posted
Causes Speculation on Extent of Union Influx—
Operators Receive Mysterious Letters

How great has been the infiltration of United Mine Workers into the open-shop mines of the Harlan fields of southeastern Kentucky? That is the big question that has been disturbing Kentucky coal circles in the neighborhood of Cincinnati during the past week or ten days.

Keyed in with this is the problem of whether the mines having a union agreement will attempt to throw this off. On Nov. 10 the officers of District 19 of the United Mine Workers named Nov. 26 and Harlan Ky., as the date and place of a meeting to work out an agreement for the Harlan field. No notice was served on the union people. On Dec. 5 a letter was directed to R. C. Tway, president of the Harlan Coal Operators' Association, in which the statement is made: "Common courtesy warrants you to at least answer our communication. . . . We say to you that any industrial conflict that may take place in the Harlan coal field you, gentlemen, will be directly responsible for." Those interested in Harlan operations with offices here in discussing

the situation, say that it remains *in statu quo*.

The extent of the influx of unionists into open-shop mines was shown in a peculiar manner last week. Facing losses through low prices a large operator posted notice of a 20 per cent horizontal cut in wages. The next day all of the men flashed union buttons on him—and walked out. He had no reason to suppose that his mine had been "organized."

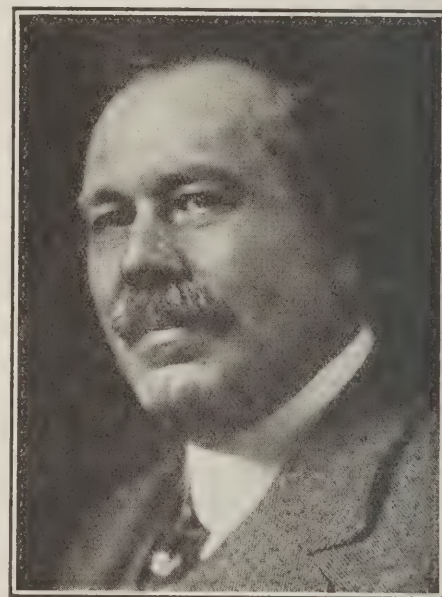
Evidence of further trouble comes from a mysterious hand-written letter posted on a Louisville & Nashville train and addressed to several operating companies with headquarters in Cincinnati as well as to operating headquarters in the Hazard fields, in which it was stated that "it would be best for all of the Hazard mines to close until Jan. 1 and avoid trouble."

General earmarks such as these would indicate that the southeastern fields are in a foment such as they went through when the last effort to implant unionism was made there four or five years ago.

William L. Connell Dies

William L. Connell, member of the Anthracite Board of Conciliation since its organization in 1902, and one of the prominent hard-coal operators, died at his home in Scranton, Dec. 10. He was born in Minooka, Pa., Oct. 14, 1862. Mr. Connell, who was twice Mayor of Scranton, returned to business last spring after a seven months' illness apparently in good health and attended a meeting of the Conciliation Board on Dec. 7, when the Hudson Coal Co. situation was under consideration.

In 1891 he organized and managed the Enterprise Coal Co., which has been in operation since and which has its mines near Shamokin, Pa. Later he became president and general manager of the Green Ridge Coal Co., and later he headed the Connell Anthracite Mining Co. and the Lackawanna Coal &



WILLIAM L. CONNELL

Cave-in at Jessup, Pa., Traps Five; All Believed Dead

Five men, including Evan Jones, the mine foreman, are crushed to death or entombed in the Mount Jessup mine of the Mount Jessup Coal Co., Jessup, Pa., as a result of cave which occurred Dec. 8. All efforts to get into communication with the men have failed and virtually all hope of finding them alive has been abandoned by the rescuers.

Mine Foreman Jones lost his life in trying to save the lives of his workmen, according to the stories told by some of the workmen who escaped death. He had gone into the mine to inspect some work, when he thought he heard the sound of sliding rock and began ordering workmen outside. He told the retreating miners that he was going to other sections of the vein to warn four other workmen, and despite their protests, went. At about the time the mine foreman would have reached the part in which the four men were working the roof collapsed. Hope was entertained for a time that Jones and the four men had escaped by way of the Sterrick Creek shaft.

Gangs of workmen under the direction of mine inspectors and officials are working in relays to remove the debris from the area affected, which is about 150 ft. square.

Two of the missing men are said to have been engaged in the work of robbing pillars when the cave occurred.

Mechanical Engineers Study Coal Storage

Coal-storage problems were discussed at the session of the Material Handling Division of the American Society of Mechanical Engineers, which held its annual meeting in New York City from Dec. 3 to Dec. 6, the morning of Dec. 5 being devoted to these problems.

In describing various coal-storage systems, H. E. Birch and H. V. Coe stated that the amount of coal in storage depends on the distance from source of supply, adequacy of rail and water connections, the seriousness of a possible shutdown, the probable future growth of the plant, and other local considerations which must be weighed separately for the plant in question.

In his paper on "Factors in the Spontaneous Combustion of Coal," O. P. Hood, chief mechanical engineer, U. S. Bureau of Mines, said that in order that the engineer may intelligently consider the phenomena of spontaneous combustion of coal he must have some general ideas about the coal substance, the character of coal surface, the atmosphere in which it may be immersed and about slow combustion.

A paper on "Economic Phases of Coal Storage," by F. C. Tryon and W. F. McKenney, of the Geological Survey, embodied the results of a study made by the coal-storage committee of the Federated American Engineering Societies pointing to the economic advantages of coal storage.

Lumber Co. During his service as a member of the Board of Conciliation Mr. Connell was the representative of the independent operators.

His part as a leader in the anthracite industry was first officially recognized by Governor John K. Tener, when the latter appointed him to the mine-cave commission in 1911. Again in 1920, when the presidential wage commission was named by President Wilson, he was chosen to represent the producers.

In 1893 he began his first term as Mayor of Scranton, serving until 1896. Six years later he was again named to the office of the city's chief magistrate, remaining in office until 1906. In politics he was always a Republican.

Aside from his interest in coal he was a prominent figure in other fields of industry. He was a director in the Scranton Life Insurance Co., the International Textbook Co. and the International Publishing Co. He was at one time a director of the Union National Bank. He was also identified with the Paint Creek Collieries Co.

W. W. Inglis, president of the Glen Alden Coal Co., succeeds Mr. Connell as chairman of the Conciliation Board.

Trade Commission's Usefulness at End, Conduct of Madeira-Hill Case Proves

Methods Savor of Persecution—Strays from Economic to Judicial
Activities—Fails to Profit by Legal Setbacks—Bill
Introduced for Its Abolition

Further evidence that the Federal Trade Commission has outlived its usefulness and has become hopelessly actuated by a spirit of persecution is seen in its conduct of the Madeira-Hill hearing. The tactics resorted to by the counsel for the commission in obtaining certain material for its record is alleged to have approached false pretense.

The Federal Trade Commission in September was told by the President to look into the matter of wholesale and retail prices of anthracite. Thereupon representatives of the Federal Trade Commission waited upon the Harding Coal Commission and asked permission to examine reports on wholesale and retail costs, which had been obtained under the powers vested in the Coal Commission. The request was granted in a letter embodying a formal resolution of the Coal Commission which stated clearly the terms under which the material could be used. Those terms do not authorize the presentation of these papers as evidence in a legal proceeding. Regardless of that, the original returns from some of the companies were incorporated into the record as evidence.

LETTERS UNFAIRLY OBTAINED

Certain letters written by Mr. Madeira to Dr. George Otis Smith were obtained on what is declared to be misleading representations. Dr. Smith was told these letters had been referred to in the Madeira reply to the Federal Trade Commission; Dr. Smith was given the impression that Mr. Madeira had thereby released them. An examination of the formal reply showed no reference to the letters written Chairman Hammond and Dr. Smith.

The letters would not have been made available had the situation been accurately stated. Counsel for the Federal Trade Commission would not allow Dr. Smith to explain the terms and purpose of the Coal Commission's resolution. The original returns were made a part of the record in the face of the clearly stated condition that the original documents must remain in the custody of the Secretary of the Interior, the custodian of the records of the commission. When Dr. Smith was on the stand, the Trade Commission's counsel in substance asked: "You seem to have some personal interest in this case." "I have," replied Dr. Smith; "As a private citizen and as a public servant trying to get at the truth."

There has been some criticism of the Harding Coal Commission because it recommended that federal supervision be vested in the Interstate Commerce Commission. There are some who

would have had the recommendation read "Federal Trade Commission." The conduct of the Federal Trade Commission during this hearing leads many to believe that it is trying for a position in the sun, and makes it clearer that the Coal Commission made no mistake in its recommendation.

This proceeding has brought out with particular clearness the trend of the Federal Trade Commission away from economic activities and toward judicial functions. The trend has been gradual but as time has passed less and less of the Federal Trade Commission's appropriations have been absorbed by its economic work. It has reached a point where many believe it to be usurping the functions of the Department of Justice. It has moved away from Mr. Hurley's constructive conception of making the commission a tower of light to dispel the twilight zone created by the anti-trust statutes.

MISSED LESSON IN MAYNARD CASE

Many are surprised that the commission did not profit by the Maynard case and other legal proceedings which have been brought successfully against it. Instead of indicating that it should be more constructive and less legalistic, these cases seem to have worked the other way. The commission was invited to look into the price of anthracite. This gave an unusual opportunity to be of constructive service. It could have done much toward allaying the feeling of panic which had overtaken buyers at that time. It could have called in the independent operators and probably could have worked out a voluntary arrangement which would have saved consumers large sums. Instead, the commission chose to marshal its whole resources in an effort to run down certain individual cases of alleged profiteering.

WOULD ABOLISH TRADE COMMISSION

This attitude on the part of the commission has resulted in the introduction of a bill by Representative Johnson, of Washington, proposing the abolition of the Federal Trade Commission and the transfer of its activities to the Department of Commerce. Mr. Johnson states that he has presented this legislation because of the failure of the commission to be constructive in its activities.

The decision in the Madeira-Hill case may be handed down Friday. There are many who think the very capable men who comprise the commission, on second thought, may take a stand against a clique within the commission's staff which would make it a muck-raking machine. P. W.

End Hard-Coal Rate Hearing; Early Decision Unlikely

The Interstate Commerce Commission on Dec. 8 practically concluded its hearing on anthracite rates and rates on anthracite substitutes. It is thought probable that the commission will call for briefs and will require oral argument. It is practically certain that a decision in the matter cannot be handed down in time to affect business in this coal year.

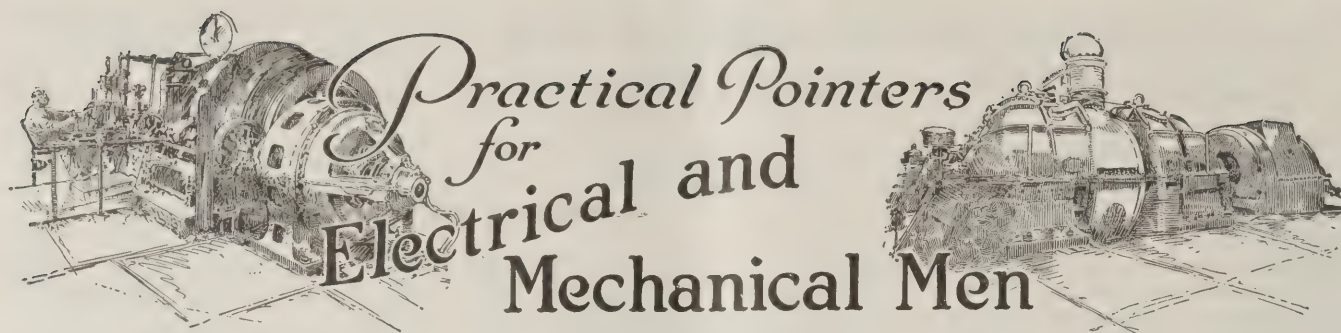
It is admitted that the railroads opposed convincingly the publication of rates from the smokeless fields. Apparently, they established that any all-rail rate to be low enough to move the coal would not be compensatory. If the rates were made high enough to be compensatory, no coal would be moved. Moreover, it was pointed out, 2,000 additional cars would be required to protect a movement of 100 cars per day. Any diversion of the New England movement from southern West Virginia via Hampton Roads would result in the further loss occasioned by idleness of expensive equipment at those ports. The point also was made that any such plan would be contrary to the recommendations of the Harding Coal Commission, which suggested a form of economic zoning to prevent long hauls. Attention also was called to the fact that the commission itself in broadening Ohio differentials had been influenced in part to reduce the haul.

With regard to anthracite proper, little evidence was introduced by consumers. It is possible that the commission will make changes on its own knowledge of the situation, but to attempt to fix rates without having evidence in the record would be an unsound basis for rate making, some contend.

Wholesalers Discuss Proposed Coal Legislation

The executive committee of the American Wholesale Coal Association will open a two-day session in the Whitehall Club, New York City, this morning, at which important matters relating to the wholesale phase of the coal industry and proposed legislation will be discussed. Invitations have been sent to every wholesale coal dealer in New York City and vicinity to attend the luncheon meeting at the club at one o'clock, at which time prominent speakers will discuss the work of the Federal Trade Commission, matters of legislation and that portion of President Coolidge's message relating to coal.

Efforts will be made during the sessions of the Executive Committee to interest the New York wholesale dealers in the work of the association and to point out to them their position with respect to the Federal Trade Commission. Charles L. Dering, of Chicago, president of the association, and Charles A. Owen, member of the Executive Committee from New York City, expect a large attendance.



Direct Determination of Volt Drop of Haulage Circuit

Much has been said and written about the importance of good track bonding on the haulage systems at the mines. Whenever there is a convention of any kind or get-together meeting of electrical men, almost invariably there is some discussion on the subject of bonding. The power losses, maintenance costs, delays and other disadvantages of poor bonding usually are well known to the average electrical engineer, electrician and mine superintendent, but few know just how bad or how good the bonding is in any of the mines.

Eternal vigilance is the motto of many electrical men and by continually following up on the bonding repairs wonderful results have been attained in maintenance of motors and train schedules, to say nothing of the saving in power and the lessened need for large generating and converting equipment to feed the direct-current supply lines.

Where bonding is poor, lines long, loads large and remote from the supply, conditions are the worst. Here it is first of all desirable to feed power into the center of the load or into localized load centers by placing the generating or converting equipment as near to the load as possible. Sometimes it will be found to be highly desirable to locate the supply station inside the mines or on the surface as directly as possible over the load center.

In localities where the coal is thin, and especially where one seam is mined at a time and the load center moves rapidly, a portable converting substation is highly desirable, because of the resulting power saving and flexibility as well as the economic and operating advantages which affect the ledger sheets and the whole personnel from the manager to the miner. We have become so set in the habit of permanently fixing these stations that our better sense of judgment seems to be somewhat tardy in asserting itself.

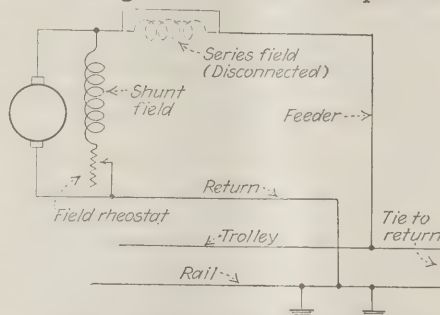
Another important feature is the shortening of all feeder and return circuits whenever an opportunity presents itself in the development of the electrical feeders and occasionally by a prearranged plan designed to better the whole power-transmission system.

Decision on the type of bond to be used frequently is a matter of track and haulage requirements. The advantages of good bonding are obvious.

Periodic bond testing is necessary on

all important track systems but the real test of the circuit is the drop of voltage under load conditions. Bond testing will localize a fault in the track return, but the resistance of the circuit is dependent also upon the resistance of the feeder system, which often is neglected.

A simple test for determining the circuit resistance is to short-circuit a feeder line to the track and force current into the circuit from the generator. The generator should be operated



TESTING FOR VOLTAGE DROP

With the generator connected as a shunt machine the voltage is built up in the closed circuit between the feeder and return to any desired load. The voltage necessary to force any given amount of current through the circuit is equal to the drop in that circuit when operated at that given load during normal operation.

as a shunt generator for the test and the voltage should be gradually built up from zero by control of the field rheostat. By taking instantaneous current and voltage readings at different loads an indication of the voltage drop in that part of the system is directly obtained. Such tests may be carried on in various parts of the mine and poorly bonded sections localized. Evidence thus obtained gives tangible proof of poor voltage conditions and can be used to advantage at conferences with superintendents, foremen and electricians.

Power-Plant Problem of the Coal-Mining Company

With reference to Mr. Butcher's letter which appeared in the Nov. 22 issue of *Coal Age* I wish to offer the following remarks:

The experience outlined in the letter referred to above is much the same as happens to most engineers entering the coal fields for the first time. The practices and types of installation seem almost criminal until a thorough study has been made of the various situations,

after which there seems to be more or less justification for some of the situations that seem so bad at first glance. It must be remembered that a great many of the power installations in coal mines in the past have had little or no engineering, but just "grew," like "Topsy." The mine superintendents were largely selected for their knowledge of coal mining, with little thought to the power end of the situation. The result was that a great deal of the power equipment was purchased on the recommendation of the manufacturers, so that in many cases the equipment was not best suited to the needs of the mine.

REASON FOR SIMPLE ENGINES

There is a fairly good reason why most isolated plants are equipped with simple automatic engines, running non-condensing. This is due to the fact that the type of experienced labor available around many of the mining communities is of a poor grade, and only the simplest kind of apparatus will give satisfactory service. It would be folly to install high-grade condensing equipment when the type of labor necessary to operate this equipment is not available.

In order to utilize the exhaust steam it is necessary to install low-pressure turbines and a complete condensing equipment. Even where water is available, this requires a much higher grade of labor than is necessary for a simple non-condensing engine. In addition, this requires a considerable layout and in many cases there is no place to utilize the additional power generated.

WATER SUPPLY IS IMPORTANT

In answer to the question, "Can a public utility sell power for less than it can be made for using waste steam at the mine?", it has been amply proved that in the large majority of cases power can be purchased at an equal or lower rate than it can be made by a mining company. This is proved by the fact that a large number of mines have changed over to central-station power during the last ten years, and with scarcely a single exception, the power is costing the mining company less than it did before, and in a large majority of the cases the mining company would not for a minute consider going back to the making of its own power. One of the principal reasons for this is that the most important essential for satisfactory power production is a plentiful supply of good water.

It is rather rare that a good supply of water is available in the mining sections. The poor water usually available requires water-treating plants, which, in turn, require a fairly high-grade type of labor to keep the water-treating plant in successful operation.

A coal-mining company is in business essentially to produce and market coal, and the generation of power is more or less foreign and requires considerable technical ability, which does not exist in the average coal-mining organization. For this reason power is not generated under the best conditions and at as low a price as it should be. Coal-mining companies, like industrial organizations, have a limited amount of capital, and they can employ this capital at much better advantage in the development and operation of the coal mine than they can in the installation of a power plant. When a power plant becomes overloaded it frequently is necessary to install new boilers as well as new engines and generators. This requires a considerable outlay of capital, which the average coal mine cannot easily obtain. With central-station power the increase in capacity can be obtained at low expense and in very much less time than would be the case with an isolated power plant.

BETTER BOILER-ROOM PRACTICE

The older boilers around coal mines usually were of the fire-tube type, while the most recent installations are putting in the water-tube type of boiler. The installation of stokers depends somewhat on the type of fuel and the saving in labor that would be obtained by their use.

It must be remembered that a large number of the coal mines were purchased by the present operators, who are not responsible for the type of power equipment that existed when they purchased the property. A large number of operators realize that their equipment is not what it should be, but they would have considerable trouble in persuading a board of directors to expend considerable sums in bringing the plant up to date. During the next two or three years the competition in the coal business is going to be very keen, and a number of the inefficient coal-mining plants will be compelled to shut down. The coal companies that expect to stay in business will have to be sure that their power plants and their entire mining equipment is operated in a most efficient manner, and where engineering ability does not exist in the coal-mining companies it should be employed from outside sources, if the coal companies expect to keep in business at a profit.

EACH MINE A DIFFERENT PROBLEM

It should be remembered that no two coal-mining problems are alike; in fact, there is a vast difference in the conditions that exist in different mining sections. No general recommendation can be made in regard to the type of power plant and whether central-station power should be used or not, since each mining problem should be analyzed

thoroughly before any recommendations can be made. In general it is safe to say that purchased power should be utilized whenever available, and where not available, if the mine is small, a simple automatic non-condensing engine or non-condensing turbine should be used in generating power. For the larger mine it will often pay to put in condensing equipment where high efficiency can be made to pay. The conditions in the average isolated power plant in coal mines are very much as pictured, and the only way to remedy these defects is to employ intelligent engineering toward revamping the plants and introducing more efficient methods of generating and utilizing power.

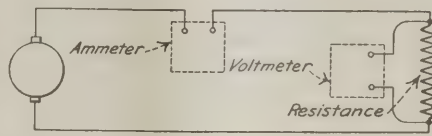
GRAHAM BRIGHT.

Howard N. Eavenson & Associates,
Pittsburgh, Pa.

Resistance of Electrical Circuits

The ohm, the unit of resistance, usually is calculated for a given circuit or part of a circuit. There is a definite relationship between the voltage, current and resistance of a circuit. This relationship has been stated in a law known as Ohm's Law. To get an understanding of how the volts, amperes and ohms are related, we must again refer to our water analogy. First of all, if we have a pipe line and we wish to force water through it, we must have pressure. This pressure is similar to voltage; the flow of water is similar to the current in the electrical circuit.

The resistance of the pipe to the flow of water is similar to the resistance of a conductor to the flow of electrical current. In electricity this resistance is measured in ohms. Obviously, if we have a certain pressure and desire a certain flow of water to pass through a pipe, if the pipe is small it offers a high resistance; in fact we may not



TAKING MEASUREMENTS FOR DETERMINING RESISTANCE

The value of the resistance is determined by taking voltage and current readings on the meters and solving by use of formula No. 3.

be able to force our given amount of current through the pipe without increasing the pressure. By increasing the pressure to the required value, however, we can force the desired quantity of water through the pipe. If the pipe is large in diameter—that is offers little resistance to the flow of the water—the pressure necessary to force a given quantity of water through the pipe becomes small.

In electrical circuits the condition is quite similar. To force a given current through a conductor, the greater the resistance of the conductor, the greater will be the voltage to force the current

through. Therefore a circuit having a low resistance will carry a heavy current and will require a low electrical pressure, while a high-resistance circuit will require a high pressure even to force a small current through the circuit. Ohm's Law establishes the relationship between the volt, ampere and ohm, and may be stated thus: The current flowing in a given circuit is equal to the voltage divided by the resistance. This same formula may be expressed in two other different ways; namely, the voltage equals the resistance times the current and the resistance equals the voltage divided by the current.

Using the following letters, this formula may be represented as shown:

I represents current in amperes;

E represents pressure in volts;

R represents resistance in ohms.

Then

$$(1) I = \frac{E}{R};$$

$$(2) E = R \times I;$$

$$(3) R = \frac{E}{I}.$$

Saving the Centrifugal Pump Motor

A few weeks ago our company had a rather interesting experience with the operation of a centrifugal pump. Unfortunately, however, the experience came when we did not have much time to spare.

The pump referred to is a large 1,000 - gallon - per - minute 400-ft. head centrifugal pump. For years this pump and its driving motor had been working without any great amount of repair and maintenance cost; in fact it was almost automatic in that constant attendance rarely was required.

This pump has always been operated against a static head of about 360 ft.; the friction in the pipe line probably is nearly equal to 40 ft., and therefore the pump and motor has been working at full capacity.

One day when everything seemed to be going fine a fire developed in one of the levels above this pump and it became necessary to tap the column line of the pump to supply water to the fire region.

The motor on the pump was running at normal load until the valves supplying the fire lines were opened. Soon after the water in the fire lines began to flow, the motor became overloaded and the pump man did not know what to do. The pump could not be shut down, so he left it operating but called one of our engineers.

When the engineer arrived the motor was becoming quite hot, but instead of shutting it down the valves on the fire lines were partly closed. The result was that these valves introduced sufficient friction in the lines to make the discharge pressure on the pump about equal to normal when operating on its usual column line and the motor load came back to a point within its capacity.

ELECTRICIAN.

Problems In Underground Management

Means for Extension and Removal Of Rails at Ends of Rooms

Plan Designed to Speed Rail Recovery So That Track May Be Withdrawn Before Roof Falls—Requires No New Equipment Unless Steel Ties Are Not Being Used

BY THOMAS J. DOWNING, JR.

General Manager, Logan County Coal Corporation,
Lundale, W. Va.

Mine ties of steel as compared with wood ties give greater headroom between the top of the rail and the roof, lessen the height the miner has to raise his coal in loading it into the car, last longer, are handled and stored with greater convenience, are more uniform in quality and size, are laid more easily, cannot be used so as to give the wrong gage but almost above all permit of prompt recovery of track from the zone of danger when a fall is imminent near the face of a room or in the pocket of a pillar that is being drawn back.

As they are not cumbersome in either size or shape and as the method by which the rails are attached to them is one that makes tracklaying easy, miners can readily draw them back when a fall of roof impends.

The means for extending and removing extension rails in the mines of the Logan County Coal Corporation, at Lundale, W. Va., is illustrated herewith. It has been used for many years in those workings with such success that we have felt warranted setting it up as one of our standard practices. It not only provides a way of extending two slide rails from the permanent room track to the face but it also en-

ables the miner to pull them out of danger with little manual effort whenever conditions at the face indicate the possibility of a roof fall.

As the illustration shows, the rails used for extension are of full length, and slide along the outside of the permanent rails. Two switch points are used in jumping from the permanent to the slide rails. The first attachment of a steel tie to the slide rail is made at the switch point by causing the button on the tie to engage the switch point.

Then two ties are placed on each side of the joint between the permanent rail and the butt end of the switch point. Those portions of the slide rails which extend in front of the switch points are joined by ties spaced at regular intervals as if the track were permanent. It will be noted that the ties to the rear of the switch point do not connect the permanent track in any way with the slide rails.

When this method is used for the laying of room track, no gob must be left near the loose rails. Otherwise they might be raised thereby to such a level that they would catch the cars passing over the track adjacent to

them, thus causing them to be derailed.

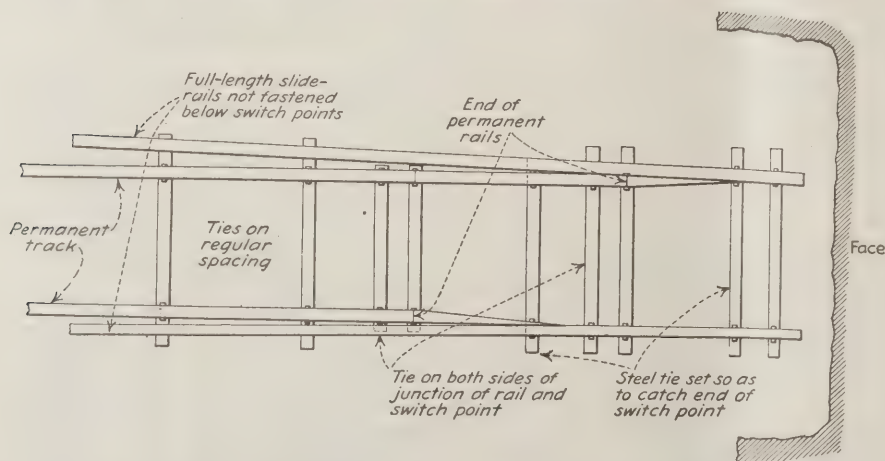
The advantage of this simple arrangement is twofold, as the track may be both laid and torn up with facility. The kicking open of a few lug nuts or clips allows the slide section of the track to be dragged bodily from under a manifestly weak piece of roof. Much steel may be saved by adopting this or a similar arrangement in pillar sections, wherever prevailing dangers and the labor involved otherwise do not warrant attempts at recovering steel once it is buried. Details for governing the exercise of this practice are scarcely necessary. Whether the track is laid to the face by company men or the miners themselves, the bosses whose duty it is to see that the workmen do their work in a manner that will avoid accidents at the same time can save steel by giving proper instructions when necessary.

Fighting Coal-Dust Menace In the Transvaal

Says H. Walker, inspector of the Scotland division of Great Britain, in his report for 1919: "The usual attitude at any particular mine where coal dust occurs is a ready acceptance of the fact that, generally speaking, such dust is dangerous, but a firm belief that in the mine under consideration it is perfectly harmless. Such an attitude is difficult to combat. All argument, other than a rude awakening in the shape of a disastrous explosion, I fear, would be futile." He could not have put the matter more fortunately had he been writing about the United States and its coal mines.

With these words of Mr. Walker, J. P. Hindmarsh prefaces his remarks on coal-dust explosion prevention in the "Annual Report of the Department of Mines of South Africa, 1922," as acting chief inspector of coal mines. He says "The necessity for dealing with coal dust becomes more and more pressing as the mines get older and larger areas are opened up. Coal begins to flake off the pillars left standing, and this in turn is ground into dust by the feet of the men and horses and the wheels of cars in transit."

He adds that at least "one mine in this state has commenced rock dusting." The Abermain Seaham Collieries, Ltd., has installed at its No. 2 Seaham Colliery a ball mill for crushing rock. It is belt-driven from a vertical steam engine of 25 hp., a conveyor being built from the shaft top to the mill, which is



SWITCH-POINT METHOD OF EXTENDING TRACK AT WORKING FACE

Ordinary steel ties are used but switch points are provided, held in place at both ends by ties. These switch points, of course, are kept closed at all times, as they furnish the means of passing from the permanent to the extension track and back again.

about 20 ft. therefrom. The shale is obtained from the roof of the Borehole Seam.

In order to prevent any coal from being mixed with it, it is hand-filled into cars, the rock being taken from the goaf edge of pillars and sent out of the mines. When the cars reach the top of the shaft they are tipped direct into a chute, or hopper, at the mill. The shale runs down the chute onto the mill floor and is there broken into cubes not larger than 6 in. across and fed into the mill by hand. The man attending the engine and mill breaks the stone and feeds it to the mill, the capacity of which is 1,000 lb. per hour of the finished product.

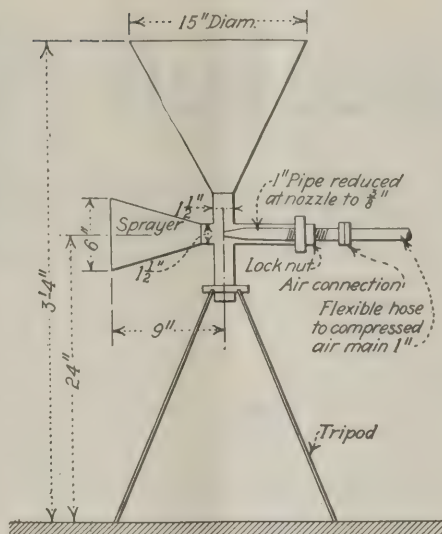
On leaving the mill the rock dust falls into a small hopper and then into a car standing on rails at the surface level. When the car is full it can be run direct into the cage at the surface. When it reaches the mine workings it is distributed along the haulage road (either loose or in bags) into stations about 220 ft. apart. In practice this distance has been found not too long for the thorough rock dusting of the roadway. The dust is distributed by ejectors operated by compressed air at a pressure of 80 lb. per square inch. A short length of 1-in. hose is attached to the air main at one end and to the ejector at the other, the nozzle being reduced from 1 in. to $\frac{3}{8}$ in. Rock dust is filled into the funnel-shaped vessel by hand and is blown out of the sprayer in a dense cloud which is carried forward and distributed by the air current.

AIR WILL CARRY DUST A MILE

Dust has been deposited in this way over a mile from the injector with an air current having a velocity of about 480 ft. per minute, but to make an effective distribution it has been found necessary to have injectors every 220 ft., as previously stated. In this way a ton of dust can be sprinkled over the gallery in about an hour. The rule at present is to distribute 2 tons each shift, the dust being thus scattered only at night.

The cost of preparing and distributing the dust is estimated at about 2c. per ton on an output of 1,200 tons per day, the charge covering interest and depreciation. This does not include cleaning up or preparing the roadways. In preparing the roadway before stone dusting all the debris is not sent out of the mine. A new face wall is built, and the debris put behind it. The cost of erecting and equipping the mill complete was about \$8,500. The stone dust, being of a light color as compared with the dull black surface of the coal, noticeably improves the illumination of the roadways.

The shale contains water evaporated at or below 100 deg. C., 1.25 per cent; volatile matter and water evaporated above 100 deg. C., 10.47; combined silica, 22.68; free silica, 33.30; alumina, 15.64; ferric-oxide iron, 8.60; titanium dioxide, 0.60, and carbon, 1.70. The free silica may appear high, but it may be said that the Altofts shale has 35



SPRAYS INERT DUST OVER LOOSE COAL IN ROADWAY

Set 220 ft. apart these ejectors cover the floor, sides and timbers of roadways with fine dust, which makes them almost explosion-proof.

per cent of that ingredient out of a total silica content of 52 per cent. Long experience has shown that it could be used with perfect impunity in the dusting of mines, not being harmful to the lungs. The silica dust is believed not to be injurious when mixed with coal dust. Under the microscope no sharp angles can be seen and the dust is very fine.

It will be noted in passing that the rock is broken down by hand and not by a jaw crusher, as might be more economical. Nothing is said as to the cost of the air. The plan of storing the dust from the roadways in the mine is not one which would seem likely to meet with commendation, even though a face wall is left as a partial defense against the raising of a dust cloud.

Peril in Use of Carbide Lamp When Testing for Gas

BY W. H. LUXTON
Linton, Ind.

Narrow, indeed, are the escapes of those who carry a carbide lamp to supplement the light from their safety lamps when making an inspection for gas. A few years ago, one fireboss replaced another at a coal mine because the latter was desirous of taking a much needed vacation. While making his examination with a safety lamp the fireboss who was preparing to leave carried a carbide lamp with him, being careful to hold it low. All went well—that morning. When the new fireboss made his visit he also took a carbide lamp, but left it well back when approaching the face of a working place.

He soon had occasion to realize that his precaution was well taken. On entering one of the places which he had to examine he ran into a large body of gas at a point 80 to 100 ft. from the face of the entry. What the result would have been had he carried his

carbide lamp with him may well be imagined.

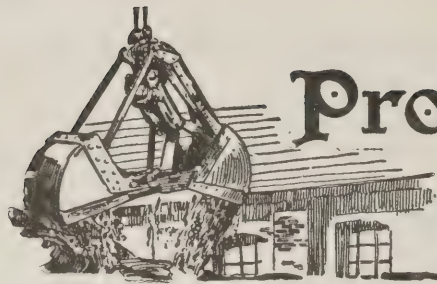
The ventilation of that section of the mine depended on the operation of a booster fan, which was running when he reached it. He would have known full well, had he found it standing still, that the headings would be full of gas. He did not know, however, that the fan had been stopped and was started again only a short time before his arrival by one of the night shift who failed to notify the fireboss of the circumstance. Just such happenings as this have cost many a fireboss his life, and only his leaving the carbide lamp which he carried on his trip a safe distance behind saved that particular fireboss from a similar fate.

Use Electric Sprinkling Tanks To Water Roads in West

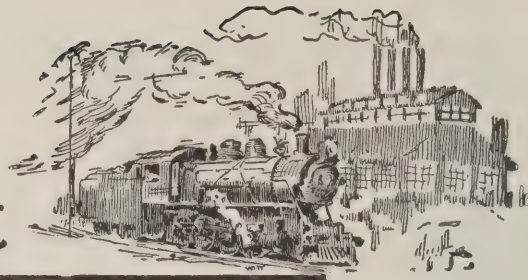
Without sufficient pressure to wet down roof and ribs no water car can be effective in mine sprinkling. The sprinkling of roadways with a mere tank car is not effective, as it does not touch the dry, fine, settled dust on timbers and rib ledges. This was the dictum of D. Harrington in a report on the prevention of coal-mine explosions to the chairman of the committee on safety of the Rocky Mountain Coal Mining Institute.

In discussion William Littlejohn, general superintendent of the Utah Fuel Co., Castle Gate, Utah, said that the coal at the Castle Gate mine was the most inflammable that had been tested at the Pittsburgh Station of the U. S. Bureau of Mines. He said that at Castle Gate and Sunnyside had been built two 500-gallon tank trucks each with a pump on one end of the truck driven by a motor which gets its power from the mine circuit. The other end of the truck has a semicircular perforated pipe. The truck is hooked onto an electric locomotive. When the pump is started it throws a fine spray which wets roof, sides and floor. With it a roadway that a man with an ordinary hose and spray could sprinkle only in two shifts, could be wetted down in half a day and the job would be more thoroughly done.

The company is expecting to use the system on rope haulageways, which, of course, will have to be run by a reel from the feed lines. The conductor lines on these reels will have to be about 400 ft. long. George B. Pryde, the general superintendent, said that the Union Pacific Coal Co. had also built two tank cars of 600 gallons capacity which are connected with hose so that the water can flow from one tank to the other. A centrifugal pump mounted on a truck is connected to the front tank. This pump takes its power from the trolley wire. The discharge from the pump being perforated it sprays the floor and sides of the entries. This water train will be used on such main haulageways as have no sprinkling equipment.



Production and the Market



Weekly Review

Weather conditions and the usual holiday spirit dominate the soft-coal market. Production is in keeping with the general downward tendency toward the end of each year; in both hard- and soft-coal fields there is a letting down in demand. The Geological Survey summarized conditions last week by noting that twenty-one districts out of thirty-two record a gain in time lost because of lack of demand; and twenty-four districts are operating with losses of 40 per cent or more of full time capacity due to poor market.

Thanksgiving Day, which was more generally observed than in previous years, resulted in a heavy cut in production, output during the week ended Dec. 1 amounting to 8,923,000 net tons, a decline of 1,237,000 tons from the previous week and 14 per cent less than for the corresponding week of last year. Output for last week, it is estimated, will not exceed 10,000,000 tons. For the first 283 working days of the present year production has been 506,813,000 net tons, according to the Geological Survey, which is about 33,000,000 tons below the record year of 1918, but larger than the low years of 1919, 1921 and 1922.

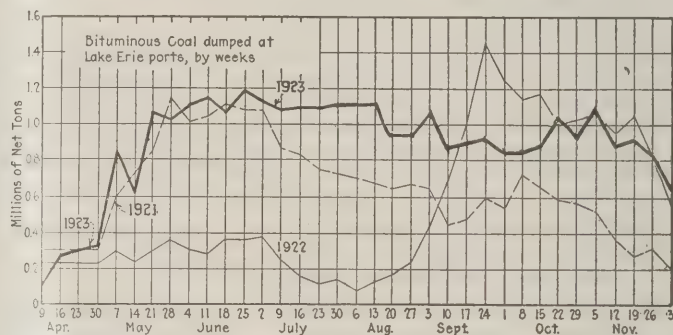
PRICES REFLECT LOW DEMAND

The downward tendency of the market is reflected in *Coal Age* Index as of Dec. 10, which stands at 180 as compared with 181 for the previous week, with an average price of \$2.18, a drop of 1c. and a new low mark for the present year. Increases in Standard, eastern and western Kentucky, Hocking and Kanawha districts were overcome by decreases in southern Illinois, Mt. Olive, Springfield, Clinton, Pocahontas, Cambria and Somerset coals.

There was a drop in demand in all domestic sizes of southern Illinois coal and with the exception of screenings the market in the central and western parts of the country was lifeless. In most parts of Ohio the smokeless market was draggy and dull, the greatest activity

being noted in slack. Retail dealers are stocked up and householders do not want to add to their winter supply. Steam coals move slowly and with lake shipments almost ended it is expected that demand for everything except slack will show a more pronounced falling off. Pittsburgh is in poor shape as far as demand goes, while operators in central Pennsylvania assert that they see a slight betterment. There is no improvement noted along the Atlantic seaboard.

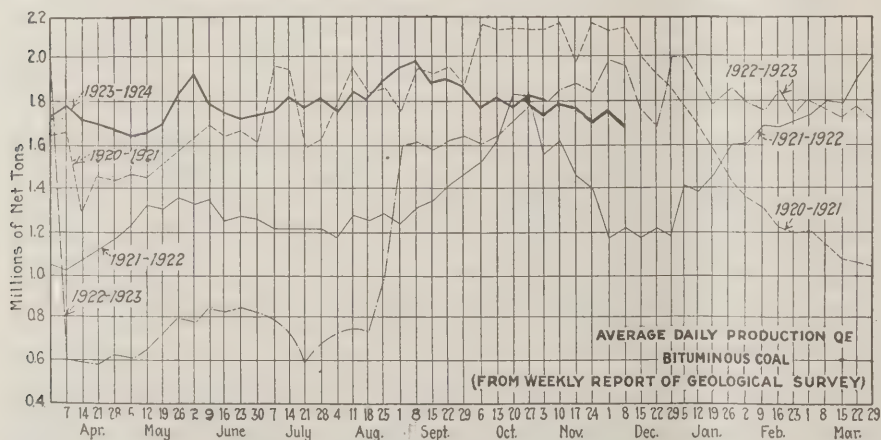
In the East there is moderate interest in the market after Jan. 1. Consumers are inquiring for contract



	Week Ended Dec. 3	Season to Dec. 3
Cargo	573,132	29,640,945
Fuel	28,106	1,589,575
Totals	601,238	31,230,520

prices covering the first quarter of 1924, but some operators are inclined to hold back for the open market. It is reported that bunker prices covering the entire twelve months had been quoted at \$6.25@ \$6.50.

Easier conditions are evident in the anthracite market. There is less urgency and with less hard coal going westward for lake shipment quotations for independent product are slightly lower than they were a week ago. Production for the week ended Dec. 1 is estimated to have



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Nov. 17	11,215,000	9,717,000
Nov. 24 (a)	11,100,000	10,160,000
Dec. 1 (b)	10,387,000	8,923,000
Daily average	1,982,000	1,763,000
Calendar year	365,437,000	506,813,000
Daily av. cal. year	1,289,000	1,792,000

ANTHRACITE

Nov. 17	2,230,000	1,725,000
Nov. 24	2,213,000	2,100,000
Dec. 1	1,852,000	1,748,000
Calendar year	46,718,000	88,204,000

COKE

Nov. 24 (b)	288,000	257,000
Dec. 1 (a)	298,000	244,000
Calendar year	6,900,000	16,936,000

(a) Subject to revision. (b) Revised from last report.

been 1,748,000 net tons, a drop of 352,000 tons from the previous week, due to the holiday and the last day of the week being pay day for the workers. It is not anticipated by the Geological Survey that the output for last week reached 2,000,000 net tons.

France again led all other countries as buyer of coal from Baltimore during November, recovering the lead attained during August and September. During November thirteen vessels leaving Baltimore carried 62,389 tons of bunker and cargo coals, and one ship took 4,050 tons of coke. In October of this year ten ships took 51,753 tons of cargo and bunker coals, and two ships carried 5,375 tons of coke.

Midwest Slumps Lower

A drop in prices on all domestic sizes of southern Illinois coal took effect Monday of this week. Warmth prevails throughout the whole central and western part of the country and the market is absolutely lifeless on everything but

screenings. There would be little interest even in steam coals were it not for the low output of practically every mine. The price of fines has risen enough to move several producers to begin crushing their lump.

Southern Illinois screenings brought \$1.75 at the end of last week and were strong at the price. Central Illinois fine sizes ranged around \$1.50 and Fourth and Fifth Vein Indiana screenings, respectively, were moving at those two quotations. The only hope of Midwest operators for the rest of the month lies in steam coal, barring a blizzard of considerable length, for there is little money in the new scale of prices. Franklin County lump, egg and nut in the new circular are now \$3.75, \$3.50 and \$3.25 as compared with previous figures 25c. to 60c. above those levels.

Practically all domestic coals are weak at whatever the circulars call for. East Kentucky, which has been striving to hold firm at \$3.50, is sinking and west Kentucky lump is going at almost any bid. The flood of cheap Pocahontas mine-run—\$1.50@2 at the mine—is having a marked effect upon trade throughout Indiana, Illinois and parts of Iowa and Michigan.

Several Illinois mines have been idle for over a week,

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Midwest						
Market Quoted	Dec. 11 1922	Nov. 26 1923	Dec. 3 1923	Dec. 10 1923†	Market Quoted	Dec. 11 1922	Nov. 26 1923	Dec. 3 1923	Dec. 10 1923†		
Smokeless lump.....	Columbus....	\$6.25	\$4.10	\$4.10	\$3.50@4.00	Franklin, Ill. lump.....	Chicago....	\$5.25	\$4.10	\$4.10	\$3.50@3.75
Smokeless mine run.....	Columbus....	6.00	2.10	2.10	2.00@2.25	Franklin, Ill. mine run...	Chicago....	4.10	2.35	2.35	2.25@2.50
Smokeless screenings.....	Columbus....	5.50	1.30	1.30	1.20@1.35	Franklin, Ill. screenings...	Chicago....	2.35	1.45	1.55	1.65@1.75
Smokeless lump.....	Chicago....	7.75	4.50	4.10	3.25@3.50	Central, Ill. lump.....	Chicago....	4.25	3.10	3.10	2.75@3.25
Smokeless mine run.....	Chicago....	6.25	2.25	2.00	1.50@2.00	Central, Ill. mine run...	Chicago....	3.10	2.10	2.10	2.00@2.25
Smokeless lump.....	Cincinnati...	6.55	4.25	3.10	3.00@4.00	Central, Ill. screenings...	Chicago....	1.65	1.05	1.35	1.40@1.50
Smokeless mine run.....	Cincinnati...	5.40	2.10	2.00	1.75@2.25	Ind. 4th Vein lump.....	Chicago....	5.10	3.35	3.35	3.00@3.50
Smokeless screenings.....	Cincinnati...	5.30	1.50	1.35	1.25@1.75	Ind. 4th Vein mine run...	Chicago....	3.85	2.60	2.60	2.50@2.75
*Smokeless mine run.....	Boston.....	7.75	4.65	4.60	4.40@4.60	Ind. 4th Vein screenings...	Chicago....	2.25	1.35	1.55	1.60@1.75
Clearfield mine run.....	Boston.....	3.60	2.15	1.85	1.50@2.25	Ind. 5th Vein lump.....	Chicago....	4.75	2.50	2.50	2.25@2.75
Cambria mine run.....	Boston.....	4.35	2.60	2.50	2.00@2.75	Ind. 5th Veit mine run...	Chicago....	3.60	2.10	2.10	2.00@2.25
Somerset mine run.....	Boston.....	3.85	2.35	2.10	1.75@2.50	Ind. 5th Vein screenings...	Chicago....	2.00	.95	1.30	1.40@1.50
Pool 1 (Navy Standard)...	New York....	5.25	3.00	3.00	2.75@3.25	Mt. Olive lump.....	St. Louis....	.....	3.10	3.10	2.75@3.25
Pool 1 (Navy Standard)...	Philadelphia..	5.15	3.00	3.00	2.80@3.20	Mt. Olive mine run.....	St. Louis....	.....	2.25	2.25	2.20@2.30
Pool 1 (Navy Standard)...	Baltimore....	5.00	.....	.....	.....	Mt.Olive screenings.....	St. Louis....	.....	1.25	1.25	1.50@1.60
Pool 9 (Super. Low Vol.)...	New York....	4.60	2.35	2.35	2.00@2.50	Standard lump.....	St. Louis....	4.25	3.05	3.05	2.75@3.00
Pool 9 (Super. Low Vol.)...	Philadelphia..	4.65	2.30	2.30	2.25@2.45	Standard mine run.....	St. Louis....	2.25	2.05	2.05	1.80@2.30
Pool 9 (Super. Low Vol.)...	Baltimore....	4.35	2.05	2.05	2.25	Standard screenings.....	St. Louis....	1.35	.55	.55	1.10@1.25
Pool 10 (H.Gr. Low Vol.)...	New York....	4.00	2.00	2.00	1.65@2.25	West Ky. lump.....	Louisville...	3.75	3.00	3.00	2.75@3.25
Pool 10 (H.Gr. Low Vol.)...	Philadelphia..	3.95	1.85	1.85	1.75@2.00	West Ky. mine run.....	Louisville...	2.25	1.75	1.70	1.50@1.90
Pool 10 (H.Gr. Low Vol.)...	Baltimore....	4.00	1.90	1.90	2.20	West Ky. screenings.....	Louisville...	1.50	.65	.70	.80@1.25
Pool 11 (Low Vol.).....	New York....	3.25	1.55	1.65	1.60@2.00	West Ky. lump.....	Chicago....	3.85	2.85	2.85	2.75@3.00
Pool 11 (Low Vol.).....	Philadelphia..	3.35	1.70	1.70	1.60@1.75	West Ky. mine run.....	Chicago....	2.60	1.75	1.75	1.50@2.00
Pool 11 (Low Vol.).....	Baltimore....	3.10	1.75	1.75	1.90						
High-Volatile, Eastern					South and Southwest						
Pool 54-64 (Gas and St.)..	New York....	\$2.80	\$1.60	\$1.60	\$1.50@1.75	Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@4.00
Pool 54-64 (Gas and St.)..	Philadelphia..	3.35	1.65	1.65	1.50@1.75	Big Seam mine run.....	Birmingham..	2.35	1.95	1.95	1.75@2.15
Pool 54-64 (Gas and St.)..	Baltimore....	3.00	1.70	1.70	1.85	Big Seam (washed).....	Birmingham..	2.60	2.35	2.35	2.25@2.50
Pittsburgh se'd gas.....	Pittsburgh...	5.25	2.55	2.55	2.50@2.60	S. E. Ky. lump.....	Chicago....	6.25	3.25	3.10	3.00@3.25
Pittsburgh gas mine run...	Pittsburgh...	.....	2.25	2.25	2.20@2.30	S. E. Ky. mine run.....	Chicago....	4.25	1.85	1.85	1.75@2.00
Pittsburgh mine run (St.)...	Pittsburgh...	2.60	2.00	2.00	2.00@2.10	S. E. Ky. lump.....	Louisville...	6.35	3.50	3.35	3.00@3.75
Pittsburgh slack (Gas)...	Pittsburgh...	3.25	1.25	1.30	1.50	S. E. Ky. mine run.....	Louisville...	3.35	1.85	1.75	1.50@2.00
Kanawha lump.....	Columbus....	5.25	3.00	3.00	2.85@3.15	S. E. Ky. screenings.....	Louisville...	3.25	.75	.80	.65@.85
Kanawha mine run.....	Columbus....	3.25	1.85	1.85	1.75@2.00	S. E. Ky. lump.....	Cincinnati...	5.85	2.60	3.00	2.75@3.50
Kanawha screenings.....	Columbus....	2.80	.80	.80	.75@1.00	S. E. Ky. mine run.....	Cincinnati...	3.35	1.50	1.50	1.35@1.75
W. Va. lump.....	Cincinnati...	5.75	3.15	2.75	2.50@3.25	S. E. Ky. screenings.....	Cincinnati...	2.80	.85	.65	.65@1.25
W. Va. Gas mine run.....	Cincinnati...	3.35	1.50	1.50	1.50@1.75	Kansas lump.....	Kansas City..	5.00	5.10	5.10	4.50@5.00
W. Va. Steam mine run...	Cincinnati...	3.25	1.50	1.50	1.50@1.75	Kansas mine run.....	Kansas City..	3.50	3.25	3.25	3.00@3.50
W. Va. screenings.....	Cincinnati...	3.00	.85	.50	.75@1.00	Kansas screenings.....	Kansas City..	2.50	2.00	2.00	2.00
Hocking lump.....	Columbus....	4.75	2.95	2.95	2.85@3.10						
Hocking mine run.....	Columbus....	2.60	1.85	1.85	1.75@2.00						
Hocking screenings.....	Columbus....	2.50	.80	.80	1.00@1.10						
Pitts. No. 8 lump.....	Cleveland...	4.10	2.55	2.55	1.90@3.00						
Pitts. No. 8 mine run.....	Cleveland...	3.10	1.95	1.90	1.90@2.00						
Pitts. No. 8 screenings...	Cleveland...	2.85	1.15	1.40	1.30@1.40						

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

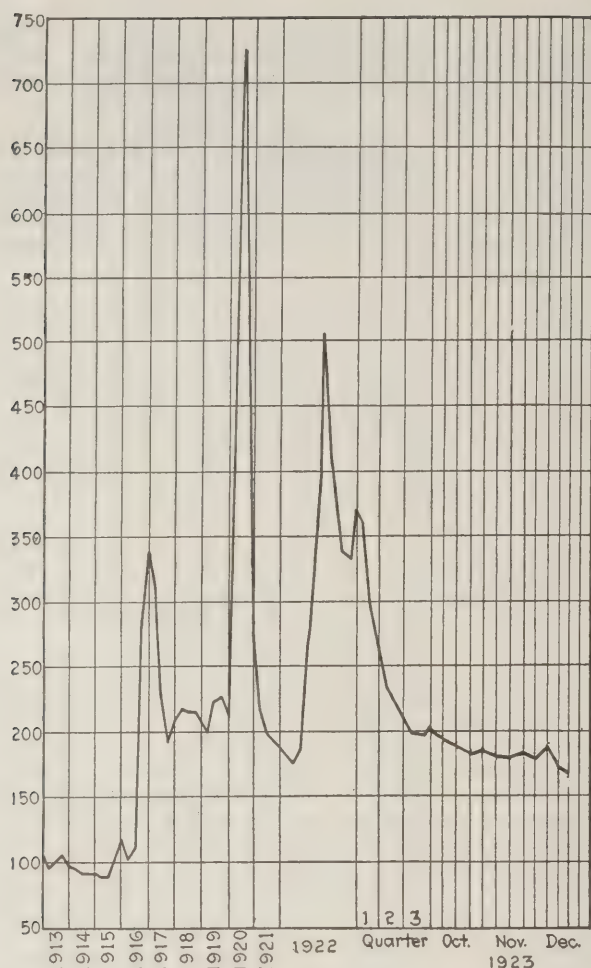
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

Market Quoted		Freight Rates	Dec. 26, 1922		Dec. 3, 1923		Dec. 10, 1923†	
			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@8.25	\$8.50@10.00	\$8.00@9.25	\$8.50@10.00	\$8.00@9.25
Broken.....	Philadelphia.....	2.39		7.90@8.10				
Egg.....	New York.....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@11.00	8.75@9.25
Egg.....	Philadelphia.....	2.39	9.25@11.00	8.10@8.35	9.85@12.20	8.75@9.25	9.85@12.20	8.75@9.25
Egg.....	Chicago*.....	5.06	12.50@13.00	7.20@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Stove.....	New York.....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.00	8.75@9.25
Stove.....	Philadelphia.....	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Stove.....	Chicago*.....	5.06	12.50@13.00	7.35@8.25	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Chestnut.....	New York.....	2.34	9.25@12.00	8.00@8.35	9.85@12.25	8.75@9.25	9.85@12.00	8.75@9.25
Chestnut.....	Philadelphia.....	2.39	9.25@11.00	8.15@8.35	9.85@12.20	8.90@9.25	9.85@12.20	8.90@9.25
Chestnut.....	Chicago*.....	5.06	12.50@13.00	7.35@8.35	9.60@12.50	8.00@8.35	9.60@12.50	8.00@8.35
Range.....	New York.....	2.34		8.25		9.00		9.00
Pea.....	New York.....	2.22	7.00@11.00	6.15@6.30	6.15@7.50	6.15@6.65	6.00@7.25	6.15@6.65
Pea.....	Philadelphia.....	2.14	7.00@8.00	6.15@6.20	6.75@9.00	6.35@6.60	6.75@9.00	6.35@6.60
Pea.....	Chicago*.....	4.79	7.00@8.00	5.49@6.03	6.00@6.75	5.40@6.05	6.00@6.75	5.40@6.05
Buckwheat No. 1.....	New York.....	2.22	4.00@5.00	4.00@4.10	1.75@3.50	3.50	1.75@3.50	3.50
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	2.25@3.50	3.50	2.25@3.50	3.50
Rice.....	New York.....	2.22	3.00@3.25	2.75@3.00	1.25@2.50	2.50	1.35@2.50	2.50
Rice.....	Philadelphia.....	2.14	2.50@2.75	2.75@3.00	1.75@2.50	2.50	1.75@2.50	2.50
Barley.....	New York.....	2.22	1.75@2.00	1.50@2.00	1.00@1.50	1.50	1.25@1.50	1.50
Barley.....	Philadelphia.....	2.14	1.00@1.75	2.00	1.00@1.50	1.50	1.00@1.50	1.50
Birdseye.....	New York.....	2.22		2.10		1.60	1.25@1.45	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923		1922	
	Dec. 10	Dec. 3	Nov. 26	Dec. 11
Index	180	181	186	325
Weighted average price	\$2.18	\$2.19	\$2.25	\$3.93

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

unable to move sizes. This is causing a shortage of screenings. Some mines work one day a week and a few get as much as four days. Railroad tonnage is light. Car supply is good and general dissatisfaction prevails throughout all southern Illinois fields among the miners. In the DuQuoin and Jackson County field operations have almost ceased, excepting at a few mines that get three and four days a week. Prices range up to but seldom above cost.

In the Mt. Olive field everything is at a standstill on account of inability to move domestic sizes. The smaller steam sizes are all cleaned up. The same condition prevails in the Standard district, where screenings and small nut are scarce and everything else is unbilled. The Mt. Olive district gets about one day a week work. In the Standard district they get from one to two days a week, excepting railroad mines.

St. Louis Does Little

A little cool weather keeps some coal yards moving small quantities of the middle grade coal. Domestic demand is very light and there is little moving, with all yards loaded. The consuming public will not buy Franklin County lump at \$8 when Mt. Olive is \$6.50 and Standard \$5.25. There is no demand for smokeless, anthracite or coke. Country domestic is also light. Local wagonload steam shows some

improvement. Carload is slow and the steam demand here is usually for shipment to Chicago or the north.

Kentucky Unhappy Too

General reports from the west Kentucky field indicate that business is slow and that additional mines are closing down through lack of market. About sixty of the really permanent type of mines are down, and the balance are running irregularly at about 30 per cent of potential time and 28 per cent of potential capacity. Strip mines are reported to have shipped something over 1,700 cars of coal in November—a little over 10 per cent of the total moved from the field.

Operators are endeavoring to push up screenings in price, but are meeting with cheap screenings from eastern Kentucky and other sections. Some mines are producing little prepared coal, and haven't many cars of screenings to sell, or have contracted or sold for the time being, with the result that they are quoting high to force a stiffer market, but without much result.

Car supply is full on all Kentucky roads. Prices show little change, though some eastern Kentucky coal in distress lately has sold down to the bottom. Horse Creek, Harlan and Hazard have all contributed their share of this.

Northwest Trade is Somnolent

Nothing has happened during the week to awaken any fuel interest in the Northwest except the virtual wind-up of the shipping season. Tremendous dock supplies are now at the Head-of-the-Lakes and all the other ports down to Milwaukee, both of soft coal and anthracite. This is so comforting to Northwest consumers that the warmth of the week lulled them practically to sleep and trade is flat. Shipments off the docks is slow.

Government engineer office figures show total receipts at the Head-of-the-Lakes up to Dec. 1 to have been 12,529,758 tons—over 11,000,000 tons of soft coal and 1,400,000 of anthracite—which compares with only 7,125,000 tons last year and an average of about 9,120,000 tons for the past ten years. November shipments to Duluth, 1,440,000 tons of soft coal and 215,321 tons of hard, were greater than was expected. Insurance goes off Dec. 12. Milwaukee season totals to Dec. 1 were 3,155,000 tons of bituminous and 930,000 tons of anthracite.

West Idles Along

Prevailing pleasant weather holds down the coal business throughout the Kansas City, Denver and even the Salt Lake City regions in spite of a snow flurry in Utah. Working time in that state is barely 50 per cent and low production aids the screenings price a little, but only enough to stop the dumping that has been general. Utah mine prices on lump, egg and pea are \$4.50, \$3.75 and \$2. The Colorado market continues to slump with the December summer weather. Working time in a majority of the mines in the state averaged twenty-five hours last week. Price circulars have not changed since Sept. 1.

A slight surplus of Kansas lump and nut has begun to collect at mines, with no relief from the screenings surplus, evident all the season. There is little demand for Arkansas semi-anthracite of any grade and there is talk of closing down more mines throughout the Southwest. Various operating concerns report their mines working from 40 to 60 per cent of normal. Circulars remain the same as last month, though reports of shading are becoming more numerous.

Ohio Market Dull

The market for smokeless coals in the Cincinnati territory continues draggy and dull. Weather conditions are not suitable for coal consumption. Slack no longer goes begging, although the demand for other coals is slow and inactive. Supplies at Toledo are reported to be heavy. With the gradual dropping in the price of domestic coals and the disposition of mine run to hold up, more and more of the heavy producing mines still running have turned to the making of unscreened coals.

The dullness in the Columbus market was attributed

largely to weather conditions. Dulness prevailed in both the steam and domestic trade and it is the belief of producers and shippers that lower temperatures will be needed to stimulate the market. Retail dealers are well stocked and householders refuse to buy. With the end of the year near dealers are inclined to await the inventory season before adding to their supplies. There is no activity in the steam trade. Reports received by the Southern Coal Exchange show that during the week ended Nov. 24 output from 443 mines, with a capacity of 695,490 tons, amounted to 168,295 tons. "No market" was responsible for a loss of 491,544 tons.

Conditions in the Cleveland market are slow. Steam coal does not move in good volume and domestic coal consumption is not large because of weather conditions. Production in the eastern Ohio field is lower and a still greater decline is expected to follow the stoppage of lake shipments.

Operators and dealers in the Pittsburgh district alike regard the coal market as in very poor condition. Prices on slack are higher and on steam mine-run a shade firmer. The advance in slack was expected, with the cutting off of a large production on account of the ending of the lake season, and to make the situation worse steam lump softened. Sellers of bituminous coal have been unable to develop any interest among buyers in a possible strike or suspension on April 1, buyers acting as if it was a foregone conclusion that the scale will be renewed on the old basis without any interruption. Conditions at Buffalo continue dull with practically no demand. More West Virginia coals are being received than is generally the case.

New England Industries Marking Time

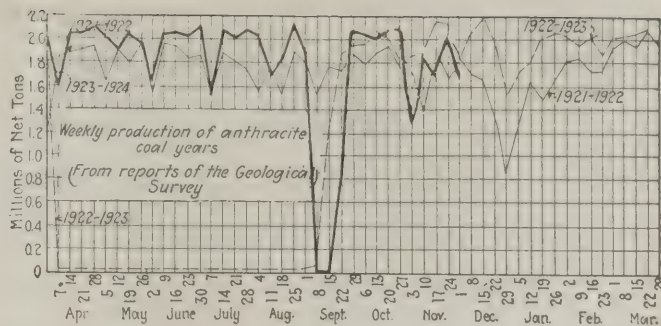
Industries in New England for the most part are marking time and there is nothing in the present situation to justify adding to present large stocks of coal for steam use. There is no buying of any moment and any improvement in demand is now unlikely until after the holidays. A few special lines of textiles are having fair business, but the bulk of New England's cotton-goods trade is stagnant. If prices move up in January it is possible that there might on that account be somewhat better inquiry for bituminous.

The Hampton Roads agencies are very much in the doldrums. Several of the large producers have restricted output to the barest requirements of contract obligations and tonnages are correspondingly light. Prices continue on last week's level, an occasional sale in cargo lots returning to the operator \$4.35@\$4.50 per gross ton, f.o.b. vessel, or \$1.83@\$1.98 at the mine, for coal No. 1 Navy standard grade.

On cars Boston and Providence there are quotations of wide range, \$5.50@\$6 being "mentioned," but it is said that 500-ton lots are still being disposed of at \$5.25@\$5.40.

All-rail inquiry is almost nil. Reasonably good grades of Pennsylvania coals roughly classified as "Pool 9" are offered down to \$2 at the mine, with less favorably known coals quoted at \$1.60@\$1.75. There appears no opening for coal all-rail so long as the New River and Pocahontas factors are obliged to hammer down prices in order to move coal.

There is coal from the Pennsylvania districts moving by the water route, especially from Philadelphia, but investigation shows the cargoes are made up either of gas coal for



illuminating purposes or they are going forward on purchases made at a time when Southern coals were much higher in price.

Better Tone on Seaboard

The soft-coal market at New York boasts of a better tone. Inquiry is greater, but actual business is slow. The tidewater market is stronger and prices firmer. Consumers are inquiring as to the prospects after Jan. 1 and until April 1, when the present wage agreement with the soft-coal producers expires. Some operators are inclined to take chances in the open market after Jan. 1, instead of making contracts covering the first three months of 1924. Receipts at tidewater piers last week were well above the previous week, while daily dumpings for the first five days of the week at four of the largest piers averaged 380 cars. No change in conditions was noted at Philadelphia. Demand remains quiet. With the exception of slight increases in the various grades of soft coal at Baltimore that market shows no change. Demand is poor and dealers have a hard time booking new orders.

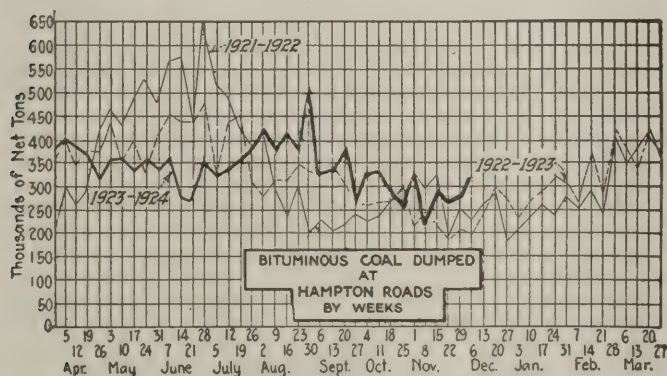
Conditions at Birmingham present no encouraging features. Buying of commercial coal is practically at a standstill, but there has been a slight improvement in domestic sales and more favorable conditions exist for further betterment in the demand of household coals. Railroads are stocking some coals for the holidays, but on account of the limited schedule on which mines are now operating the holidays will have little effect on the output.

Anthracite Demand Easier

The anthracite market is easier. Cancellations continue to be received by some New York wholesale dealers, and retailers find that receipts of the favorite sizes are larger. Egg and pea coals are easy, while stove and chestnut are being received in large enough tonnages to take care of immediate needs. Some retail dealers in sections of New York City are advertising all sizes for immediate delivery. Quotations for independent domestic coals are gradually lowering. Pea coal was offered during the week alongside, New York harbor, on a basis of about \$6, f.o.b. mine, and it was said that a public utility corporation had received bids for more than 1,000 tons of this sized coal at a similar figure. The steam coals are hard to move and quotations for the cheaper grades are low.

Conditions at Philadelphia remain quiet but dealers find no difficulty in placing all the stove and chestnut sizes they receive. At Baltimore although dealers complain of the lack of shipments, there is no great rush on the part of consumers.

The general tone of the Connellsville coke market is not as good as a couple of weeks ago and is not justifying all the expectations recently entertained by operators, based on the recent pig-iron buying movement. The report is confirmed that two furnace interests contracted for first-quarter coke at \$4.40, but that particularly good coke was involved. Standard coke is being offered at around \$4.25. Two makers of particularly high-class foundry coke have put out prices for first quarter at from \$6 to \$6.50 and it is said some contracts have been closed. Production of beehive coke during the week ended Dec. 1, according to the Geological Survey, amounted to 244,000 net tons, as compared with 257,000 tons the previous week.



Foreign Market And Export News

British Coal Production Increasing; Prices Show More Strength

Quotations on various grades of British coal for the week ended Dec. 8 show a substantial increase over the previous week, as a result of a firmer demand. Production is increasing, output for the week ended Nov. 24 amounting to 5,726,000 tons, according to a cable received by *Coal Age*, as compared with 5,574,000 tons the previous week, a gain of 152,000 tons. Output for the corresponding week of last year was 5,471,800 tons.

The Welsh market is much steadier and all the principal operators report having sold their output to the middle of December. Inquiry is steady, but rough weather is delaying shipping. Operators are well pleased over the outlook for December and the early part of January.

French demand is more active but from the rest of Europe inquiry is spasmodic, with Germany buying meagrely. A normal demand is coming from Italy, with a stimulated inquiry from backward shipment. It has been announced that the credits for the purchase of British coal on German account have been partially arranged.

The Newcastle market is strong, the steam coals being materially stiffened by a contract from the German State Railways for 400,000 tons; as a result of the financial credit which has been arranged in London. Shipments are heavy; all sections of Durham coals are active and coking grades are in full demand.

Hampton Roads Receipts Decline

Receipts of coal at Hampton Roads were slower last week owing to the continued strike on the Virginian Ry., resulting in a somewhat upset market. Prices stiffened in consequence.

Coastwise business picked up somewhat, bunkers held their own and foreign trade continued on the downgrade. The prospect for better coastwise trade was brighter, although bunker business was not expected to show material improvement. It is expected that when grain movement becomes active bunker

business will show much improvement.

Domestic prices slumped twice, from \$12.50 to \$10, while anthracite prices were forced down to \$16, unusually favorable weather and slackened demand causing prices to decline.

French Coal Market Dull

Conditions in the French industrial coal market are dull due to less activity in plants and heavy unfilled orders. There has been a slightly better movement of house coals however. Announcement has been made that prices for the various grades are to be raised in the northern coal fields, the increases ranging from 5 fr. to 10 fr. and are to be applied according to mine up to Jan. 15.

The coke situation is improving. During the first twenty-one days of November receipts amounted to 139,000 tons. It is expected that the price for French coke will be increased 10 fr. and a similar increase will be made for German product. It is also expected that Belgian grades will be increased 2.50 fr.

France and Luxemburg during the first ten days of November received 71,900 tons of reparation coal; 98,900 tons of coke and 10,800 tons of lignite, a total of 181,600 tons, as compared with a total of 148,500 tons during the last ten days of October.

Imports of coal during October amounted to 1,935,821 metric tons as compared with 2,619,831 tons, in September, while exports were 121,915 tons in October, as compared with 156,137 tons in the previous month. Coke imported was 282,806 metric tons, as compared with 280,516 tons in September and 44,082 tons was exported in October, as compared with 50,944 tons in September.

Hungary's Coal Production

The mines of Hungary produced 1,724,895 metric tons of coal during the second three months of 1923, as compared with 2,082,626 tons the first quarter of the year, making the total production for the six months 3,807,521 tons, says Vice Consul Reineck, of Buda-

pest, in a report to the Department of Commerce at Washington. The decline in production during the second quarter was caused by a reduction in working hours, many strikes the result of wage disputes, and miners returning to their homes in Czechoslovakia when the operators abandoned the practice of paying part of their wages in Czechoslovak currency. Some progress has been made in the mining industry; two new mines have been opened, and the larger operators have completed surveys for the purpose of extending their workings. Two of the larger operators the report says, have purchased and installed new equipment and begun work on a larger scale. During the first half of 1923 Hungary imported 38,242 metric tons of lignite, 424,550 tons of bituminous coal; 69,319 tons of coke and 1,549 tons of briquets, while its exports were 6,344 metric tons of lignite; 120,799 tons of bituminous coal and 2,741 tons of coke.

Export Clearances, Week Ended Dec. 8, 1923

FROM BALTIMORE

	Tons
Fr. SS. Wesseling	6,896
For Porto Rico:	
Am. SS. Delfina	3,145
For Cuba:	
Am. Schr. Victoria S.	1,077

FROM HAMPTON ROADS

	Tons
For Cuba:	
Br. SS. Berwindvale, for Havana.	7,721
Amer. Schr. George W. Truitt, Jr., for	
Media Luna	1,090
For Africa:	
Amer. SS. West Kedron, for Dakar.	6,452
For British West Indies:	
Amer. Schr. Georgette, for Georgetown.	1,266

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Nov. 28	Dec. 6
Cars on hand.	1,706	1,581
Tons on hand.	100,622	92,373
Tons dumped for week.	116,322	123,709
Tonnage waiting.	9,250	15,375

Virginia Ry. piers, Sewalls Pt.:

	Nov. 28	Dec. 6
Cars on hand.	667	1,246
Tons on hand.	41,550	71,850
Tons dumped for week.	40,422	31,924
Tonnage waiting.	2,300	

C. & O. piers, Newport News:

	Nov. 28	Dec. 6
Cars on hand.	1,217	1,316
Tons on hand.	67,290	67,458
Tons dumped for week.	100,907	119,640
Tonnage waiting.	17,152	5,950

Pier and Bunker Prices, Gross Tons

	Dec. 1	Dec. 8†
Pool 9, New York.	\$4.90@ \$5.25	\$5.00@ \$5.25
Pool 10, New York.	4.75@ 5.00	4.75@ 5.00
Pool 11, New York.	4.40@ 4.75	4.50@ 4.75
Pool 9, Philadelphia.	4.85@ 5.10	4.90@ 5.20
Pool 10, Philadelphia.	4.00@ 4.65	4.50@ 4.90
Pool 11, Philadelphia.	3.95@ 4.00	4.25@ 4.60
Pool 1, Hamp. Roads.	4.50@ 4.60	4.60@ 4.75
Pools 5-6-7 Hamp. Rds.	4.15@ 4.35	4.15@ 4.30
Pool 2, Hamp. Roads.	4.25@ 4.35	4.25@ 4.40

BUNKERS

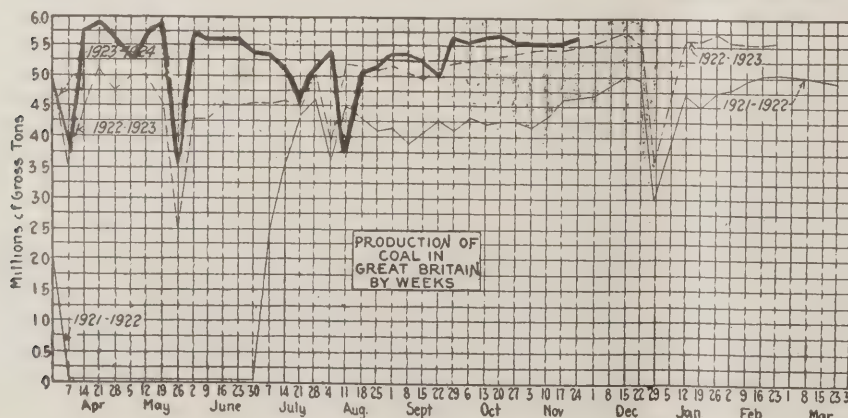
	Dec. 1	Dec. 8†
Pool 9, New York.	5.20@ 5.55	5.30@ 5.55
Pool 10, New York.	5.05@ 5.30	5.05@ 5.30
Pool 11, New York.	4.70@ 5.05	4.80@ 5.05
Pool 9, Philadelphia.	5.10@ 5.50	5.15@ 5.55
Pool 10, Philadelphia.	4.65@ 5.00	4.90@ 5.25
Pool 11, Philadelphia.	4.30@ 4.55	4.65@ 4.90
Pool 1, Hamp. Roads.	4.50@ 4.60	4.60@ 4.75
Pool 2, Hamp. Roads.	4.25@ 4.35	4.25@ 4.40

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Dec. 1	Dec. 8†
Admiralty, large.	28s. 6d.	29s. 6d. @ 30s.
Steam smalls.	19s. @ 20s.	20s. @ 22s.
Newcastle:		
Best steams.	26s.	24s. 6d. @ 26s. 6d.
Best gas.	24s. @ 24s. 6d.	23s. 6d. @ 24s.
Best bunkers.	24s. @ 25s. 6d.	22s. 6d. @ 24s. 6d.

† Advances over previous week shown in heavy type, declines in *italics*.



Traffic News

To Probe Lignite Rate "Plot"

President Coolidge has directed the Interstate Commerce Commission to make an investigation into what appears to Governor R. A. Nestos to be a conspiracy to destroy the coal mining industry of North Dakota by increasing the freight rates on lignite. This action was taken following the receipt of a telegram by the President from Governor Nestos asking for a Congressional inquiry into the proposed advance, which he says, if granted, would virtually destroy the industry.

Governor Nestos has been joined in his request for an investigation by U. S. Senator Shipstead, of Minnesota, who wrote the Interstate Commerce Commission stating that the proposed rates are confiscatory and will throw thousands of laborers out of employment. He adds that the rates are of such a character that they will prevent the movement of lignite and thereby favor Eastern coals.

Governor Nestos' appeal to President Coolidge supplemented instructions to the State Attorney General to investigate to determine if sufficient evidence of conspiracy to violate the Sherman Anti-Trust law has been obtained to be laid before the federal Grand Jury. The railroads have declined to abandon their petition for rate increases and, in response to the protest, the traffic manager of one Northwestern railroad declared that the proposed advance was made on demand of "our connecting lines." Rates temporarily suspended by the Interstate Commerce Commission, pending a hearing.

Soo Coal Traffic Still Heavy

During November 1,918,249 net tons of bituminous coal passed through the Canals Sault Ste. Marie, as compared with 2,031,084 tons in the preceding month. Of this amount 1,902,506 tons went through the United States Canal and 15,743 tons through the Canadian Canal. Anthracite handled amounted to 238,800 net tons, compared with 200,600 tons the previous month. The tonnage passing through the United States Canal was 230,250 tons, the balance going through the Canadian waterway.

Seek Rate on Topographic Basis

George T. Bell, attorney for the Southern Wyoming Coal Operators' Association, on behalf of the Rock Springs-Kemmerer district, has submitted a brief to the Interstate Commerce Commission in connection with the complaint of the Colorado and New Mexico Coal Operators' Association against the Denver & Rio Grande Ry. in which he contends that the Rock Springs-Kemmerer operators "are entitled to an adjustment of rates predicated on a parity between Rock Springs-Kemmerer and Walsenburg be-

cause the topographical, operating and traffic conditions are much more favorable in and from the southern Wyoming districts than in and from the complainant districts. They reasonably may be permitted to retain such an adjustment where they have it on the ground of competitive condition and on the broader and higher ground of public interest," he says.

Lehigh Valley Loadings

During November the Lehigh Valley R.R. loaded 1,030,067 tons of anthracite as compared with 1,124,502 tons in the corresponding month of last year. Officials of the Hazleton and Mahoney divisions of the railroad report that during the week ended Nov. 29 204,340 tons of hard coal were sent to market over those branches.

Protests Some New Indiana Rates

The Indiana Public Service Commission has announced a tentative schedule of coal rates for Indiana groups of cities in which it is revealed that the rate for Logansport has been increased $\frac{1}{2}$ ¢, to \$1.69. The State Chamber of Commerce protests the rate from Logansport, Delphi and Monticello as well as that for Lebanon, Lafayette and Frankfort, its committee having proposed that the rate for Logansport, Delphi and Monticello be reduced to \$1.50 and that the Frankfort, Lebanon and Lafayette rate be placed at \$1.50. The commission has announced the latter rate as \$1.45.

Oppose Removal of Through Rate

There has been a through rate on hard coal from the mines to the Twin Cities of \$6.56 which the roads recently sought to withdraw, effective Jan. 1. This would leave the rate the sum of the locals, an increase of \$1.66. The proposed withdrawal is being vigorously opposed by the independent retailers of the Twin Cities, who see in the move a step to force them to buy hard coal from the docks only. They suspect that it presages a further advance in the price of hard coal. The withdrawal probably will be suspended, pending a hearing on it.

G. & E. Rates Unreasonable

In an order which becomes effective Feb. 29 next, the Interstate Commerce Commission finds that rates on coal in carloads from mines on the Greenbrier & Eastern R.R. to interstate destinations are unreasonable. The order was issued upon the complaint of the Nelson Fuel Co. and others against the Chesapeake & Ohio Ry. and other carriers. The Commission also held that the rates are unreasonable to the extent that they exceed or may exceed the group rates contemporaneously maintained from branch-line points on the Chesapeake & Ohio Ry. in the New River district in West Virginia to the same destinations.

Recent Patents

Mine-Car Coupler. P. J. Elliott and E. L. Bonamy, Newcastle, Wash.; 1,469,434. Oct. 2, 1923. Filed June 17, 1922; serial No. 669,174.

Cutting Link for Coal-Cutting Chains. C. N. Barton, Indianapolis, Ind.; 1,469,576. Oct. 2, 1923. Filed Dec. 15, 1919; serial No. 344,841.

Safety Holder for Mine Squibs and Detonators. J. W. Davis, Ansted, W. Va.; 1,470,150. Oct. 9, 1923. Filed Feb. 10, 1922; serial No. 535,644.

Mining Machine. Morris P. Holmes, Claremont, N. H., assignor to Sullivan Machinery Co., Chicago, Ill.; 1,470,571. Oct. 9, 1923. Filed March 28, 1918; serial No. 225,342. Renewed April 14, 1922; serial No. 552,593.

Cutter Chain for Mining Machines. T. E. Pray, Chicago, Ill., assignor to Goodman Mfg. Co., Chicago, Ill.; 1,472,736. Oct. 30, 1923. Filed Dec. 16, 1920; serial No. 431,250.

Method and Means for Handling Cars in Mines. Marion Stufflebeam, St. David, Ill.; 1,472,696. Oct. 30, 1923. Filed April 19, 1923; serial No. 633,202.

Association Activities

At a meeting of the **Northeast Kentucky Coal Association** held recently at Ashland, Ky., a report was received from the State Workmen's Compensation Board announcing an increase in the base rate from \$3.40 to \$3.75 and the minimum rate from \$2.50 to \$2.85, a flat increase of 35¢ per \$100 payroll. The increase was made notwithstanding a protest filed with the board by every association in Kentucky. The annual meeting of the association will take place Jan. 24 at the Ventura Hotel, in Ashland. A special committee was appointed by President Connor to arrange for the annual gathering, when important problems confronting the industry will be considered.

The fourteenth annual meeting of the **Smokeless Coal Operators' Association of West Virginia** is being held at Washington today. Officers are to be elected and a board of directors chosen for the new year. United States Senator David A. Reed has accepted an invitation to make an address at the luncheon following the business meeting.

Holding their semi-annual meeting during the first week of December, members of the **Huntington Coal Exchange** elected T. M. Hooper as president to succeed I. F. Vass, who has led the exchange since its organization. Roy H. Cunningham, of the Tri-State Fuel Co., was elected vice president. Other officers will be elected at the annual meeting in May. The new president is a member of the Hooper-Mankin Fuel Co., of Huntington. There were about twenty-five members in attendance at the meeting. In addition to electing officers, members gave their attention to questions of policy and discussed general coal conditions.

Coming Meetings

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

Tug River Coal Operators' Association. Annual meeting Jan. 4, 1924, Bluefield, W. Va. Secretary, C. C. Morfit, Welch, W. Va.

New England Wholesale Coal Association. Annual meeting Jan. 8, 1924, Boston, Mass. Secretary, R. S. Townsend, Boston, Mass.

Engineers' Society of Western Pennsylvania. Annual meeting Jan. 15, 1924, Blue Room, William Penn Hotel, Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

American Wood Preservers' Association. Annual meeting Jan. 15-17, 1924, Hotel Buehlebach, Kansas City, Mo. Secretary, P. R. Hicks, Chicago, Ill.

Northeast Kentucky Coal Association. Annual meeting Jan. 24, 1924, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

News Items From Field and Trade

ALABAMA

The Thomas & Weller Mining Co., of Birmingham, has leased coal mines at Aldrich, and will use 150 convicts in operating them.

The Bryan Coal Corporation has sold 10,000 acres of coal lands in Walker and Jefferson counties to Walter Moore, president of the Pratt Fuel Corporation, and associates, who will operate present mines and contemplate further development.

ARKANSAS

At the recent convention held at Fort Smith, of District 21, U. M. W. of A., the delegates amended its constitution to debar from membership any mine worker holding membership in the K. K. K.

The Coronado Coal Co. on Dec. 4 appealed to the U. S. Circuit Court of Appeals from the decision of Federal Judge Pollock, Oct. 27 last, directing a verdict for the defendants in a retrial of the company's suit against the United Mine Workers for \$2,222,000 for alleged damages to property in the 1914 coal miners' strike. The appeal was filed for C. H. Finley, receiver for the company, with a request that the case be advanced on the docket. In support of the motion it was contended that the decision, if allowed to stand on the records, would encourage organized labor, including the mine workers, to destroy property in strikes. The United Mine Workers filed an answer opposing the motion to advance the case on the docket, declaring it was of no more public interest than others on the docket, and that Judge Pollock's decision merely put into effect previous decisions of the U. S. Supreme Court interpretative of the Sherman Anti-Trust act.

ILLINOIS

Preparations for opening up the Empire mine of the Illinois Coal & Coke Co., near the state fair grounds, which has been closed since April 1 are being made. About 375 men are employed at the shaft. Orders have been given to place mules in the mine and begin work of cleaning up. Officials of the mine did not say at what time operation will be resumed.

George A. Wilson, of Sparta, is sinking a new shaft a short distance southwest of the junction of the Mobile & Ohio and Missouri & Illinois railroads there. The old shaft of the Boyd Coal & Coke Co.'s mine will be abandoned. The new mine is the cause of litigation, resulting in a suit for \$100,000 against the Missouri & Illinois R.R., which constructed a dam creating a pond covering more than thirty acres. This may eventually wipe out a summer resort at a lake nearby, and, it is alleged, will endanger miners at work in the new mine which will extend under the pond.

After two months idleness, on account of labor troubles, the Brewerton Coal Co. at Lincoln, will reopen its shaft. Trouble over the check-weighman's scale caused the men to quit work Sept. 26.

The Illinois Department of Mines and Minerals is disturbed by politics. Since the resignation of Robert M. Medill as director, members of the staff have been uneasy because some asserted that Governor Len Small expected them to work for his re-election. Richard Neeson, a special investigator, has already resigned.

Announcement of an expenditure of \$500,000 by the Leland Coal Co., of St. Louis, on its ten or more mines in Illinois has been made. The company owns mines at Tuxhorn, Shelbyville, Auburn, Athens and Girard, besides five others in Sangamon County. The amount will be spent in various improvements at the mines.

A. J. Moorshead, president of the Madison Coal Corporation, of Chicago, is spending the month of December cruising along the California and western Mexican coast in the private yacht of his son, Oliver Moorshead, of Los Angeles. Mr. Moorshead probably will be back in Chicago about Jan. 7.

INDIANA

One of the first bills to be introduced in Congress will be one by Representative Everett Sanders providing for a federal mine-rescue station in Terre Haute, Ind. The recent disaster in the Hunt mine at Staunton, in which four lives were lost, is proving to be one of the chief points to spur those interested in the coal mines into greater activity. The entire northern region of the Indiana bituminous fields has its center in Terre Haute and the nearest federal aid is the truck station at Vincennes. Phil Penna, secretary of the Indiana Bituminous Coal Operators' Association; John Hessler, president, and William Mitch, secretary of District 11, United Mine Workers, have expressed the sentiments of their organizations as favoring the station.

The Joan Coal Mining Co., capital \$75,000, has been incorporated at Riley by George G. Rowland, David Rowland and Louis Clements.

An order naming Frank C. Gore, attorney, receiver for the Key Coal Co., was set aside in probate court at Evansville recently on motion of the Consumers' Coal Co. of Indianapolis. Gore was appointed receiver for the company on petition of Martin Emig, Jr., who alleged that the Key Coal Co. owed him \$200. The Consumers' Coal Co. asked that the order be set aside on the ground that it had filed a receivership petition four days before. According to attorneys in the case, the Key Coal Co. has issued and sold \$80,000 worth of securities with the approval of the Indiana Securities Commission.

Indiana's major coal mines produced 25,363,388 tons during the fiscal year ended Sept. 30, 1923, which was 10,413,998 tons more than was mined the previous year and which came within 3,432,294 tons of the peak production during the war, according to Cairy Littlejohn, chief inspector of the State Department of Mines and Mining. The wage paid to 31,189 miners in the major mines amounted to \$45,920,877.54, said Mr. Littlejohn. The average wage was \$1,472.32 a year. There were seventy-five fatal accidents and 6,528 other accidents during the year, with no large mine disasters. The miners of Indiana were idle 9,359 days because of overproduction, 7,814 days through shortage of cars, 459 days on strikes and 2,736 days for other reasons.

KENTUCKY

Brent Hart of the Hart Coal Corporation, Madisonville, has offered a reward of \$1,000; Governor Morrow, for the State of Kentucky, \$500; and business men of Madisonville and western Kentucky, \$800, making a total of \$2,300 for arrest and conviction of those dynamiting the home of Lee Row and Dewey Williams, non-union miners, employed by the Hart Coal Corporation. The explosion occurred in late November, but no one was injured. It followed threatening notes and placing of bundles of switches on the door steps of the house.

Hazard reports that the Himya Coal Co., at Domino, and numerous mines on First Creek, Lotts Creek, Carrs Fork, and around through the Hazard Field have closed and thrown many miners out of work.

The first coal coming into Louisville by water in several weeks arrived on Dec. 6, when as a result of rains and higher boating stages, the towboat J. F. Butts came in from the Kentucky River with six barges of eastern Kentucky coal.

An effort will be made at the January session of the State Legislature to establish a state constabulary, which would be of considerable value in handling riots and labor troubles. Union labor is expected to fight the effort.

A flood of coal taxing, coal regulating and labor bills is expected before the meeting of the Legislature in January. At the last session an appropriation of \$30,000 was made for investigating the coal situation and the taxation situation.

It is reported that Birmingham (Ala.) interests are behind the Morrison Coal Co., which is planning a stripping operation at Centertown, which will have a capacity of 5,000 tons daily. There are now some nine plants which are operating and which have capacities ranging from ten to forty cars a day, with one reported to have a capacity of eighty cars or more a day. Several additional plants are getting ready to operate.

Henry E. James, Kentucky State Inspector and Examiner, in his biennial report on the Department of Mines, Lexington, reiterates that the appropriation is far from adequate for the work. This appropriation is but \$23,800 to cover salaries and traveling expenses for nine men, including a chief and eight inspectors, and for inspection of 650 or more mines each three times a year.

NEW YORK

The Independent Coal Corporation of New York City, has been appointed agent at New York for the Naples Coaling Co., Naples, Italy, in connection with the supply of bunker coal to steamers at that port. Arrangements have also been completed whereby the corporation will represent the British Coal Bunkering Co., of Gibraltar.

PENNSYLVANIA

Negotiations are reported to be under way to purchase of coal underlying the Holy Cross Church, one of the largest in Scranton, from the Glen Alden Coal Co. The coal will cost the congregation approximately \$6,000. Thirty-five cents a ton is the figure upon which this is based, the Scranton school district having purchased coal under several of the schools at this price.

The Park Hill Coal Co., which was recently incorporated at Harrisburg, operates a slope with surface vein mining in the West Scranton residential section. Operations were started about a year ago. About 100 tons a day is the capacity of the operation.

Men experienced enough to go into the mines and cut coal are exceedingly scarce in the Wilkes-Barre region, according to statements made by several of the big producers. The operators assert that while there is more than enough common labor, men holding state mining certificates are unobtainable.

That the company has the right to prevent miners' committees from meeting on the company property; that if a committeeman or a committee calls a strike without first taking the issue before the proper body for adjudication of disputes, namely, the Conciliation Board, the company has the right to discharge the committeeman or the committee, as a whole, was the attitude announced by the Lehigh Coal & Navigation Co. at Lansford during the past week, following a strike at the Nesquehoning collieries.

Many grievances advanced by the miners' union were settled during the week at meetings arranged by the Anthracite Conciliation Board in Scranton, Shamokin and Hazleton. Only parts of the board were represented at the sessions and several of the meetings were held simultaneously in the different cities.

Assessment of culm banks for tax purposes is being made by the Scranton board of assessors this year for the first time in the history of the city. In the past the land on which the culm banks stood was merely assessed at a nominal value, equal to the figure placed against adjoining land. Next year the city will try to collect taxes on a valuation which includes both the worth of the land and the value represented by the reclaimable culm in the banks. On what basis the assessors are fixing the valuations was not made known.

To safeguard the lives of their employees and to facilitate the movement of supplies from one section of the operation to the other, the Glen Alden Coal Co., of Scranton, has constructed a 175 ft. concrete subway under the roadbed of the D. L. & W. R.R. at the Baker colliery in Bellevue. A track for mine cars has been laid in the tunnel. In the past it was necessary for employees to cross three tracks on the Lackawanna to go from one section of the operation to the other and supplies had to be hauled over one-half mile by motor truck.

The Hillman Coal & Coke Co. has resumed operations at the Griffin No. 1 plant, which had been idle for about a month, firing half of the 200 ovens at that place; the Isabella plant, which also had been idle for about a month, is firing all of the 136 rectangular ovens and half of the 124 beehive ovens.

The Husted Semans Coal & Coke Co. has fired 50 of its 195 ovens at the Husted plant, near East Millsboro, which had been idle for over a month.

The Luzerne Coke Co., a subsidiary of the Hillman Coal & Coke Co., of Pittsburgh, on Dec. 1 purchased the Orient plant of the American Coke Corporation at a sheriff's sale of the property at Uniontown, for \$45,000 cash and the assumption of the \$850,000 mortgage held by the Luzerne Coke Co., making the total purchase price \$895,000.00. The plant is located in Fayette County, between Uniontown and Brownsville, and consists of about 800 acres of unmined Pittsburgh vein coal, hoisting and air-shafts about 200 ft. deep, with modern steel tipples and equipment, and 480 beehive ovens, all thoroughly equipped. The plant has been idle for the past two or three months.

G. W. Esslinger, for the past twenty-two years chief engineer for the L. & W. V. R.R. Co., has purchased the controlling interest in the Spencer Coal Co., at Dunmore, and will take over full charge of the mine. The Spencer mine has a daily output of between 200 and 300 tons of coal and employs about 200 men. For the past three months the employees have been on strike but it is expected that the taking over by Mr. Esslinger will result in a settlement with the men and that they will return to work soon.

Coleman & Co., Inc., bituminous-coal producers, announce the removal of their offices, Dec. 1, to Banker's Trust Building, N. E. Corner Juniper and Walnut Streets, Philadelphia.

Announcement has been made by the General Committee of anthracite operators that an "anthracite economy show" is to be opened in Philadelphia and maintained on a "more or less permanent basis." The show was organized by the committee, it was stated, acting in co-operation with the makers of apparatus for burning the smaller sizes of anthracite. Nine or ten manufacturers of such equipment will exhibit. Information for all anthracite users will be available, it was announced, experts representing the manufacturers being reinforced by fuel engineers connected with the producing companies.

Coal must be sold by the weight and not by the load in Hazleton, according to an opinion from the State Department at Harrisburg. City Inspector of Weights and Measures James P. Lamont, of Hazleton, found coal being sold by the wagon load in some parts of that city.

West Nanticoke Coal Co., through its president and secretary, A. D. W. Smith and Carl B. Metzger, has filed a petition with the Luzerne County Court, asking for a dissolution of its charter. A hearing will take place December 31.

Rinaldo Cappellini, president of District No. 1, United Mine Workers, has been elected delegate to the international convention of the United Mine Workers of America in Indianapolis, Ind., in January, to represent the No. 6 colliery local of the Pennsylvania Coal Co. The district president is a member of the local.

Considerable business is coming to central Pennsylvania coal operators, notably in the Broad Top region and in Somerset County, by making bituminous coal available as a substitute for anthracite. Operators are installing breakers and screens to prepare the coal in suitable sizes, corresponding to the sizes of anthracite. In Somerset County, the E. E. Sheets Coal Co. has purchased the coal property a short distance southwest of Somerset, for many years operated by Wesley J. Barron and later by his son Ira Barron. Recently a deposit of cannel coal was opened up on the property and it has since gained such strong favor in the markets of the East that the entire output has been contracted for by a Baltimore dealer. Local consumers of the fuel are using the smaller sizes which result from breaking and screening, being unable to secure a supply of the larger sizes by reason of the contract with the Eastern dealer.

The U. S. District Court at Philadelphia in a decree signed by Circuit Judge Davis Dec. 4 appointed the Wilmington Trust Co., Wilmington, Del., as trustee of the stock of the new coal company which is to be organized as part of the plan for the dissolution of the Reading Company and its

underlying subsidiaries, under orders of the U. S. Supreme Court. At the same time counsel for the Reading companies revealed that the new corporation is to be organized under the laws of Delaware and will be known as the Philadelphia & Reading Coal & Iron Corporation. A warrant showing the right of stockholders to subscribe to certificates of interest in shares of no par value of the proposed new Philadelphia & Reading Coal & Iron Corporation, will be delivered on Jan. 10 to stockholders of the Reading company, Jay V. Hare, secretary of that company, announced Dec. 6. The warrants are to be issued to shareholders of record at the close of business Dec. 17. This procedure was ordered in a resolution adopted by the Board of Directors.

William H. Patton resigned Nov. 30 as district sales engineer, in charge of the Pittsburgh office of the Ironton Engine Co., with which he had been connected for the past five years and eight months.

TENNESSEE

An early morning fire Nov. 14 destroyed the commissary store of the Fork Ridge Coal & Coke Co., Fork Ridge, Delsea, just south of Middlesboro, Ky., resulting in a loss estimated at \$50,000. Lack of wind made it comparatively easy to prevent spreading of the fire and loss of the town. Two residence buildings were burned.

VIRGINIA

Hugo Stinnes, Jr., son of the German industrial king, was in Norfolk recently in company with T. J. Licklider, manager of the Norfolk office of the Lake & Export Coal Co., agents for the Stinnes ships. Stinnes came from Charleston, W. Va., where he inspected coal operations, and looked over the coal-handling facilities at Norfolk. Mr. Licklider said Stinnes was following coal from its source to tidewater to study methods used in handling it. He went from Norfolk to Baltimore to watch the operation of piers there.

The Board of Directors of the Virginia Iron, Coal & Coke Co. on Nov. 22, declared a dividend of 2½ per cent on the preferred stock, and a dividend of 1½ per cent on the common stock, payable Jan. 2, 1924, to stockholders of record at the close of business Dec. 15.

WASHINGTON

The twenty-eighth winter mining session of the College of Mines, University of Washington, will be held at Seattle from Jan. 4 to March 20, 1924. The courses are open without examination to anyone interested in mining. Expenses consist of the cost of materials actually used and a university fee of \$20. The studies are arranged in four groups: quartz mining, placer mining, coal mining and ceramics.

WEST VIRGINIA

President J. B. Clifton, of the Raleigh Smokeless Fuel Co. and of several other large operating companies in the Winding Gulf field, with headquarters at Beckley, sailed Dec. 6 on the ship "Southern Cross" for South America to visit the company's agency at Rio Janerio and other points in South America. He expects to be away for several weeks.

One of a series of meetings of mine inspectors to be held was concluded on Dec. 5 in the office of R. M. Lambie, chief of the state Bureau of Mines, at Charleston. Problems confronting the West Virginia inspectors and methods with which to meet them were discussed. Other meetings will be held at Fairmont and Welch. A two-day examination for foremen and firebosses of this district, in which seventy-two candidates had entered, also ended the same day.

The Gage Coal & Coke Co., operating at Junior, Barbour County, is engaged in constructing a river conveyor which will enable the company to dump coal on both sides of the Tugarts Valley River.

The D. T. S. Coal Co. has increased its capital stock from \$100,000 to \$250,000; the Holly Elk Coal Co. from \$200,000 to \$350,000; Pinnacle Coal & Coke Co. from \$500,000 to \$750,000; Middle Fork Block Coal Co. from \$150,000 to \$200,000. The capital stock of the Elk Ridge Coal & Coke Co. has been reduced from \$75,000 to \$25,000.

There were ten new coal companies launched in the state during October, eight

of them resident and two of them non-resident coal corporations, with an aggregate capital stock of \$4,750,000. The largest was the Mansfield Coal Corporation, of New York City, having an authorized capital stock of \$3,500,000. Other companies organized included the Columbus Pocahontas Coal Co. (non-resident) of Columbus, capitalized at \$500,000; Cap Smokeless Fuel Co., Charleston, \$75,000; Wheeling-Glenwood Coal Co., Wheeling, \$50,000; Jaunds Mining Co., Charleston, \$130,000; Royal Pocahontas Coal Co., Iaeger, \$20,000; Cagney Coal & Coke Co., Fairmont, \$25,000; Bellis Coal Co., Buckhannon, \$25,000; La-Go Pocahontas Coal Co., Iaeger, \$100,000, and Gibraltar Coal Co., Charleston, \$325,000.

A suit instituted in the Circuit Court of Marion County by S. A. Scott, an operator of Fairmont, against W. W. Brewer, Ed Baker, Bruce Davis, Ervid Right and H. H. Harrison, partners trading as the Stone Lick Coal Co., involves approximately \$300,000, the largest amount of money in litigation in Marion County in several years. The plaintiff claims breach of contract on the part of Brewer and his associates in not permitting Scott and his employees to operate a tract of coal of about 600 acres in the Lewis County field under the terms of a contract in existence. The plaintiff bases the amount involved in the suit on the profits which he claims could be made on the tonnage mined from the tract. Another action has been brought by C. W. Brandon against Brewer and his associates, in the sum of \$10,000, Brandon claiming that he carried on the negotiations which would have permitted Scott to mine coal from the Lewis County tract.

WISCONSIN

Low water in Lake Michigan is troubling coal men because large carriers are unable to load to capacity and reach docks at receiving ports. This is particularly true of Milwaukee. The leading dock companies of that port have petitioned the municipal authorities to provide increased funds for dredging harbor channels.

Four steel steamers belonging to the Cleveland Cliffs Iron Co. are being equipped with self-unloading machinery at Sturgeon Bay. It is designed to use the vessels in delivering coal to ports on the upper lakes where docks have no unloading bridges.

CANADA

At the annual meeting of the United Boards of Trade and Chambers of Commerce of Western Ontario at St. Thomas, on Nov. 29 a resolution was adopted urging the Dominion and Provincial governments, the Canadian railways and all others concerned to endeavor to make it economically possible for the people of Ontario to use Alberta coal, to prevent the recurrence of the shortage experienced during previous winters.

Overproduction is given by H. B. Gillis, superintendent, as the cause for the suspension of operations at the Bell Island mines of the British Empire Steel Corporation. The mines closed on Nov. 30, about 1,000 men being thrown out of employment. Only sufficient help will be kept on to keep the mines pumped and the power house in readiness for resumption of operations, which it is hoped will be about the middle of January.

One of the outstanding events of a week ago from the viewpoint of coal-mine operators and employees was the announcement in the budget speech of John Hart, Minister of Finance, to the Legislative Assembly of British Columbia, that a tax of one half cent a gallon would be placed on foreign fuel oil consumed in that province. This is a policy that has long been advocated by William Sloan, Minister of Mines, who represents the coal mining town of Nanaimo, Vancouver Island, in the Legislature.

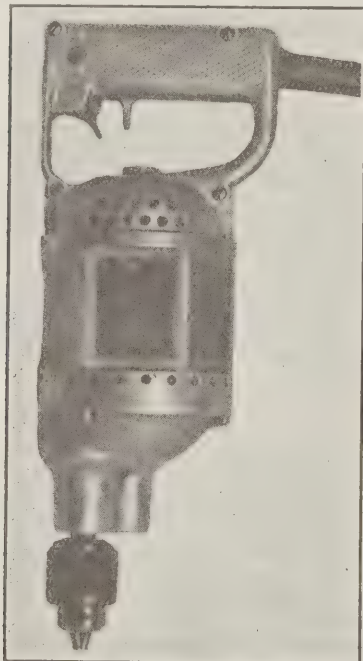
Over three million tons of coal was produced by the Dominion Coal Co. during the eleven months ended Nov. 30, according to figures obtained last night. The output for November was 205,658 tons, which is the smallest month's tonnage since April, 1922, when a strike on the job policy resulted in curtailing the monthly output to 162,085 tons. The actual figures for the first eleven months of this year are 3,071,159 tons, compared with 2,558,293 tons for the same period in 1922, an increase in 1923 of over half a million tons. The November output is some 88,434 tons less than the October tonnage and 111,212 tons less than that for November, 1922.

New Equipment

New 5/16-Inch Portable Electric Drill

This portable electric drill with a capacity up to $\frac{5}{16}$ in. in steel is quite similar to the $\frac{1}{4}$ in. drill, but has a much more powerful motor and other parts in proportion to its size. It is equipped with a three-jaw gear nut chuck for straight-shank drill bits. It weighs 7 lb. and has a no-load speed of 1,400 revolutions per minute. It is equipped with the well-known pistol grip and trigger switch.

The Black & Decker Co., Towson Heights, Baltimore, Md., now have this tool in production and expect to be ready soon to make deliveries.



NEW PORTABLE ELECTRIC DRILL

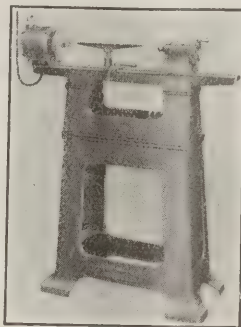
Drilling the work on the job instead of carrying the work to a drill press is possible on many jobs where this drill is supplied.

Single-Speed Bench Lathe

A new single-speed portable 6-in. bench lathe has been placed on the market by J. D. Wallace & Co. This machine, which probably is the smallest electrically driven woodworking lathe made, is designed to do the smaller turning operations which make up a great share of the work in many woodworking plants.

This little lathe is intended for work up to 6 in. in diameter. It clears 5 in. over the tool rest and 7 in. on the faceplate, with full 24 in. between centers, and runs at 3,400 r.p.m. The machine weighs but 203 lb. and at the same time it is heavy enough to stand rigidly without vibration. Its height over all is 46 in. and length over all 40 in. The sub-base is open, so that it serves as a convenient holder for tools.

A $\frac{1}{2}$ -hp. ball-bearing motor is built into the headstock and is entirely enclosed, making it dustproof. It is



MOTOR-DRIVEN BENCH LATHE

This little bench lathe is designed for work up to 6-in. diameter and is supplied complete with electric motor drive.

direct-connected to the lathe spindle and provides ample power for cutting up to the limit of the lathe. It is controlled by a conveniently located switch, and as there are no belts to shift, the safety element is well taken care of.

Double Drum Hoist for Slushing

The tremendous increase in demand for metals, coal and other products of the mine has caused the application of mechanical methods to one mining operation after another during the last half century. The drilling of the rock and its transportation are now done in several efficient mechanical ways but the handling and loading of the material broken in the underground workings is still almost universally being done by hand.

The inefficiency of the hand shovel and the increasing scarcity of the class

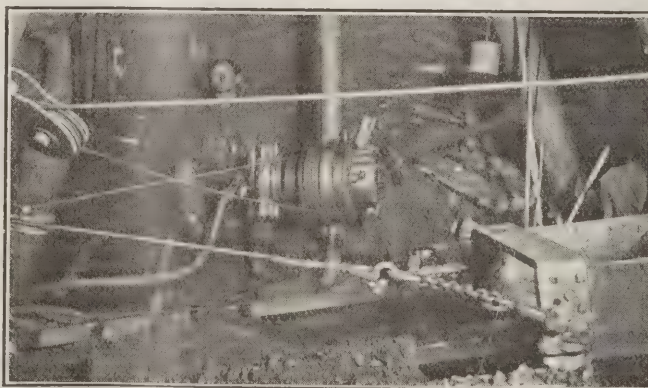
of laborers required for the work have led to the development of a number of loading and shoveling machines, many of which are successful in the class of work for which they are designed and adapted. Machines of this class now on the market are practically all large, heavy and of high capacity. They require the services of operators of a higher grade of mechanical intelligence than is common among ordinary mine labor. In addition to high first cost, many of them frequently require expensive and time-wasting repairs. Furthermore, their size, weight and capacity limit their adaptability to utilization in the larger openings and most accessible places.

An excellent solution to the problem lies in the use of the 6-H "Little Tugger" air hoist with a scraper. The method is called "slushing." The use of scrapers in mining merely involves the application of the several arrangements that have long been widely used in surface operations, varying from the horse-drawn slip scraper, or "slusher," seen on every small grading job to the various dragline scrapers and graders used in ditching, grading and other large excavation work.

The 6-H "Little Tugger" hoist is small enough to work in narrow drifts or crosscuts and under very low heading. It is sufficiently powerful to load any muckpile. It is simple enough to trust to an unskilled workman. It is so rugged that it will continually stay on the job without needing any expensive time-wasting repairs.

The small size, portability and ease of mounting the "Little Tugger," allows it to be quickly moved. As it can be set up almost anywhere—it can be clamped to a column, bolted to a timber or mounted on a truck in a few minutes' time—it usually is unnecessary to make any rearrangement of chutes, crosscuts or rooms to effect a marked saving in mucking and loading time and labor.

This hoist was specially designed for slushing, but there are many other jobs to which it can be successfully applied, such as balanced haulage in mines and strippings. The Ingersoll-Rand Co. are the manufacturers.



DOUBLE DRUM AIR HOIST

Within the next few years one of the greatest developments in coal mining probably will be in the application of labor-saving devices at and near the coal face. This little air hoist, being portable, can be used for scraping in many rooms.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, DECEMBER 20, 1923

Number 25

Investment Engineering

COAL-MINE electrification has been rapid, its economies have been real and amazing; yet much has been done with a blind faith in the savings to be realized. Greater advantages are still possible. Many mines have only begun to electrify their machinery and install new labor-saving, high-efficiency, lower-cost-per-ton equipment. Mining companies which believe themselves completely electrified today will find themselves making new applications in the next few years. Again, since this type of equipment is out of date in from ten to eleven years, there are continuous big engineering and financial problems to solve each day.

Thus we find the financial questions involved in making a coal mine modern loom larger and larger. It becomes increasingly more necessary that the engineer better understand the investment side of his business; he must do his engineering from the financial point of view and ably present to his company executives his engineering proposals, which are sound only as they are founded on lower cost, safer coal production.

Herbert Hoover recently said: "The function of the investment banker is to find the money for the advancing of equipment of the nation. As science advances, it is the duty of the engineer to lead its promises up to the investment bankers." Here we have the urge upon the banker and the coal-company engineer. How can these big forces be brought together? A part of the answer lies in a better understanding of investment problems on the part of the engineer.

Wage Competition

ALREADY there is bitter complaint on the part of groups of operators paying the union scale of wages in the soft-coal fields that they are not able to compete with non-union coal at lower wages. It is a rumbling such as preceded the war of 1922 in these coal fields. It is difficult to understand how the comparatively small amount of wage reductions that have taken place in the non-union fields could have made the situation so acute as some profess to find it. The large groups of non-union operators are holding fast to the high scales; those making the reductions are small and relatively few in number, mainly, it appears, in Somerset and eastern Kentucky.

There are none so blind as those who will not see and such are those who blame all their lack of ability to sell on underpriced non-union competition. There is little statistical basis for such an alibi as yet, but how much stronger the disclaimers will be next spring if costs are really hacked down in southern West Virginia as in 1921-22!

And if the non-union producers can and do later on cut their costs by reducing wages, it will be because they can. The union operator who harbors any idea that he can by hook or crook, by any device or strategy

gain the consent of the United Mine Workers to a reduction in the scale next spring is fooling himself. The organized soft-coal industry is plainly faced at best with a continuation of the present scale. We say *at best* advisedly, for the treacherous 10-per cent that Pinchot handed to the hard-coal miners, by common consent, darkens even that prospect. The most ill-advised move possible is for any group of union operators to commit themselves to a demand for a wage reduction next April. There is not the slightest sentiment in business today for an attempt to deflate coal wages at the expense of another 1922.

What is the answer then? If it does not lie in endless, pointless damning the other fellow it must lie in earnest seeking to get the union coal-mine worker to *earn* the high wage he now gets. If the problem of the coal operators were markedly different from the operators in other industry, then we might conclude that the coal producers were alone at fault, but that is not so. Organized labor the country over still feels its oats and is unitedly in opposition to any reduction in its war and post-war wage rates.

Trade-Commission Policy

JUST what the Federal Trade Commission hopes or expects to gain other than free advertising by its series of reports on anthracite prices is not clear. The statements are as misleading now as when first issued, for they stress the insignificant minority of premium-priced anthracite and glide over the normal priced majority. The institution of this series drew its inspiration from the White House. The President, it was reported at about the time the Coal Commission ceased to function, believed that the hard-coal trade needed airing, and to the Federal Trade Commission was assigned the mopping up job. The idea of the Federal Trade Commission always is to pick a culprit and roast him on a spit. The commission has not even the finesse of Pinchot, who before he launched his attack approached the anthracite operators with a proposal for lowering the retail price; a proposal that was illegal and therefore rejected.

American business has long since foregone the thought that the Federal Trade Commission has any intention of being helpful; the coal industry has come to expect it to be unfair. Whatever be the personnel of the Commissioners, the staff is the fountain head of ideas and inspiration for business-baiting prosecution. We have no criticism of the Trade Commission for proceedings instituted in respect to unfair trade practices, if and when the cases are instituted on some reasonable grounds. It would be the people's protection against high coal prices, or any coal prices, perhaps. But that is not all the Trade Commission indulges itself. Advantage is taken of every opportunity that affords to assail coal. These anthracite reports are but bi-weekly re-

hash of the same old story, without the critical discussion offered by the Coal Commission when it gave the same material to the public.

Is it the idea of the administration that such material will serve to lower the price of coal; that this is publicity that will tranquilize the market; that the Trade Commission is helping the industry, the government or the public by broadcasting the already well-known fact that some anthracite is sold at higher prices than the remainder, when the market will take it at those prices? Has advertising reduced in any way the volume of speculation on Wall Street or in Chicago on grain, or in Louisville on horse races? The margins of the middleman handling anthracite may be speculative, and away above normal, under certain market conditions. The Trade Commission is not simply giving publicity to that fact, but is seeking to establish a public opinion contrary to any free trade in coal. The Trade Commission wants the distribution of coal put under its supervision.

Function of Presidents

WHAT is the function of the president of a coal company? By that we mean not what he does but what he ought to do. Judging by experience of presidents as a class, they are principally interested in the "politics" of the coal industry and the selling of coal after it is produced. Exceptions there are, especially in some fields, and incidentally it may be remarked that they are among the best and most progressive of operators. Too many executives are today interested solely in the strike question, in sales, taxation and federal regulation.

For all their activities, the operators—the bituminous operators at least—have organizations; for strikes, their operators' associations; for sales, their sales organization; for taxation, their accounting department and taxation experts; for federal regulation, their National Coal Associations; for production, their field force. Consequently when well organized their business should conduct itself.

But somehow they grant that so-called autonomy only to the field force, and they busy themselves with the other activities, for no other reason apparently than that they are urban and do not require them to subject themselves with their urbanity to the discomforts of the mining town, the mine boarding house and the underground.

But is the field force autonomous? By no means. It is ruled with an iron hand. It may do almost anything so long as it produces cheap, salable coal and does not demand any expenditure of capital. Consequently, usually no experimenting and no purchases of new forms of equipment are permitted. The progress of invention passes along unheeded until some enterprising and real president adopts it, economizes thereby or makes better coal. Then at last the president of the average company gets interested and arranges to get what he should have had long ago. Or perhaps an explosion occurs and the field force gets co-operation as to constructional funds and operating expenditures that will make such hazards less menacing.

Many mine managers fear to advise the purchase of additional machinery or the inauguration of conservational or safety measures likely to show on the monthly cost sheet. They would seek co-operation from the president if he knew more than the one word "No."

The Future for "Too Many Mines"

TIME has a way of creeping up and catching some folks unawares. Time caught up with the overdeveloped anthracite industry of two decades ago. Time, smooth flowing time, easing from one year of trouble to another year of quiet, has brought the hard-coal industry a new set of troubles. None will say that having solved, at great cost and long effort, the problem of "too many mines" the hard-coal men are not up against other and as difficult problems.

Depending on who does the guessing, estimates of overdevelopment in soft coal range from 25 to 100 per cent. We all recognize that the bituminous-coal industry is treading the mill over which the anthracite industry passed a decade or so ago. Development of the anthracite mines was checked; demand has overtaken production, putting the business on a profitable basis, as it should be. But being thus, new problems have been presented, serious because becoming acute in a period of general economic unrest and positive union-labor control.

And is the bituminous-coal industry about to profit by the lessons in anthracite? Much is different, but much is similar in this aspect of the two industries. There is definite push from the public—President Coolidge voiced it in his message—for consolidations in the soft-coal industry. The country is growing; it will not require long for consumption to overtake the productive capacity of all soft-coal mines that are at least reasonably efficient. It were well that the soft-coal industry look back over anthracite history and think ahead in soft coal to that time when "Too many mines" is a thing of the past. The problems of the future will be different from those of today.

Judge Gary is a forward-looking man—one reason why he heads the Steel Corporation. He recently said: "There are no substantial grounds upon which to base a thesis that in America the productive capacity of the country as a whole is in excess of the ability of the people to consume, and it is a sound business policy to build on the theory that consumption will continue to increase. The growth may be irregular, with innumerable waves; but these are of much less importance than the fact that over a period of years there is always a substantial increase. A man can provide against temporary depressions but cannot take advantage of increases in demand unless as a matter of business policy he has built up liberally his productive machinery."

It is all well and good to stem the tide of overdevelopment of coal but there must be no overlooking of the problems of the future such a program entails.

"IT IS NOT THOROUGHLY UNDERSTOOD in Washington why Governor Pinchot is insisting upon outside regulation of the anthracite industry when the State of Pennsylvania can do under its own power everything that he suggests. There are those who believe that the only way to meet the anthracite situation is to authorize a combination which will include all mines producing that type of coal in Pennsylvania."—*News Note*. That is just what Mr. Warriner said in his academy speech last month—"Certainly it is not sound public policy to transfer from experienced managers to the political arena the regulation and control of this industry until the managers have been given an opportunity to try and work out their problems under laws which permit collective action and self-correction."



Courtesy, National Safety Council

Safety Stunts Help Miners Protect Themselves

Reminders Should Be Unusual and Striking—Freshen Up the Bulletin Board with Drawings of Accidents at Mine at Which They Occur—Warning Cards in Pay Envelopes and Premiums for Foremen Also Help

"HOW can we make men protect *their own* lives?" It is an old lament. The Midwestern coal operator who gave voice to it as he scanned a fresh report of a fatal accident in one of his best protected mines is only one of thousands of conscientious employers who have wagged their heads helplessly over this puzzle of the age.

Miners are just like other workers. They do grow callous to danger—their own danger. No matter what their instructions, there are always a few who *will* open a can of powder by driving a pick point into it. No matter what the boss says, there are always a few who *will* be reckless with electricity. No matter about the instructions, or the boss, or common sense itself, there are always a few who *will* strike a light where gas may lurk.

"You can't get away from it," declares a safety engineer; "there always will be careless miners and there always must be a campaign for safety going on, no matter how discouraging an occasional case is, here and there. The more safety work is done, the more lectures are delivered, the more signs are posted, the smaller will grow the number of serious accidents. That is proven by comparative statistics covering recent years. Operators must carry on general safety work all the

time, and then, on top of that, they should be forever striving to find new, fresh, striking ways to make the miner 'think safety.' The old tricks do grow stale with time."

Keeping the thought "safety" fresh in miners' minds is an art that gets a good deal of attention in many mining companies. R. M. Lambie, chief of the West Virginia Department of Mines, told the Mine Inspectors' Institute of America something about it at the last Institute meeting. In Mr. Lambie's state, there are several large companies whose effort along safety lines bears abundant fruit, and "stunts" of one sort or another are part of the effort.

SAFETY WORK PREVENTS MANY ACCIDENTS

Since 1917 safety work has been more at the fore than it was previously. Statistics prove that it has paid. In 1917 West Virginia mines employed 95,883 men and in 1921 the figure rose to 124,576, but the number killed dropped from 394 to 346, which means that only one life was lost for every 338 men employed instead of one for every 225. These figures mean something. Somewhere there was a sound reason for this saving of lives.

One reason was the marked shift from black powder

to permissibles. Between 1917 and 1922 the quantity of black powder consumed dropped off 253,383 kegs, which is a vast quantity of dangerous explosive. Permissible powders increased 1,183,777 lb. in the same six years, which had a good deal to do with reducing the number of lives lost by explosion. Explosion fatalities at Davis Coal & Coke Co. mines were reduced 75 per cent. In 1922 the state produced 232,000 tons for every life lost inside the mines. The annual average since 1883 is only 187,000 tons. Something is responsible for this great change for the better. It must be the safety work.

There are plenty of facts to prove that the mines in West Virginia in which safety is actively taught are least afflicted with death. For instance, though the state's total tonnage per fatality last year was 232,000, the Consolidation Coal Co.'s record is 749,600! Other companies also can show proud records. But the state is full of lesser mines where the words "Be Careful" are not so often dinned into miners' ears, and where safety precautions are not so prevalent. These pull down the average. Mr. Lambie's state is striding forward every year, however, and the work of the chief himself and his crew of state inspectors is an important reason why.

But what are some of these "stunts" used in West Virginia to make men "think safety"? Every one of them is aimed to awaken within men the knowledge that after all is said and done, after the company has installed every known protective device, after experts have sounded every possible warning and given all sorts of instruction, a man's safety depends only 20 per cent on all these and 80 per cent on himself.

One "stunt" has to do with pay envelopes. Every man takes a personal interest in what that particular envelope contains. In one company, if any official or miner is observed to disregard the usual safety rules or is known to have done so at any time during the preceding pay period, a card with red ink on it appears in his envelope, stating just what he did, and when and where he did it, and is signed by someone in the safety department. The reverse side of the card says: "Remember—safety first. Never again be the cause of receiving a similar card, but ALWAYS BE CAREFUL." The chances are the reminder in that pay envelope goes with that man through many a week to come.

A 3x6-in. tag plays a part in one big company's safety work. That company keeps careful safety statistics on the accident record of each of its mines. Each

READ CAREFULLY	
Mine No. 3	Check No. 81
Alex Markov	
At Room 4 off main heading Parcel	2 PM
Aug. 30 1923 you were observed to disregard the usual SAFETY RULES that benefit YOU, YOUR FAMILY and FELLOW MEN by entering new working place without testing roof	
Result	J. H. Flaherty Safety and Efficiency Department

A WARNING IN THIS MAN'S PAY ENVELOPE

Alex Markov was observed entering a new working place without properly testing the roof. He got this card, with some of its message printed in red, warning him that he had disregarded "the usual safety rules that benefit you, your family and fellow-men." Perhaps he was a safer man after that.

C. W. & F. ACCIDENT PREVENTION BULLETIN NUMBER 5

The miner in the picture below has gotten into a manhole to let a trip pass so that should the motor or a car jump the track, he will not be hurt.



Always get into a manhole when you see a trip coming, but before stepping out again look for the rear marker or rear light to make sure that the trip has not come uncoupled. Also look back to make sure a second trip is not following the first. Many men have been killed or severely injured by run-away cars following a trip, or a second trip following the first.

ANOTHER SAFETY NOTE IN THE PAY ENVELOPE

An Illinois mining company uses a series of these safety lessons on small sheets stuffed into the envelopes once a month for several months at a stretch. Then there is a lapse of time before the next burst, for it will not do to overwork even a good idea lest it get stale.

month some mine is unfortunate enough to have the worst record for accidents. Immediately that mine is all afficker with the 3x6-in. tags attached to cars, signboards, timbers, headframe, wash-house door—everything about the mine. The tags are printed in green, showing as their outstanding feature a big hand in a circle.

"Safety First," the old, old slogan, is on the palm of the hand. On one side the tag says "You are Judged by The Company You Travel In. Travel With The Safety Men; It Means Your Happiness and Safety." The other side says: "Do Not Remove This Tag. It Is Here for a Purpose." And every man in that mine knows what that purpose is. The tags remind them of that purpose for thirty days, or until they remove their mine from the "worst" proposition on the company list. Then all the tags are removed.

Cash is another weapon against accident. It may seem a doubtful policy to pay men to protect their own lives, but when that pay goes to foremen and assistant foremen who are directly in charge of the performance of men on the job, the objection is largely removed. These officials are being paid for protecting others—not themselves. After all, nothing speaks louder than good American dollars, so a premium system is used in one of the great coal mining companies' system of mines under which foremen can add as much as \$25 and assistant foremen up to \$15 a month to their pay.

In order to qualify for premiums, foremen and assistant foremen must not miss more than one working day in the month, they must have received and receipted for a copy of the company's "Synopsis of Instructions" on safety and they must have been examined by the company physician to prove their own physical condi-

tion. Also in order to collect the premium each one must have less than ten demerit marks against him. He gets ten demerits if during the month any man under him suffers a minor injury (causing the loss of seven days or more), twenty demerits for each serious injury and forty demerits for each fatality.

If a company inspector finds any dangerous condition existing in an assistant foreman's section of a mine, that assistant foreman gets five demerits, but the assistant foreman wins five merit marks for each month in which no dangerous conditions are found, and five more are credited if there are no accidents. Thus the man has a chance to wipe out his demerits. The foreman's account is charged with all demerits and credited with all merits of the assistant foremen under him.

An added premium for long-time safety service is provided in this clause of the premium rules: "Any mine foreman or assistant foreman who for six consecutive months is entitled to the monthly premium of \$10 or \$5 will, at the end of the sixth month, receive a special premium of \$15 or \$10 and for each month thereafter so long as his record is up to the requirements; but when his record does not come up to the requirements he again will have to make a clear record for another six months before he is entitled to a special premium."

KEEPING "PUNCH" IN THE BULLETIN BOARD

That old stand-by, the bulletin board, does its bit for safety at many a mine. The problem is: What should be put on it that does not get stale, that keeps the board forever interesting and that will put over the lesson of safety with punch?

One device is a picture of every accident. This does not mean a photograph. It means a blueprint drawing of just what happened, where and how, as viewed both from the side and overhead. These two drawings on each such blueprint tell the story even to a man who cannot read the description of the accident which is printed at one side. There is human interest in such sheets, and it is enough to draw a lot of attention to the mine bulletin boards.

A similar idea in the use of pictures on the bulletin boards is embodied in the plan of the Chicago, Wilmington & Franklin Coal Co., in southern Illinois. The names of the principals in each accident are not used, but whenever an accident of major importance occurs, it is described in a series of pictures drawn by company home talent on a single big sheet. This is posted at all mines.

For instance, a man loses a foot by using it to open the knuckle on a freight-car coupler as he was coupling up a string of empties. The artist draws four pictures. The top one shows the unfortunate man signaling for the cars to be shoved together. The second shows him trying to open the knuckle with his foot. In the third drawing, he is lying on the ground with his foot crushed in the couplers of the two cars and the last shows him extricated, minus a foot, surrounded by stretcher bearers and first-aid men.

"This accident, which occurred at our mines Feb. 10, 1921, could have been avoided if the coupler had been doing his work in the right way and had taken proper precautions. Better be safe than sorry. Use the proper methods!" says the type matter on the bulletin.

News interest is worked into blueprints for the boards at the United States Coal & Coke Co. mines

in West Virginia and Kentucky. The company posts at the end of every month tables showing the safety standing of every mine. Comparisons are made with previous months and previous years so that a miner may know exactly where his own mine stands in the list and whether it is improving or slumping.

To keep the bulletin board ever changing, messages of all sorts are pinned up from time to time. "The wife of a careless man is ALMOST A WIDOW," says one, and it is a line which is not easily forgotten. Another was inspired by the game of "Put and Take." On a blueprint sheet were drawn six pictures of put-and-take tops, each showing one of the hexagonal sides of the top with its inscription "Put two," "Take one," "Take All," and the like. Each inscription was worked into a sentence thus: "TAKE ALL precautions for your safety," "PUT TWO hands on the hand bar when in the cage," "TAKE TWO knocks on the roof before you start work," "PUT ONE prop up before you TAKE ONE down," and so on. Another blue sheet says: "The only safety appliances which this company cannot furnish for YOUR protection are eyes that see and brains that think. They are the best safety devices known. USE them."

DON'T "NAG," ESPECIALLY ON A BULLETIN BOARD

There is plenty of safety service that mining companies can get out of the bulletin board; but how many of them make the board a live, appealing thing which grips men's attention? How many of them permit it to get all cluttered up with stuff of all sorts that distracts rather than attracts attention? How many of them put it in the right place and give it light enough? How many of them keep the board fresh and new? The National Safety Council spreads some good ideas about bulletin boards.

Three things every safety bulletin ought to do, or it

DATA REGARDING ACCIDENT	
at NO. 10 MINE NO. 3 SEAM	
By which <i>Steve Deikolo</i>	
Seriously Injured	Was <i>June 12, 1923</i>
Nationality	<i>Russian</i>
Age	<i>29</i>
Married or Single	<i>Married</i>
No. of Children	<i>None</i>
Employment	<i>Loader</i>
Nature of Accident	<i>Back Broken</i>
Location	<i>In 47 Room 2nd Left No. 1 Wp. Right</i>
Cause of Accident	<i>Slate Fall</i>
Witness to Accident	<i>Mr. Maxwell</i>
First to see Injured	<i>Do.</i>
Those to render Asst.	<i>Mr. Maxwell, Charlie Cook</i>
Physician	<i>Dr. Coulson</i>
Mine Foreman	<i>George Leach</i>
Asst Mine Foreman	<i>Art. Cairns</i>
Survey Date	<i>6-13-23</i>
Survey made by	<i>W. B. Hendley</i>

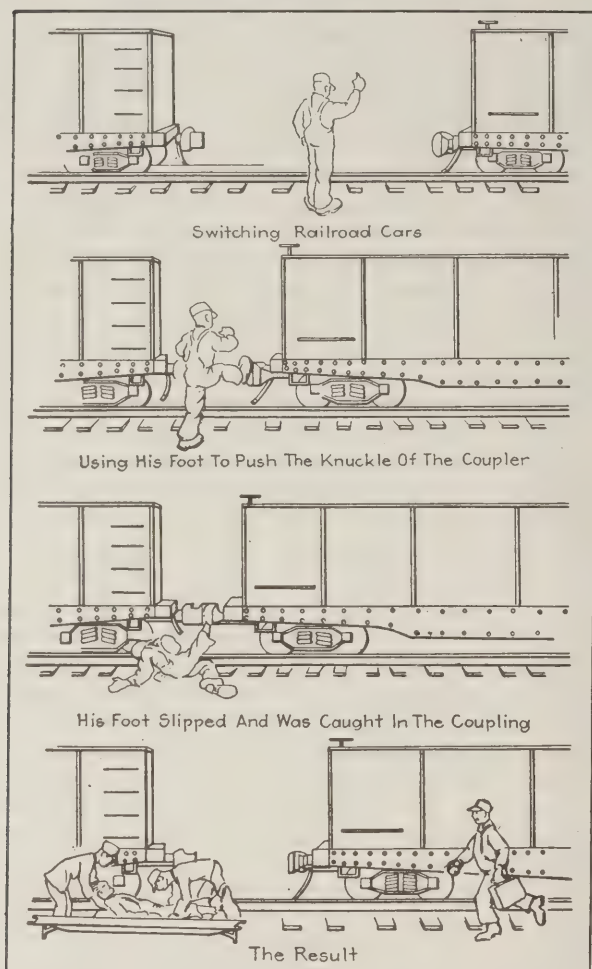
Note: Steve Deikolo was shoveling coal into a car when a piece of slate fell from the rib, struck Deikolo and broke his back.

AN EFFECTIVE WAY TO TEACH A SAFETY LESSON

The whole story of how Steve Deikolo's back was broken by a chunk of slate falling on top of his head is told in these two home-made drawings and the information entered in the blanks at the left. The poster does not need to say that it is dangerous to begin loading out coal from a freshly cut and shot place without making sure that there is no loose top or overhang. Every miner reading the bulletin gets the lesson.

C. W. & F. SAFETY BULLETIN

This accident, which occurred at one of our mines February 10, 1921, could have been avoided if the coupler had been doing his work in the right way and had taken proper precautions



Better to be safe than sorry; use the proper methods

HOME TALENT OFTEN MAKES THE BEST POSTERS

This picture story, showing how a certain man in the employ of the Chicago, Wilmington & Franklin Coal Co. lost a foot, was posted on all the bulletin boards of the company just after the accident, when its message might have the deepest effect upon the rest of the company's men. Great expense is not essential to the making of good safety bulletins.

is not worth posting, the Council says. It should stimulate safety thinking, create good will toward safety work and warn miners against unsafe practices. The whole

bulletin should be such that it can be read at a glance—or practically that. Picture and text must be vivid and directly to the point. The bulletin must aim to get over just one idea.

Directness, however, does not mean telling readers bluntly just exactly what you mean. It is more effective to frame the message in such a way that the reader infers its meaning. For instance, if a man has been hit on the head with a sledgehammer head that flew off the handle, the bulletin based on this accident should not say "Don't use loose-handled sledges" and let it go at that. Better, it should say, "Nobody has ever been smart enough to think of a good excuse for using a sledge with a loose handle; there isn't any." The reader must make a trifling mental effort in order to get the lesson. For that reason, he remembers the lesson longer.

Another thought for bulletin makers is: Don't harp continually upon the word "careless" lest the miner eventually get sore. Bulletin results will thus be made less effective. Also it is generally accepted nowadays that revolting pictures of accidents are not good because they tend to scare a man instead of instruct him. Instilling perpetual fear within a man does not necessarily make him safe. Rather it reduces his efficiency and makes him flighty and more likely to have accidents. Therefore good safety bulletins should be positive in tone rather than negative.

"Put a good man in charge of bulletins," says the Safety Council. "Let him strive always to make his bulletins as local as possible. Free use of his own camera is always a good thing. He will want the bulletin board in some place where men congregate rather than at some gate where they merely stream past. He will keep changing everything on the board from day to day and he will put very few things on at a time. If he learns a few of the main principles of advertising display so as to be able to make each bulletin an attention getter, if by no more complicated an expedient than the proper drawing of a heavy line or two or the skillful use of a piece of colored crayon, his service will be of greater value."

Good bulletins and cards and pay-envelope stuffers—devices like these are answering, in a way, the lament of the operator who wonders how to make his men protect their own lives. There are scores of other special methods, all backing up the basic safety work of instruction, and each fresh crop of "stunts" helps make men "think safety." When miners do that, accident rates drop markedly.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of November

Ports	Railroads	1923			1922			1921		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo.....	Hocking Valley.....	5,003,169	150,612	5,153,781	3,195,480	91,530	3,287,010	4,417,407	115,981	4,533,388
	N. Y. C.-Ohio Central Lines.....	1,179,147	36,815	1,215,962	848,157	27,141	875,298	1,094,976	32,070	1,127,046
	Baltimore & Ohio.....	2,861,500	83,889	2,945,389	2,814,496	75,895	2,890,391	2,550,450	78,085	2,628,515
Sandusky.....	Pennsylvania.....	3,005,405	95,418	3,100,823	2,695,899	97,303	2,793,202	1,853,148	52,138	1,905,286
Huron.....	Wheeling & Lake Erie.....	1,471,905	58,169	1,530,074	413,682	16,753	430,435	1,577,500	45,468	1,622,968
Lorain.....	Baltimore & Ohio.....	3,643,163	194,893	3,838,056	1,798,619	90,969	1,889,588	2,523,920	102,449	2,626,369
Cleveland.....	Pennsylvania.....	1,850,573	198,975	2,049,548	1,024,802	91,394	1,116,196	2,062,722	91,364	2,154,086
	Erie.....	739,025	31,920	770,945	381,903	14,208	396,111	359,981	12,782	372,763
Fairport.....	Baltimore & Ohio.....	880,389	80,118	960,507						
Ashtabula.....	New York Central.....	3,322,902	253,537	3,576,439	1,472,339	86,792	1,559,131	1,125,792	62,214	1,188,006
	Pennsylvania.....	2,083,379	91,037	2,174,416	1,623,878	88,638	1,712,516	2,300,210	78,029	2,378,239
Conneaut.....	Bessemer & Lake Erie.....	2,781,553	240,553	3,022,106	1,546,725	61,850	1,608,575	1,462,450	20,195	1,482,645
Erie.....	Pennsylvania.....	717,240	93,489	810,729	198,110	70,383	268,493	1,016,447	66,134	1,082,581
Total.....		29,539,350	1,609,425	31,148,775	18,014,090	812,856	18,826,946	22,344,983	756,909	23,101,892

Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

What Will It Cost? What Will It Earn?

BY CHARLES M. MEANS
Consulting Engineer, Pittsburgh, Pa.

THE engineer of today must solve business problems as well as those pertaining to engineering. In this article Mr. Means tells the engineer how to arrange his report, revealing important points in presenting a proposal and in setting up the engineering data.

ELECTRICAL engineers employed by coal companies frequently make reports intended to show the value of proposed changes or extensions to the electrical system. The report is carefully made up and submitted to the particular officer responsible for expenditures and quite often the engineer is not further advised as to the outcome, in which case he naturally feels that his work has not been appreciated.

In the course of my work I have had occasion to review many such reports and a considerable number were so arranged as not to admit of an analysis except by an engineer. There are only two questions that are really important to the official responsible for finances and these are: How much will it cost, and what will it earn? Anything else is subsidiary to these two items. If the answers to the above questions are hidden away in a mass of figures and calculations they may mean very little to one not familiar with engineering problems. If the change under consideration is one where monetary gain is a considerable item and it is shown clearly in the report, the official responsible for results cannot afford to allow it to lie quiescent as he never knows when it will return to haunt him.

I have had occasion to make up reports on existing or proposed electrical systems for more than a hundred properties throughout the country and have had ample opportunities to observe the reactions from the various arrangements of data compiled.

RECOMMENDATIONS SHOULD SUIT CONDITIONS

It is important that all information be obtained as to present operating costs and how they are incurred, all engineering data having a bearing on the problem under consideration, together with a complete personal examination of the existing local conditions and a careful study of the personnel of the organization. It might seem that a study of this last item is not essential, but in reality it is fully as important as any other phase. It is economically wrong to recommend any arrangement that cannot be successfully handled by the men employed at the mine. It is infinitely better to install equipment that the present employees can operate than to try to get new men.

With all data available, the problem of the engineer is to work up a report showing clearly all the details of the proposed changes. Herewith is shown a table of contents (Fig. 1) which appears as the first sheet of such a report. The next sheet is a short introductory statement outlining what the report is intended to cover. The following sheet (Fig. 2) is really the first page of the report and contains all the essential information that is required by a board of directors.

The first item may cause quite a shock to the board members, but they are in much better spirits to recover

from it than if they had been required to read through the entire report before arriving at the final figure. The second item has a rather soothing effect and by the time the members reach the subsequent figures on the page they are fully reconciled to the apparent high first cost. The figures shown on this page must be supported by thoroughly reliable data and calculations appearing on the subsequent pages.

Inasmuch as a report such as described is intended for those responsible for the financial investment and returns, it is essential that the entire arrangement of the report be such as will show all details in the sequence of their importance with respect to the investment and returns. By showing cost and earnings on the first page and a duty cycle curve of a proposed shaft hoist with the root mean square horsepower calculations on the last page, an ideal arrangement is obtained. The average director of a coal-mining property is vitally interested in cost and earnings, but has no more interest in the root mean square horsepower than he has in the behavior of electrons in an atom of helium.

It also is important that all bookkeeping and engineering details be incorporated in the report so that the results indicated may be completely checked and the possibility of errors eliminated within the limits of certain data which must necessarily be assumed. The report also will be used as a check on the cost of various details as the work progresses. Such a report

THE KILOWATT COAL MINING CO.	
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FIG. 1—WHAT THE REPORT SHOULD CONTAIN

THE KILOWATT COAL MINING CO.

Summary

Total cost of proposed equipment erected and ready to operate.....	\$195,452.00
Net saving per year effected by change.....	148,256.25
Deduct for interest, taxes, depreciation and insurance.....	\$29,317.80
Deduct for added labor.....	7,400.00
	36,717.80
Net saving per year.....	\$111,538.45
Net saving per ton produced.....	0.147
Net saving during life of property.....	\$1,115,384.50

Note:

The output is taken at the rate of 750,250 tons per year as produced during 1922, which implies an active life of ten years for the property. The savings indicated will vary as the yearly output varies from that of 1922.

No salvage value is taken into account for the equipment replaced nor for the new equipment at the end of the amortization period of ten years.

FIG. 2—FINANCIAL STATEMENT OF PROPOSED PROJECT

is extremely valuable to any concern contemplating changes involving considerable expenditures of money, as it supplies a tangible starting point, removing many of the uncertain elements and indicating whether or not such expenditures are fully warranted.

Mortality Among British Coal Miners In Relation to Output

During the ten-year period 1913-1922, at the mines in Great Britain operating under the Coal Mines Act, the average annual death roll was 1,243, representing a death rate per thousand persons employed of 1.15, the average number of deaths per million tons of mineral raised being 4.92. During this period the annual average number of persons employed was 1,091,391, and of mineral raised 251,454,646 tons, the figure for coal being 241,081,755 tons, or 220 tons per employee.

Last year, as appears from tables prepared by the Chief Inspector of Mines, the mineral production was 255,971,696 tons, coal being responsible for rather more than 249,500,000 tons, and the persons employed numbered 1,162,754, while the deaths from accidents totalled 1,105, representing a death rate of 0.95 per thousand persons employed, the deaths per million tons of mineral raised working out to 4.32. The record for 1922 may therefore be said to be favorable when it is compared with the average for the last ten years. As the Secretary for Mines expressed it, "the picture is not one of unrelieved gloom." The tonnage per person was fully maintained.

THE COAL MINES in the Twentymile district of Colorado, according to a report by the U. S. Geological Survey, have been developed since the Denver & Salt Lake (Moffat) R.R. was extended into this district, in 1906. The coal has become widely and favorably known as an excellent fuel for both manufacturing and domestic use, but the development of mines has been greatly hampered by inadequacy of transportation facilities and by the fact that all the coal reaching the market had to be hauled up steep grades over one of the highest passes in the Rocky Mountains.

The Miner's Torch

The Children at Our Mining Camps

I HAVE just finished reading an article written by a woman who has visited a number of coal-mining camps to see what our mining companies are doing for the miners' children. It is a terrible picture that she paints and we are almost led to believe that if the men and women of the next generation have to spring from these mining-camp children, all of our schools and churches will be useless within two generations.

With the description which she gives of the things that she saw we cannot quarrel, for anyone who has lived much in mining towns in different sections of the country must agree that her sketches are true to life; but there be men living today of middle age and beyond who were raised in mining camps where conditions were worse than any to be found in mining camps of today, and these men are good citizens and some of them have even attained to positions of trust and eminence.

Things are not always as they seem. I recall an incident that happened about twenty-five years ago. I was acting as guide to a director of the company for which I worked, showing him around one of the mining camps. "Is this camp typical of all our camps?" he asked me, and when I replied in the affirmative he assured me that he was ashamed of his connection with the company. "Why," he said, "you must be breeding a race of anarchists here. Such smoke, such odors, and My God! such pitiful looking children." That camp has long since been abandoned, but I occasionally meet some of the children now grown to manhood and they are not anarchists.

Miners move around a good deal and they are out of employment quite often and they are not over-particular about the dress and the manners of their children; furthermore, the tippie often sends forth clouds of dust. Any visitor to a mining camp will discover these things and be impressed by them. But there are other things that ought to be taken into consideration before suggesting that our mine owners be hanged and quartered.

Mining villages have to be built where there is coal to be mined, which means that they are often miles from the main line of a railroad, sometimes located in gulches and at other times half way up a mountainside. Children on ranches and in logging camps or even on our farms often have a harder time in every way than the children of our miners. And if you want to find children who have fewer advantages than those of our miners, go to some of the villages around our large cotton mills.

In the same mail that brought me the article which I have discussed above, I received an article dealing with "welfare work"—so called—and its author was of the opinion that the matter had been overdone by most of the larger companies and in future many companies would expect their employees to initiate movements having to do with education, gardening, social service, etc. This author argued that the workers are beginning to resent the attitude of the employers, and that with reason.

So there you are—you can take your choice.



Belt Conveyors Well Suited For Hoisting Coal From Shallow Mines

In Most Cases Any Coal Under Less Than 225 Ft. of Cover
Can Be Hoisted by This Means — When Depth Exceeds
120 Ft., Two 500-Ft. Units Should Be Used in Tandem

BY ALPHONSE F. BROSKY

Assistant Editor, *Coal Age*, Pittsburgh, Pa.

SOUND advice for the mining engineer is the dictum: "Hoist coal with belt conveyors wherever the depth of the seam, the nature of the material to be excavated and retained, the daily tonnage to be handled and the life of the plant favor such a method." It must be remembered, however, that the seam should not be too deep; the material over the coal should not be too loose or water-bearing and the daily and total tonnage must justify the greater expense involved in the construction of a slope.

"Slope-conveyor hoisting" is a comparatively new term in the vocabulary of the coal industry. By overlooking the possibility of the slope conveyor when planning for the landing on the tipple of coal from beds that do not outcrop, engineers have passed by many opportunities which would have lowered the costs of underground transportation. The usual hoisting methods tie the mine management hand and foot, for, with them, only with difficulty can the output of the mine be increased.

The congestion of traffic at the mine opening delays the return of trips to the working entries and adds considerably to the uncertainties of transportation. A shaft mine is much like a big bottle with a small neck. From it the coal emerges in a broken and uncertain stream. Dispose of the coal as quickly as it arrives at the bottom landing, and the traffic will move freely. An all-around saving can be made if a belt conveyor

and a slope are provided, with the former delivering the coal direct to the shaker screens on the tipple.

In other industries moving belts have been put to extensive and varied use for carrying raw and finished materials. Many are used in anthracite breakers; they are indispensable in byproduct-coke plants, in chemical plants and in the rockhouses and concentrating mills of the ore regions. Belts of many sizes are performing efficiently elsewhere and serving better than expected the purposes for which they are installed.

In the immediate future the bituminous-coal industry will find more numerous applications of belt conveyors than at any time hitherto. Mine mechanical engineers acknowledge the usefulness of such conveyors in and about tipples, and power-plant experts recognize their efficiency in transporting coal from storage piles to bunkers. On the strength of close observation of level and inclined-belt conveyors in carrying coal, iron ores and even more abrasive rocks, mining engineers now see opportunities to simplify the operation of hoisting coal to tipples from comparatively shallow buried seams.

Uses of belt conveyors in the Lynch tipple and dump-houses of the United States Coal & Coke Co., in Kentucky, should assure us of their practicability. The permanent tipple, which has the semblance of an anthracite breaker, was completed in the early part of 1921.

Conveyor units leading from two dump-houses to the tipple have handled to date more than 4,000,000 tons of run-of-mine coal. Superimposed belts in the same galleries have carried a due proportion of mine refuse. One coal conveyor is 387 ft. long and another 404 ft. Both are 48 in. wide and travel on a slope of approxi-

Paper delivered, Dec. 4, at Huntington, W. Va., before the West Virginia Coal Mining Institute.

Headpiece shows tipple and slope of the Aluminum mine of the United States Aluminum Co. The upper Freeport seam lies only 60 ft. below the railroad tracks.

mately 18 deg. at a reduced speed of 156 ft. per minute. Traveling at maximum speed their capacity will be 1,000 tons of coal per hour each.

The two slate belts just mentioned also are 48 in. wide, move at a speed of 300 ft. per minute and have a capacity of 200 tons per hour each. These discharge at a junction tower onto the main 48-in. slate belt, which has a speed of 475 ft. per minute. The latter is 686 ft. long on a slope of 18 deg. and leads to a slate dump on the mountainside. All these belts and numerous shorter ones used for many purposes are driven by slip-ring induction motors aggregating only 720 hp.

The Lynch belt installation is proving to be highly dependable, as judged by results obtained. One can conceive of no other methods to accomplish more satisfactorily the duties of the units at this plant. True, the belts require regular attention, but any other kind of equipment for the same purpose likewise has to be carefully maintained. The job at Lynch points the way to possible installations involving the hoisting on slope conveyors of large and small tonnages of coal from buried seams.

Imagine the 686-ft. slate conveyor transposed from its present position in daylight into a slope tapping a coal seam which lies 135 ft. below the surface. The change would allow 75 ft. for tippable height and dumping facilities at the bottom of the slope. And it would afford a means of hoisting over one belt as much as 830 tons of coal per hour when traveling at the rate of 450 ft. per minute.*

Traveling at the speed specified, the belt would carry a load of about 20 tons of coal. Possibly the splices would not carry so great a load. In that case the rate of feed could be reduced to distribute a load of 14.5 tons of coal over the length of the conveyor. That is the load recommended by belt experts for 48-in. belting traveling at a speed of 450 ft. per minute on a 500-ft. conveyor unit.

The main coal conveyors at Lynch, with exactly the same characteristics, are calculated to carry a load of

14.3 tons. Carrying a load of 14.5 tons, the belt would transport coal at the rate of 675 tons per hour. Thus is a 5,400-ton hoisting layout in the making.

A slip-ring induction motor no larger than 100 hp. would be sufficient to drive the conveyor. The main slate conveyor at Lynch is driven by a 100-hp. motor. At the Kinloch mine of the Valley Camp Coal Co., in Pennsylvania, a 150-hp. motor drives an apron conveyor weighing 40 tons, which carries a load of 40 tons of coal, is 430 ft. long and on a 30-deg. slope.

Consequently one is conservative in assuming that a 100-hp. motor would be of ample size to drive the 686-ft. conveyor carrying a load of 14.5 tons of coal. Undoubtedly, belt conveyors in slopes will show a saving in power when compared with cages or skips under like conditions.

Much in the choice of hoisting by slope conveyors in preference to cages or skips depends upon these four closely related factors: The nature of the overburden in which a slope must be sunk, the depth of the seam, the first cost and the production desired.

Where the cover is as much as 200 ft. thick and composed chiefly of loose ground or strata of rock which bear an abundance of water, the sinking and lining of a slope would be impossible or otherwise very costly. In the last event only a large production would justify the expense. In solid cover a slope may be sunk and lined without serious difficulty but here again the desired output must influence the choice.

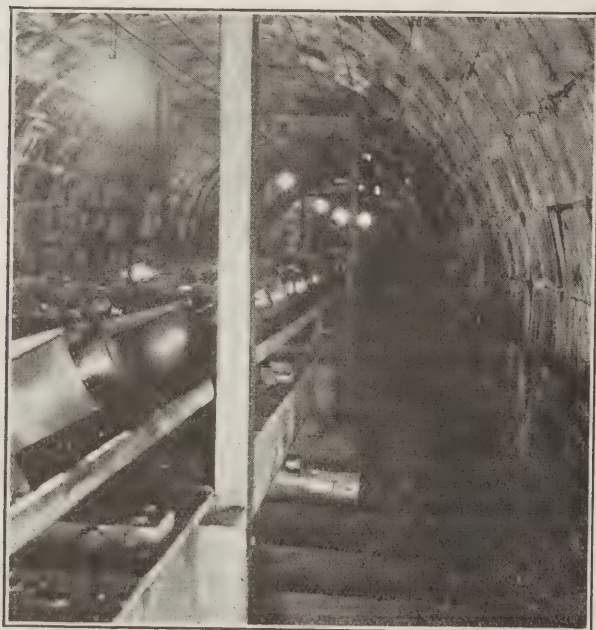
In general the depth from which coal should be hoisted by belts is governed by the output desired. By placing two 500-ft. conveyor units in tandem, a rise of more than 300 ft. can be obtained. Coal from seams lying at depths of 225 ft. can be hoisted by means of such an arrangement at the same theoretical rate—5,400 tons in eight hours—as that of the single-unit conveyor mentioned earlier in the paper.

That is precisely what the Hudson Coal Co., of West Virginia, proposes to do at its Indian Creek operation, near Morgantown, W. Va., where the Sewickley seam is to be mined at a depth of about 275 ft. The total rise of the two conveyor units in tandem being about 350 ft., each unit will have to be about 550 ft. long, if the slope is 18 deg. This mine is being planned to produce 4,000 tons of coal per day.

The trend of present-day opinion is that the depth from which coal may be economically hoisted by means of slope conveyors ordinarily will not exceed 225 ft. That depth will require two 500-ft. conveyor units in tandem on an 18-deg. slope, as already stated. It is possible, nevertheless, to hoist economically from slightly greater depths by means of longer conveyor units, as pointed out in the case of the proposed Indian Creek operation of the Hudson Coal Co. Who knows? In the future we may find it economical to hoist from depths of 300 ft., using three conveyor units in tandem or 400 ft. with four such units. Only a very large production, however, could warrant these extremes.

On the depth of the coal seam below the surface hinges the application of slope conveyors for hoisting small daily tonnages. Wherever slope-sinking operations are easy, the cover is less than 100 ft. thick, and the mine is to produce 2,000 tons of coal per day, hoisting by belt might be preferable to cage hoisting. Most 1,000-ton mines in coal 50 ft. below the surface are best served by belt conveyors.

The total first cost of sinking a slope and installing a conveyor may be more or less than that of shaft and



CONVEYOR IN TILE-LINED SLOPE IN LEWIS MINE

Where, as in this case, the length of the conveyor is less than 250 ft. and the tonnage of coal carried by it is not more than 2,500 tons per shift, the base of the conveyor can be built of wood at low cost. This arched slope is lined with tile, the cost of this type of construction being two-thirds that of concrete.

*Based on table in Marks' Mechanical Engineers' Handbook.

A 430-Ft. Pan Conveyor

At the Kinloch slope. Because so long it must necessarily be made of heavy material. This conveyor weighs 40 tons and carries an equal weight of coal. It is driven by a 150-hp. motor, but one of 100-hp. would carry the average load. When this conveyor was installed mining men shook their heads. It has proved after five years of service one of the most efficient devices in the industry.



cages. The cost per foot is greater for sinking a shaft than for a slope. But when sunk at 18 deg. a slope is nearly three times as long as a shaft of the same depth. For this reason the cost is more for a completed slope than for a shaft at the same location. That factor is fixed. On the other hand, slope equipment will in most cases cost less than shaft equipment.

Hoisting by means of self-dumping cages would be a better arrangement if only 2,000 tons of coal per day were required from a seam lying at a depth of, say, 200 ft. The first cost would be less than that of an arrangement involving a slope conveyor. Primarily, the greatest merit of a slope conveyor is its continuous performance, which makes for a continuous dumping schedule on the slope bottom. It is best suited to a mine having a large production.

It is readily apparent why large tonnages may be handled with greater efficiency by a belt conveyor than by cages or skips. As rapidly as coal is dumped into bins it is fed onto the conveyor. Properly functioning skips do not retard the rate of dumping, but they are much more likely to get out of order. The added cost of skips and their more complicated bottom layout favor the use of belt conveyors.

The slope conveyors now in actual use are giving excellent service. The installation at the Kinloch mine of the Valley Camp Coal Co., at Parnassus, Pa., is outstanding because this mine ranks on merits of production as one of the "Big Three" in the Pittsburgh district. Its actual daily output is 3,400 tons. Though a pan conveyor is used, the arrangement has many features common to belt conveyors. Its reliability is indicative of what one can expect when belts are used.

At the Kinloch mine a 30-deg. slope having a length of 430 ft. strikes the Thick Freeport seam at a depth of 150 ft. below the slope mouth. It is wide enough to accommodate a 60-in. pan conveyor, a mine track for materials and slate and a stairway for man travel. The conveyor is fabricated heavily, as it must be, weighing 40 tons and carrying a load of coal equal to its own weight. Even so, a 150-hp. motor is sufficiently large to move the conveyor and coal at the rate of 75 ft. per minute. The capacity of the unit is 475 tons per hour. A double track extends 500 ft. from the tail of the conveyor. The arrangement for handling trips is like that generally used on the surface at a drift mine, a kickback and two car hauls serving their customary

purposes. Six men are employed on the bottom for the usual duties of uncoupling and coupling mine cars, dropping them to the dump, spotting, taking checks and dumping. A crossover dump empties the mine cars into a 9-ton chute pocket, from which the coal is fed to the main conveyor by means of an apron feeder.

The most notable feature of the dumping and hoisting arrangement at this mine is its operating continuity, for three 2½-ton mine cars are dumped in a little less than a minute. For this reason only 600 mine cars are required for the haulage of 3,400 tons of coal, though the mine is well developed.

Slope hoisting, therefore, like skip hoisting, has the advantage over hoisting by means of cages in that mine cars are dumped at the foot of the slope and are immediately available for use, which means, or should mean, that fewer mine cars are required for a given output. Consequently there should be less congestion on the bottom.

Only once in a period of five years has a long delay in transportation been caused at Kinloch by the breaking down of the pan conveyor. In that specific case the delay lasted several hours. Belt conveyors should do as well, and probably will, providing they are watched carefully and defects repaired immediately in off-shifts.

A typical application of belt conveyors for hoisting from shallow depths is made at the Lewis mine of the Hudson Coal Co., near Clarksburg, W. Va. The conveyor from tail to head rises 83 ft. in a distance of 247 ft., forming a slope of 18 deg. A 75-hp. motor is reduced by gears to move the belt at the rate of 250 ft. per minute. At that speed the capacity of the conveyor is 250 tons per hour. The same motor will drive the belt at a maximum allowable speed of 500 ft. per minute to carry 500 tons per hour.

An example of an extreme application of slope conveyors for hoisting coal is the installation at the Aluminum mine of the United States Aluminum Co., near Pittsburgh, Pa. The site of the mine plant is on the bank of the Allegheny River. An intervening railroad prohibits the bringing of mine cars to the river tippie from the Upper Freeport seam, which outcrops at about the level of the railroad track. The problem was solved by erecting a conveyor gallery at tippie height across the railroad tracks to connect with a gently inclined slope which penetrates the hill. The belt is 30 in. wide and 180 ft. long, driven by a 25-hp. motor at a speed

of 270 ft. per minute. The capacity of the conveyor is 195 tons of coal per hour.

No better arrangements could be made for bringing coal to the surface at the Lewis and Aluminum mines. Hoisting coal up shafts from depths of 50 ft. is not practicable. Rope or chain haulage in a shallow slope is no longer recommended where the output is sufficiently large to justify the use of a belt conveyor. The arrangement at the Aluminum mine is ingenious and suggests another use of belt conveyors, namely, for solving peculiar problems of plant layout.

A mistake was made not long ago at a mine in Pennsylvania. Because a chain haul in a slope 250 ft. long and 60 ft. deep was inadequate to handle increased production during the war period, the management of the mine abandoned the use of the slope for haulage purposes after first sinking a shaft and erecting a new tippie. The bottom could have been altered to meet the requirements of a slope conveyor without seriously interfering with the daily operation of the mine.

In that event mine operation could have been suspended for a week or two while a temporary slope conveyor was being installed and a few alterations made on the tippie. The shaft and equipment today are as inefficient as the chain haul they displaced was inadequate. This mine is now producing nearly 3,000 tons of coal a day. Attempts to maintain a high rate of hoisting by quick acceleration and retardation in a short lift are shaking the headframe and the tippie and causing much spillage of coal during dumping.

No mining man need hesitate in accepting the possibilities of belt conveyors for transporting coal horizontally or on inclines because of doubts as to the life and dependability of composition belting. Reliability is a quality of well-designed belt conveyors. Only rarely is a duplicate unit installed as a precaution against breakdown. Standby units are not even provided in byproduct-coke plants which operate 24 hours per day, year after year. Belts with good splices seldom break without giving warning months in advance, whereas hoisting ropes sometimes snap in two without warning and apparently without an indication of weakness. Splices are not likely to break inopportunely unless a belt is greatly overloaded. At the Lynch plant the life of a splice is about two years.

Like the life of an automobile tire the life of a belt depends largely on the care taken of it. Its life will be greatest when it runs continuously with a capacity load. Weakness in a belt is not entirely the result of wear. In time it weakens from the effect of changing climatic conditions, moisture and strains caused by tension and bending. The greater the tonnage passed

over a belt in a given period of time, the longer will be its life, figured in tons. Consequently the maximum productive life will be obtained at mines of large output.

From many sources come accounts of long life of belts under all kinds of conditions. If composition belting were not dependable and extremely serviceable, other industries would not use it as they do now in places where continuity of service is a requisite. In the coal industry such records of belt longevity are on file as should allay the doubts of the most skeptical.

A 36-in. belt should have a life of not less than 2,000,000 tons of coal when properly installed and maintained. At the No. 9 mine of the United States Coal & Coke Co. at Gary, W. Va., a 36-in. belt on a 235-ft. conveyor, moving at a speed of 480 ft. per minute, carried 3,300,000 tons of run-of-mine coal in a period of eleven years. If intermittent operation and severe service curtail its life to one-half the figure given above, the life of a belt would still be considered long.

One 36-in. belt is credited with having carried 12,000,000 tons of pulverized coal, but that was a freak performance. In the Marvin colliery of the Hudson Coal Co. of Pennsylvania, two 36-in. belts in tandem units have been in service more than two years. During that time they have carried more than a million tons of anthracite under 4½ in. Yet they show no appreciable signs of wear. The well-preserved appearance of some of the belts in the tippie at Lynch, after carrying more than 2,000,000 tons of mine-run coal, is sufficient basis to forecast a life of twice that tonnage. Most of the sections of the main slate belt at this plant have been subjected to harsh abuse by over 500,000 tons of slate and continue to give service. Certainly the cases cited are sufficient proof that belt charges are low when figured on a per-ton basis.

The sizes of belts recommended for the transportation of the whole mine output vary from 30 to 48 in. Belts of these sizes, running within the maximum limit of speed, will furnish capacities up to 1,000 tons of coal per hour. If a still larger capacity is desired, a 54-in. belt can be used.

Most belt-conveyor experts recommend that for ordinary purposes conveyor units be no longer than 500 ft. and that the slope be no more than 18 deg. By increasing the belt speed or decreasing the feed, a belt conveyor may be lengthened to as much as 700 ft. on such a slope. It is a safer policy, whenever an inclined belt must be longer than 500 ft., to make it as near that length as possible even though horizontal belts may be used of much greater length.

Belt conveyors will carry coal on a slope of 20 deg. or slightly more but when they are being operated to



Dump at Kinloch Slope

In the Kinloch mine the mine cars are dumped into a bin, a pan feeder taking the coal to a belt conveyor. A spring latch and a kick-back switches the empty cars to the empty track. Cagers and cagers' helpers are eliminated.



CONVEYOR HANDLES 2,000 TONS PER SHIFT

Only five men and the conveyor are required to transport the output of the mine from the wagons to the screens on the tippie.

capacity the coal at the point where the conveyor is being emptied of its load may roll back, with unfortunate results. When the slope is thus steep one is never safe in the vicinity of the belt conveyor. Judgment suggests a limit of 18 deg. except for short distances, as at the overlap with tandem units.

The application of belt conveyors for hoisting in slopes, especially those of great length, presents several problems. The most important one perhaps is how to arrange the slope to accommodate a conveyor, manway and supply track. The Kinloch slope has only one wide compartment, in which the three travelways are located side by side. This practice is not advisable from the standpoint of safety.

The slope of the proposed Indian Creek operation of the Hudson Coal Co. of West Virginia is double-decked. At the spring line of the arched slope, which is about 14 ft. high and 11 ft. wide, a concrete floor reinforced with 6-in. steel beams will form the setting for the belt conveyor in the upper compartment. In the lower compartment will be placed the supply track, leaving ample room for a manway.

ESCALATORS MAY BE INSTALLED FOR MINERS

In sinking a slope for a belt conveyor 1,000 ft. long or longer on an incline of 18 deg. the mine owner faces another problem: Will it be fair to expect a miner to climb a long stairway after a hard day's work? This objection might be met by installing one, or perhaps two escalators. The device is in successful use for transporting men to an elevated seam at a mine at Ward, W. Va.

Not all are agreed as to how the lower of two conveyors in tandem should be arranged to discharge coal onto the upper. I have in mind one proposed plan which specifies that the floor line of the lower half-length of the slope be above, but still parallel to, the floor line of the upper half-length. This arrangement would facilitate lapping the lower conveyor unit over the upper. The roof, of course, would have to be made higher above the junction, where also a hump would occur in the floor. This layout is not advisable as it would add to the difficulties of sinking and the offset would obstruct a free downcast of air.

A more logical layout is proposed in which a common floor line is provided for both conveyor units, with the roof made higher at the junction. To raise the head end of the lower conveyor unit sufficiently to give an

overlapping at the junction point, the head end of the lower conveyor is sprung at an angle greater than the primary slope. Chute plates will most likely be used to ease the fall of coal at a junction.

Roller bearings on idlers are advantageous not so much because they reduce power consumption but rather because they greatly reduce attendance for lubrication. Plain bearings bind at times in spite of proper care. Grease cups on them must be filled every other day on an average; the more often they are turned during the course of a day the better.

Grease cups on roller bearings need be filled only once in two months and given a half turn each day. At Lynch they are filled once a month and given a whole turn each day to insure the injection of sufficient lubricant to the bearings. The Alemite system of pressure feeding, as used on automobiles, has been suggested. With it as many as twenty idlers are lubricated through pipe connections. The scheme is not believed to be practicable now but may be worked out later.

Conveyors for hoisting coal are disadvantageous in that a means for inspecting coal after it has left the mine car cannot well be arranged. Nowadays every effort is made to detect miners who load dirty coal and give it a good appearance by topping the car with clean coal. Market competition demands close surveillance of the contents of all mine cars. The possibility of providing an arrangement for facilitating the inspection of coal is a subject requiring consideration.

SLATE MUST TRAVEL BY ANOTHER ROUTE

Contemplated slope-conveyor layouts call for the hauling of slate up the slope in mine cars by a rope. This provision seems crude when coupled with the highly efficient conveyor systems for hoisting coal. At least in large mines which take much slate to the surface, a belt conveyor could be superimposed upon or placed at the side of, one carrying coal. This might be used for taking slate to the tippie from which point it might be transported to the slate dump by another conveyor unit. Here is an opportunity to save much labor, and here again the arrangement at Lynch should serve as an inspiration. As already stated, secondary conveyors from the dumphouses discharge slate onto a main conveyor 686 ft. long and on an 18-deg. slope, ending at the slate dump on the mountainside. Some sections of these belts are expected to carry as much as 1,000,000 tons of slate before they are replaced.

By reason of its operating continuity a belt conveyor will maintain a steady, uniform stream of coal over the shaker screens, unlike the spasmodic discharge of two to ten tons of coal in mass. Consequently, the efficiency of the screens and of the attendants on the picking tables will be increased. Regularity of feed also will markedly lessen the vibration of the tippie.

By the adoption of the belt conveyor for hoisting coal, labor will be saved. Specialized attendance is not needed to control belt conveyors. The men who look after moving parts on the tippie can start and stop them at will by push-button controls. Thus the service of hoist operatives is dispensed with. Aside from lubricating, no other attention need be given to belt conveyors while they are in motion. Like the skip, they will eliminate the need for cagers and cagers' helpers and an attendant on the dumping platform of the head-frame. Only as many men should be needed on the slope bottom as are necessary at the dumphouse of a drift mine.

How 1921 Agreement Has Worked Out In British Coal Mines



Miners Renew Demand for Revision
— Seek Amendment Rather Than
Destruction — Receive 83 per Cent
of Profits, Want 87 per Cent

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

SINCE my return from the British Isles, renewed demands have been made for a revision of the British coal agreement of 1921. At this writing the matter still is under discussion, but despite wide dissatisfaction with some of the terms of the agreement, the predominant demand, as stated previously in this series, is for amendment rather than the destruction of the agreement.

The mine workers now are asking for an increase in the minimum wage. The minimum fixed by the agreement was 20 per cent above the basic wage of each grade of labor in July, 1914. The mine workers ask that this be increased to 40 per cent. They ask further that they be allowed 87 per cent of the standard profits instead of 83 per cent. There are additional demands dealing with the publication of further particulars of costs of production.

So that the existing controversy may be better understood, a condensed summary of the original profit-sharing agreement may be of interest. The agreement provides for the substitution of all the pre-war standards by a new standard wage, representing in each coal field a basic wage equal to the aggregate earnings of each grade of labor in July, 1914. A standard rate of profit is fixed for the capital used in the industry, and the surplus proceeds, after meeting the minimum wages and deducting other allowable costs of production, are divided in the fixed proportion of 83 per cent to labor and 17 per cent to capital.

The mine workers have contended from the start that they should participate in any profits derived from the industry as a whole. It was determined finally, however, that they should not share in the profits of the following related activities: Coke ovens and byproduct plants; smokeless fuel plants; manufacture of patent fuels; selling agencies and merchanting depots; operation of ships, barges and private railroad cars; privately owned railroads; farms and cottages; washeries and electric-power plants, except those at the mine.

OWNERS' DEFICITS NOT RECOVERABLE LATER

The standard wage is the first charge against the industry. In those cases where the proceeds have been sufficient to meet the standard wages, other costs and the standard profits, but insufficient to pay the mine workers the minimum wage, the operators have had to surrender the whole of their standard profits and are not allowed to carry forward against future income any such deficiency in their standard profits. This swallowing up of the operator's standard profit and any claim he may have for recoupment have resulted in determined protest. The operators contend that the agreement should be altered so that they may receive the same proportion of their pre-war profits as the miners receive of their pre-war wages and that temporary

deficits should be recoverable when conditions improve.

Under costs of production admissible under the agreement come such items as timber, supplies, depreciation, royalties, surface damage and restoration, workmen's compensation payments and insurance, health and unemployment insurance, remuneration of mine foremen, rescue work, aid service, fire service, welfare fund. Among the operator's costs which have been held to be inadmissible are interest on capital and loans, contributions to trade associations, income tax and corporation profits tax, amortization of capital.

It is generally admitted that one of the great needs of the present agreement is to rearrange the districts. The mine operators originally contended for twenty-six districts. The mine workers wanted only one district. This resulted in a compromise that set up thirteen districts. It is believed that the mines can be gerrymandered into better groups. A joint committee of miners and operators now is engaged in a study of points in disagreement. The miners in South Wales, Lancashire, Durham and Scotland are particularly insistent on their demands for a larger share of standard profits. Frank Hodges, secretary of the Miners' Federation, has been a consistent supporter of the agreement, but he now is faced with the possibility of independent action on the part of the mine workers in the district mentioned above. Independent action would disrupt the federation and it is possible that a general vote will have been taken by the federation before this article appears in print. The coal agreement is terminable on three months' notice by either mine workers or operators.

WAGES ADVANCE 35 PER CENT

Mr. Hodges told George S. Rice, chief mining engineer of the U. S. Bureau of Mines, in September that the average increase in wages, as compared with 1914, had been only 35 per cent, whereas the increase in living costs was 70 per cent. On the other hand, he contended that the operators are getting a disproportionate amount of the profit. Since the 17 per cent is based on an average it results in many mines, Mr. Hodges said, making more money than ever before has been the case. He admitted, however, that many of the operators are in a bad way. He contended that the operators would be better off under a pooling arrangement covering the entire United Kingdom. He admitted that the banks will have to be particularly liberal in the case of some mines.

The high-cost mines must pay the standard wages even if they lose money. Mr. Hodges pointed out to Mr. Rice, however, that improved management in certain of these properties would make their situation less acute. In that connection it may be pointed out that deficiencies in management cannot be covered up, as was the

case under the old sliding scale, when there were periodic revisions of general wage rates according to fluctuations in prices and in volume of trade.

An idea of how the distribution of the proceeds works out may be had from the results of the joint audit of the South Wales field for May and June, which happened to be issued during the time that I was in the United Kingdom. That audit gave an advance of 3.85 per cent on the standard wage which was payable during September and October. The available surplus, which is divided 83 per cent to labor and 17 per cent to capital, was £1,606,118, or £215,639 more than in March and April. For Great Britain as a whole, during the time that I was in England, production was running slightly over 5,000,000 tons per week. The highest weekly output during the twelve which had preceded was that during the week ended April 21, when 5,824,900 tons had been produced.

Due to the basic importance of coal to British trade, both operators and mine workers are much interested in keeping the output at the highest possible point and are interested in winning all of the coal. Much study has been given the subject of eliminating the waste represented by unmined coal.

Next week Mr. Wooton will give further details of the working of the 1921 agreement.

Standardization of Underground Power Transmission

Factors Influencing Transmission Efficiency—Variation of Efficiency Due to Variable Loads
With Low Load Factors

BY CARL LEE
Peabody Coal Co., Chicago, Ill.

THE objects of standardization in mining have been nicely stated in the three words, safety, efficiency and conservation. The objects of standardization in underground power transmission might be correctly summed up in the words, safety, efficiency and economy.

The first of these, safety, is covered by a long list of rules developed principally from Bureau of Mines Technical Paper 138, "Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous-Coal Mines," and rules of the National Electric Code.

The second object, efficiency, as applied to machinery is very well covered by the standardization rules of the American Institute of Electrical Engineers. Well-defined rules for testing, well-known laws of design, and keen competition in manufacture assure the mining industry of efficient electrical equipment.

Efficiency, as applied to underground power transmission may be simply defined as the ratio of the voltage at the load end of the line to the voltage at the generator end of the line. For any given steady load this may be measured by means of meters. For a simple two-wire circuit it may be quite closely calculated from tables or charts.

It is not physically possible to have 100 per cent efficiency in transmission. The usual 2 to 5 per cent loss in lighting circuits is almost impossible for mine circuits and even the 10 to 12 per cent loss sometimes found in industrial plants usually is unattainable for the average mine.

In many states the maximum trolley voltage allowed by law is 275. Mine generators usually are designed for 250 volts at no load and 275 volts at full load, thus compounding 10 per cent. This compounding partly offsets the drop in voltage or loss on the line. The loss frequently, if not in the majority of cases, is over 20 per cent. Thus 275 volts less 20 per cent equals 220 volts at the load end. Manufacturers have realized the average conditions existing and therefore generally use 210- or 220-volt motors on coal-mining equipment.

The efficiency of transmission depends principally on the following: Voltage used, size of load, size of conductors, length of conductors, joints in negative and joints in positive.

For any given circuit an increase in the load decreases the efficiency of transmission almost inversely. For a given load and voltage an increase in the size of the conductors will increase the efficiency almost in direct proportion, while an increase in length will decrease it almost inversely. The joints in the conductors affect the efficiency in a similar way as the length affects it. The poorer the joints the lower the efficiency. This often plays an important part where the rails are used as the return circuit.

Ideal conditions where the load is steady and concentrated, the joints perfect, and the wires the same size on both sides of the line are seldom found. Such cases can be calculated, the proper efficiency decided upon and the exact wires required to give that efficiency installed. Unfortunately, these are rare cases in mining service.

The actual conditions usually met are complicated and require considerable calculation to arrive at even an approximate figure to represent the efficiency of transmission. Even with those figures at hand there is another factor to be considered. That is the economy of the entire mining operation. It is here that further study and standardization from an engineering standpoint will mean a great deal to the industry.

The efficiency of transmission required from an economic standpoint will depend upon or be affected by: (1) Cost of power at the main generating station or substation; (2) cost of copper and upkeep of lines; (3) load factor.

The efficiency of transmission should be increased as the cost of power increases. Thus the reduced losses would partly offset the increased cost per kilowatt-hour.

The cost of copper is reflected principally in an interest and depreciation charge, which is a considerable item, but not nearly so great as the cost of power.

The load factor affects the economy of transmission. If a line has a high load factor the percentage losses should be kept low; on a low-load factor the losses may be high for peak loads and low for light loads.

The load factor will be affected by the character of equipment used, thus: (1) Haulage locomotives usually have a low load factor; (2) gathering locomotives usually have a slightly higher load factor than haulage locomotives; (3) mining machines having shunt-wound motors and working at the face usually have a somewhat higher load factor than either of the above; (4) pump motors and fans generally furnish a higher load factor than any other form of load.

The various points mentioned are those that appear important in the consideration of additional standardization rules. A great deal of study will be required to formulate general rules to cover the subject of power transmission.

Storage: The Power to Make or Break Coal Market

Relation Between Consumers' Stocks and Price Almost Mathematical
—Reserve Below 30,000,000 Tons a Sellers' Market—20,000,000
Tons the Panicky Point—Above 40,000,000 Tons Favors Buyer

BY F. G. TRYON AND W. F. MCKENNEY

STORAGE is not an untried thing, an experiment to be urged upon a public entirely unfamiliar with the idea. With a great many coal consumers it is instead an established practice of years' standing. Like superpower, while we are talking about it, it has come. The pioneering in coal storage has largely been done, and the task of promoting now lies chiefly in inducing consumers who already store coal to store a little more, or inducing consumers who live from hand to mouth to adopt a practice that others in their own territory have long been following. The economic advantage of storage under some conditions became apparent long ago, and increasing economic pressure is rapidly extending the practice today. The problem of the engineer is therefore not merely to guard against spontaneous combustion, not merely to devise means to cut the cost of handling and reclaiming, but chiefly to show that it pays to store. If the economic incentive can be supplied, storage by consumers will come fast enough. The following is an abstract of a paper read at the annual meeting of the American Society of Mechanical Engineers.

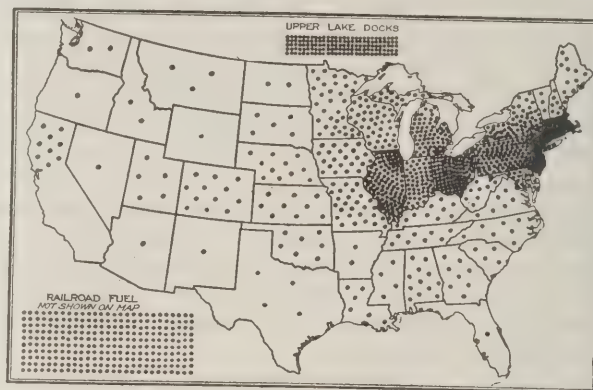


FIG. 2—WHERE COAL IS STORED

The geographical location of reserve stocks is influenced not merely by the number of consumers in a locality, and the amount they consume but by the fact that stocks increase as distance from the mines increases. The region of greatest density of storage is southern New England. In the three states of Massachusetts, Connecticut and Rhode Island there were approximately 6,000,000 tons in storage on Armistice Day. Other areas of dense storage are northern New Jersey, New York, Ohio, Pennsylvania, the Detroit district and the Chicago district.

TO APPRECIATE how far the practice of storing even bituminous coal has progressed, one need only consult the government's latest report on consumers' stocks of coal. On Sept. 1 commercial consumers and retail coal dealers had on hand an estimated total of 56,000,000 tons of soft coal, which is equivalent to five weeks' output at the present rate of production. This figure does not include 6,400,000 tons on the Upper Lake docks, 440,000 tons stored by the producers at the mines and at intermediate points, the millions of tons in transit in railroad cars and in vessels, and the large tonnage in the cellars of householders. This 56,000,000 tons is simply what commercial buyers of carload lots had on hand at points of consumption. The reports of these consumers furnish an adequate basis for estimate because the relation of their stocks in

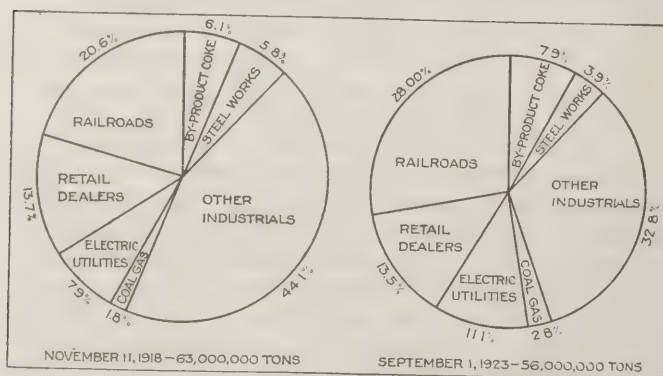


FIG. 1—WHO STORES THE COAL

The largest reserves of coal above ground are held by the general industrial consumers. The general industrials, other than coke ovens and steel works, had 44.1 per cent of the total in consumers' storage on Armistice Day (November 11, 1918), and 32.8 per cent on September 1, 1923. The next largest tonnage is that held by the railroads, which are followed in order by retail coal yards, electric utilities, by-product coke ovens, steel works and coal-gas plants.

1918 to the total stocks at that time found by actual count by the Fuel Administration is known.

The records of consumers' stocks include all coal on hand at the consumers' plants, whether in specially designed storage yards or in bunkers or bins, or simply in piles on the ground. How much of the large tonnage that accumulates under certain conditions is accommodated in specially constructed yards is not known. It is a mystery where the 60,000,000 odd tons that was accumulated by consumers in anticipation of the strike of 1922 was stored. Much of it was stored in emergency stockpiles, inconveniently placed and inadequately protected. We can take it as proved, however, that, given the incentive, the consumer can find means to store.

To equalize the seasonal demand for coal and relieve the winter burden of railway traffic would require the storage during the summer of only 20,000,000 tons more than is already stored. American consumers can manage to find room for this additional 20,000,000 tons. It could be put away without involving the construction of new yards, simply by utilizing more effectively the existing storage facilities or by expanding the crude arrangement of the ordinary small plant.

An interesting fact is that the smaller plants carry greater reserves, expressed in terms of days' supply, than the larger plants. This condition, shown graphically by Fig. 5, was in part the result of a deliberate policy of the Fuel Administration to give the smaller consumers priority in accumulating heavy stocks.

Stocks of the Provident and Improvident.—Up to this point we have been talking in terms of average stocks for the country, for some district, or for some class of consumers. In every community some consumers habitually live from hand to mouth and others habitually carry a reserve even larger than that which may be warranted by the condition of the market.

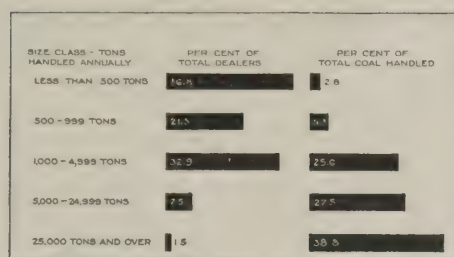


FIG. 3—THE SIZE OF RETAIL DEALERS IN SOFT COAL

Out of 21,207 coal dealers covered by a study of the Fuel Administration made in 1917, only 321 did a business in bituminous coal of 25,000 tons or more a year. Yet these 321 dealers handled 38.8 per cent of the total business. They probably carried nearly as large a share of the stocks in reserve.

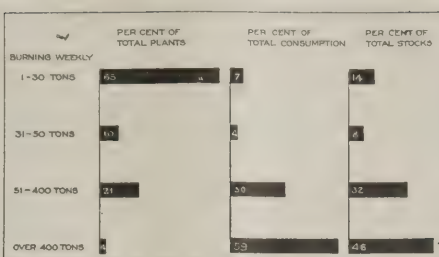


FIG. 4—SMALL INDUSTRIALS HAVE GOOD STOCKS

Small plants appear to carry a larger days' supply of coal in storage, but hold a relatively small proportion of the total tonnage in stock. From a study by the Fuel Administration of reports from 19,729 industrial plants (other than steel and by-product coke works) buying coal in carload lots; representing conditions in August, 1918.

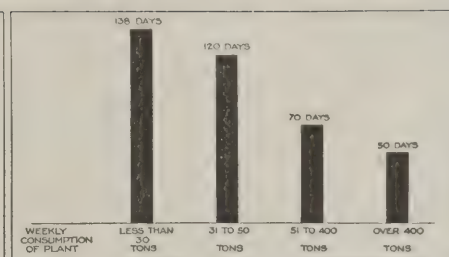


FIG. 5—DAYS' SUPPLY CARRIED BY LARGE AND SMALL INDUSTRIAL PLANTS, AUGUST, 1918

Bars represent days' stock of soft coal on hand in August, 1918, would last at current rate of consumption. From study made by the U. S. Fuel Administration covering 19,729 general industrial plants, not including byproduct coke and iron and steel works.

When the distribution of the reserve in storage is very unequal a shortage in supplies quickly brings distress and consequent sharp and excessive rise in price. We know now that the acute distress of consumers in the winter of 1917-18 was intensified by a very unequal distribution of stocks. A stoppage of rail deliveries due to severe winter weather and congestion of the railroads caught many consumers with no stocks at all. The price at that time was held down by government order, but all remember the heatless days and lightless nights that marked that period. When prices are not under control it is the frantic bidding of buyers caught without supplies that has the most explosive effect upon the spot price.

Quite significant is the curve in Fig. 6 showing the stocks on June 1, 1920, when the "coal panic" of that year was approaching its height. Some champions of the coal trade have held that the shortage of that year was purely psychological, but the figures tell a different story. Seven per cent of the industrial plants reporting on June 1, 1920, had been reduced to less than two days' supply.

Changes in Price.—What is there to offset the cost of storage? Leaving out of consideration its effect in stabilizing prices, the advantages claimed for storage are: (1) Saving in price through purchasing when coal is cheap, and (2) insurance against shutdown of plant. Of these the insurance appears to make the stronger appeal. The remark is commonly heard, "There is no saving in price, but a man will pay anything to avoid shutting down." This remark is only half true, because most consumers know that even at times of shortage they can procure coal if they are willing to pay a price high enough to take it away from someone else.

The consumer has always the option of buying in open market. He is not justified in buying on contract except when he feels that in the long run he can do just as well as in the open market; and the test of the value of storage to him turns on whether or not its cost is kept within the range in the spot price.

Consumers' Stocks Control the Price.—The point to be emphasized is the powerful influence which stocks themselves have upon the price. The direct relation between spot price and the total tonnage of coal in storage is shown by Fig. 8. In this diagram the black columns represent the total quantity in the hands of commercial consumers on all dates of record from October, 1916, to September, 1923. The condition of stocks in between the black columns is not known exactly but may be inferred from the other facts of

supply and consumption. Across the diagram moves a jagged line of spot price.

Output alone does not control price. Production made new records throughout the shortage of 1916 and 1917 and in the end nearly every consumer got his coal. A drop in production does not seriously affect prices until it is registered in lower stocks. As shown in the diagram, every time stocks have fallen below 30,000,000 tons the price has immediately increased and when it has dropped close to 20,000,000 tons the market has been in a state of panic.

So direct is the relation in the rest of the curve that we might almost plot the course of what prices would have been during the life of the Fuel Administration had they not been fixed by government order. Low stocks in the autumn of 1917 meant distress of consumers and would have meant runaway prices if the price had been free to respond. On the contrary, when stocks had been built up to a high level, late in 1918, there were districts in which the operators could not have obtained even the maximum price set by the Fuel Administration. Again the panic price of 1920 was related to extraordinarily low stocks, the consequence of the miners' strike of the preceding autumn, of severe

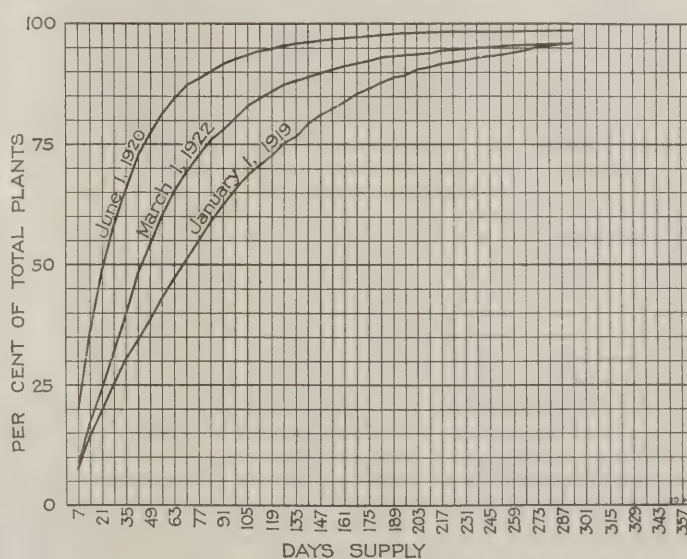


FIG. 6—INDUSTRIAL PLANTS GROUPED BY DAYS' SUPPLY OF SOFT COAL ON HAND

This shows the range in stocks at industrial plants on three dates, which typify the varying conditions of the last five years. The heaviest stocks were on Jan. 1, 1919. Some 40,000,000 tons had been placed in consumers' storage during the war year, 1918, and the condition more nearly represented general saturation than ever before, yet even then 60 plants were carrying less than two days' reserve and 122 were carrying two days' but less than seven days' reserve.

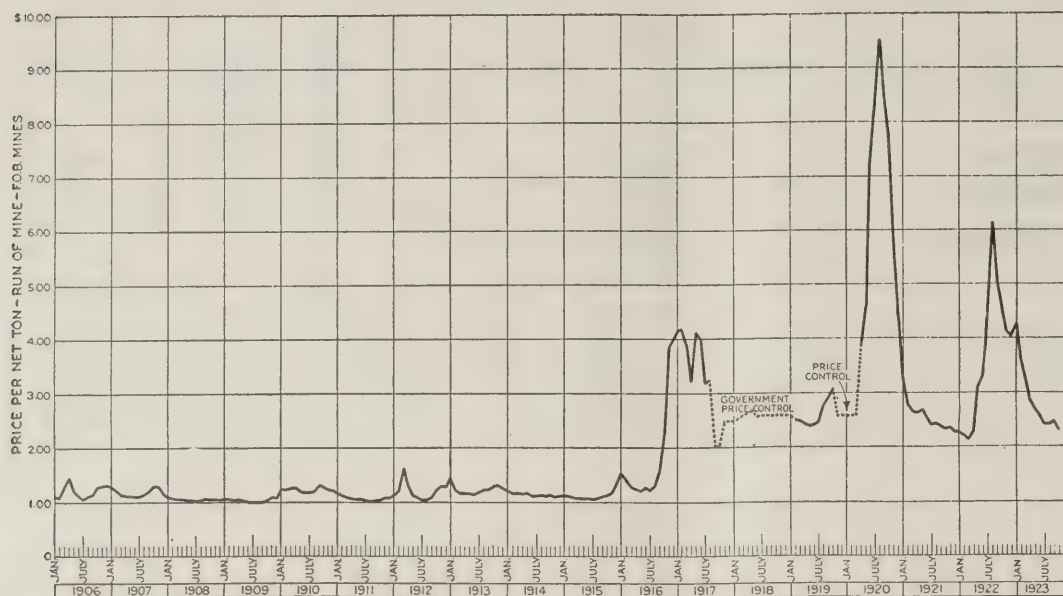


FIG. 7

Spot Price

Data for 1913 to 1923 cover fourteen coals that represent nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared, and run-of-mine normally shipped, and second with respect to the tonnage of each normally produced. This average is published currently in *Coal Age*. Data for 1912 and earlier years have been compiled by Mr. Tryon in as nearly the same way as the records permit, and though subject to revision are fairly comparable.

weather in February, and of the switchmen's strike, which handicapped the railroads from April to June, 1920. When, by the end of 1920, stocks had been adequately built up, the price quickly dropped to normal. Large reserves were maintained throughout 1921 and the price was correspondingly low. So dull was the market at this period that non-union operators cut wages and coal from union mines was sold at the barest margin if not at a positive loss.

Again, it was not until the heavy reserves built up in anticipation of the 1922 strike had been reduced below the level of safety that the price rose wildly. The same almost perfect inverse correlation is shown by the course of stocks and the course of prices since the settlement of the strike in September, 1922.

The lesson is not far to seek. Consumers collectively have the power to make or break a market. The relation between the consumers' reserve and the price is almost mathematical. A reserve below 30,000,000 tons indicates a sellers' market; 20,000,000 tons indicate a panicky market; and above 40,000,000 tons indicates a buyers' market in which salesmen again take the road and solicit business on the consumer's terms.

How Much Should Individual Consumers Store?—The record also includes a lesson for the individual

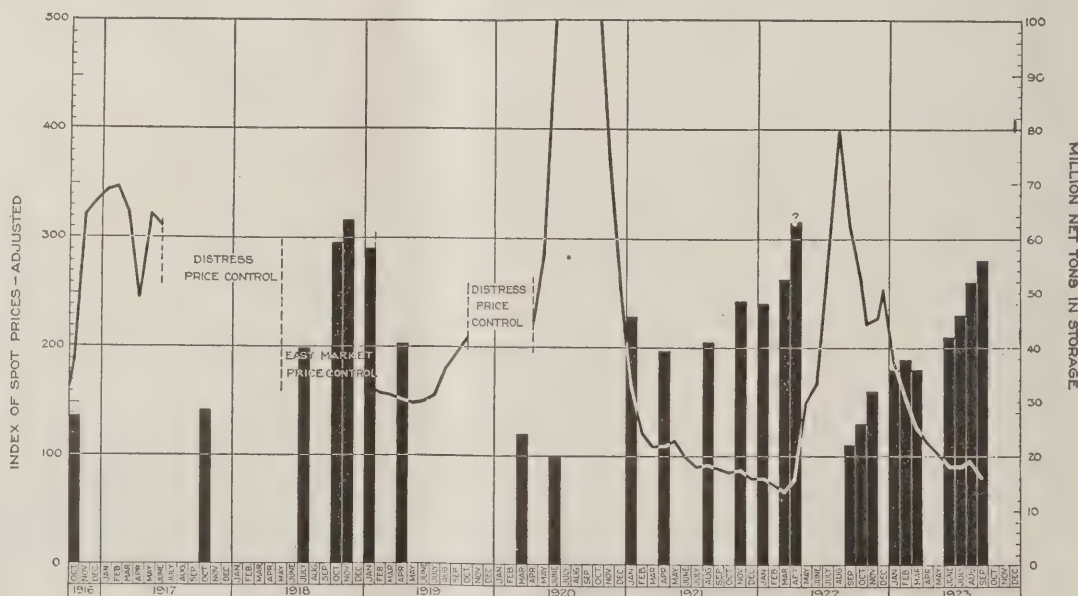
consumer. If he is to profit to the full from the policy of storage, let him store more than his neighbors. He can then stay out of the market while his neighbor is in distress and is bidding up the price to scarcity levels.

Many consumers live off their stockpile; clearly it is a mistaken policy. For two months after the strike of 1922 broke the price rose but little, and though the walk-out of men in the non-union fields showed to a keen observer the seriousness of the situation, the mass of consumers were so apathetic that mines in the non-union fields of West Virginia and Kentucky did not have orders enough to run full time.

The time to utilize the stockpile is not in the first stages of the suspension but in the last stages, or even for months after work has been resumed. Practically all these great suspensions have ended in the same way. They have ended in distress among consumers, rapid increase in price, pressure on the union operator to settle up and take care of his customers, and still more powerful, the operators' desire to participate in the highly profitable market that follows the strike. Why be one of the consumers whose distress forces a settlement? Would it not be better business, if the consumer is to store at all, to store enough to carry him past the peak of the price?

FIG. 8
Stocks and
Prices

Black columns represent tons in hands of commercial consumers and retailers on all dates for which a canvass of stocks was made. Curve represents *Coal Age* index of spot prices f.o.b. mines, the average price July, 1913, to June, 1914, being taken as 100; adjusted, however, to eliminate increases due to the several increases in union wage rates. Thus adjusted the fluctuations in price reflect only the changing conditions of the market.



News of the Industry

Restriction of Trade Associations Seen As Foretaste of Coal Legislation

Action Against Cement and Tile Manufacturers Heartens Champions
of Compulsory Statistics—New England and Northwest
Coalesce for Anthracite Control

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

The successful way in which the Department of Justice is adding scalps to its belt in its campaign against trade associations has an important bearing on the legislative program as it pertains to coal. Judge Knox's action against the cement manufacturers, following as it does on the heels of the decree in the tile manufacturers' case, restricts further the chance of obtaining voluntary statistics from the coal industry. It is certain to give new heart to those who contend for compulsory statistics.

In this connection, the unexpected has happened in Pennsylvania, and apparently the anthracite-consuming states are ready to put all of their impetus behind federal regulation of the anthracite industry. It is regarded in Washington as being quite significant that the second Pinchot conference should have succeeded so well just at a time that it had been generally concluded that it constituted another fiasco. When a group of state executives representing different political parties and whose interests conflict sharply at many points are able to get together on a common program such as was outlined at the last Pinchot conference, it is evident that a new force looking to federal regulation has been unloosed.

The introduction by Representative Treadway of a bill dealing with the quality of anthracite and with its distribution was expected. While it was not known that Mr. Treadway contemplated the introduction of this bill, it was expected that someone from New England would sponsor legislation of that type.

In this attitude, however, New England has the warm support of the radicals, and even some of the conservatives, from the Northwest. Apparently the public in those sections is clamoring for some control over the anthracite industry. The bill, however, indicates a narrow and provincial spirit in that it does not include bituminous coal. It is very easy to observe that the author of the bill is looking at the problem from a local instead of a national point of view.

In conformity with the message of

the President, the administration leaders apparently have no thought of favoring drastic action dealing with the coal situation. Judging from the developments of the past week, however, the initiative is to be seized by a New England-Northwest coalition. It happens that these members are in a position to obtain consideration for legislation even if they may lack the strength to carry it through to final passage.

Warns Smokeless Men Against Meddlesome Legislation

Addressing the annual meeting of the Smokeless Coal Operators' Association of West Virginia, in Washington, Dec. 13, Senator David A. Reed, of Pennsylvania, denounced governmental meddling with business.

Senator Reed criticized various proposals for the regulation of business, including legislation aimed at the coal industry. He warned the bituminous coal operators to keep close watch of legislation relating to the coal industry. He said that while the most discussion relates to regulation of the anthracite industry there are many members of Congress who do not realize that conditions in the bituminous and anthracite industries are different.

Roderick Stephens, chairman of the Government Relations Committee of the National Retail Coal Merchants Association, also spoke briefly, emphasizing the need of greater co-operation on the part of the entire coal industry.

About 100 members attended the meeting and unanimously indorsed the Mellon income-tax plan.

Robert H. Gross, of Boston, was re-elected president of the association. Mr. Gross was unable to be present because of a sudden illness. Oscar M. Deyerle of Bluefield, W. Va., presided in his absence while George Wolfe of Beckley, W. Va., acted as secretary.

Officers elected besides Mr. Gross were: William C. Atwater, of New York City, first vice-president; W. P. Tams, Jr., of Tams, W. Va., second vice-president, and George R. Collins of Charleston, W. Va., treasurer. Members elected on the board of governors

were: Pocahontas district, T. F. Farrell of New York, and L. R. Page, Jr., of Philadelphia; Tug River district, John C. Steinbughler, of New York City, and George R. Collins, of West Virginia; New River district, G. H. Caperton, of Charleston, W. Va., and M. L. Garvey, of Winona, W. Va.; Winding Gulf district, W. P. Tams, Jr., of Tams, W. Va., and P. M. Synder, of Mounthope, Va.

Mr. Farrell, in presenting a report from the transportation committee predicted that the Interstate Commerce Commission would approve the proposed through rates on smokeless coal to New England and other Eastern points as submitted to the commission during the previous week.

Charge Unfair Trade Methods To Midwest Retailers

Unfair methods of competition in the sale and distribution of coal are charged in a complaint by the Federal Trade Commission against the Illinois & Wisconsin Retail Coal Dealers Association, including its officers and members. The association is composed of retail coal dealers of Illinois and Wisconsin. The complaint recites various methods by which the association and its members enforce its co-operative scheme of boycotting so-called "irregular" or "illegitimate" dealers, such dealers being determined by the association as being outside of its definition of a retail coal dealer.

The complaint further states that the association's acts constrain producers and wholesalers of coal to confine the distribution of coal in respondents' so-called "regular channels" and to prevent so-called "irregular dealers," co-operative associations and groups of purchasers from securing coal at wholesale or from any other source than from "regular" or "legitimate" retail coal dealers, thereby unduly obstructing and hindering free competition in the distribution and sale of coal in the association's territory.

J. B. Sanborn & Co., publisher of the "Coal Dealers' Blue Book," is listed as a respondent in the complaint, and is charged with co-operating with the coal association in its undertaking to confine the sale of coal in its territory to their so-called "regular" dealers. Others individually named in the complaint are Russell H. Jones, R. B. Her-ring, C. S. Dodge, I. L. Runyan, W. H. Baethke, W. J. Dambold, E. H. Keeler, A. H. Holcomb, R. S. Hunter, H. E. Eastman, J. H. Wall, F. A. Young, W. J. Baker, H. B. Gaines, R. C. Wagner, Jr., P. F. Irwin, W. S. Harwood, C. R. Burnton, J. V. Tapper and Joseph Rademacher.

Illinois Operator Suggests Government Control Plan with Teeth in It

H. C. Adams Would Have Coal Board Fix Prices and Restrict Output to One-Sixth Above Consumption, Aiming at 20-Day Working Months and Stability

An outline of a government-control plan to remedy the ills of coal has gone into the mails for Congressmen and others, from the office of H. C. Adams, president of the Peerless Coal Co., of Chicago, a veteran operator. It is called "Suggestions for the Solution of the Bituminous-Coal Problem" and was worked out after much thought and consultation with other experienced coal operators of the Middle and Far West.

Under this plan a permanent government commission of eleven with a minority of coal operator members would try to restrict production to about one-sixth in excess of the normal consumption of the country. This would be attempted (1) by licensing all producing mines, (2) by passing upon the necessity of opening any new mines, and (3) by requiring substantial and therefore expensive construction of all new mines and possibly by requiring them to operate from the first on a retreating basis.

The commission would gather and publish facts about coal and would "fix selling prices when production and consumption were close together," but would take no part in wage negotiations. Mr. Adams also firmly recommends the incorporation of the United Mine Workers of America. The complete set of "suggestions" follows:

"The Fact-Finding Commission developed, in their investigation, a number of conditions having to do with the general demoralized condition of the coal business. The report would indicate that one of the greatest, if not the greatest factor is over-development, which is by no means an unsolvable problem, and the writer, in offering the plan hereinafter described, is doing so in the belief that Congress has the power to change existing laws and to make new ones to suit conditions.

"Over-development of the industry cannot be regulated by the industry itself, and so long as unrestricted development is continued, the coal situation will be chaotic in every sense.

"The following plan is offered as a basis to govern future development and to secure the maximum of safety, economy and conservation.

"A commission to supervise the coal industry should be appointed by the President of the United States, and should consist of eleven members, as does the Interstate Commerce Commission, three or four of whom should be skilled coal mine operators, presumably one from the East, one from the central East, one from south of the Ohio River, and one from the Far West—the coal members should be in the minority. The other members should be selected business men. Their term of appoint-

ment should be not less than seven years.

"The commission should receive from railroads and coal companies statistics covering all matters pertaining to the development, production and marketing of coal and to cars in which to move it.

"*Method of Licensing New Mines.*—A company owning coal acreage desiring to open a mine should file application with the commission above described. With all statistical facts before the commission it would be easy to determine whether further development was justified and whether or not the applicant could develop new business or further divide the district's current business. When coal consumption reached five-sixths of the developed capacity of all mines, then further development should be authorized and such ratio maintained.

"It is obvious if five-sixths of the available supply of coal were consumed, the flow of coal must be on the basis of about twenty days of mine operation per month, and that the domestic user must take in a large part of his coal during the summer months, and that the steam consumer must store in the summer a surplus for winter. In other words, each month's supply of coal must be shipped in approximately twenty days, and if not consumed must be stored. The above distribution

Hoodoo

An old woman with a bad eye aided and abetted by a Greek mystic in a greasy Chicago "lunch" nearly shut down No. 2 mine of the Union Pacific Coal Co. at Hanna, Wyo., on Dec. 13. A few days before the 13th the old woman with the bad eye had a dream—she saw No. 2 blow up on the 13th! Hanna heard all about it over the back fences and snickered—outwardly. Then came a Greek miner back from a Chicago visit. He had been in a restaurant in Chicago eating "whit cacks, cup coffee and pits oppla pie" and got a prophecy—so he said—from the mystic waiter that No. 2 mine was going to blow up on the 13th! Hanna heard it—and didn't even snicker. The morning of the fateful 13th, 20 loaders out of 110 went down. The evening of the fateful 13th the 20 came up. That's the whole story, except that Gene McAuliffe, president of the coal company, says the old woman with the bad eye and the Chicago whit-cack mystic cost the company a thousand dollars.

would obviate the necessity of increasing railroad equipment, as car supply is adequate if kept in service.

"This regular movement would permit the railroads to handle the business in a much more satisfactory manner to all concerned, and as coal and transportation are so closely allied, any plan that would help one must of necessity help the other.

"Wage-scale negotiations should be conducted as now, or if some better plan between the operators and miners could be devised it could be accepted, but the commission should take no part in such negotiations.

"Prior to the expiration of a wage contract the commission should make a public statement by districts and states of the rates of pay, days worked, days available and such other information as would be useful.

"In order to further stabilize the industry and make contracts between the operators and miners enforceable, labor unions should be incorporated.

"All new development of mines should be made on government or state plans, and full and careful consideration should be given to what is known as the retreating system of operating mines. This means the entries or haulageways are driven to the boundaries of the properties before room development commences. This plan contemplates the removal of practically all coal from the seam. It is a conservation measure and should be given consideration.

"It would be advisable to compel the purchase of the surface as well as the coal underlying it. This would permit of the retreating system and would eliminate the contentions arising out of subsidies.

"All mine buildings and shafts should be of fireproof construction, and particular attention should be paid to the shaft bottom. Sufficient supports should be left in to insure the mines' perpetual safety. Hoisting apparatus should be equipped to insure safety.

"Such restrictions would discourage all but competent, well-financed companies from engaging in the business, and would not only stabilize the industry but guarantee maximum safety to employees and conservation of coal measures, of which fully 35 or 40 per cent is now wantonly wasted.

"A glance at the financial condition of a great many railroads, utilities, packers, and others that are under government control or supervision discloses a reasonably satisfactory healthy business condition.

"It would be necessary for the commission to fix selling prices when production and consumption were close together, and they should be empowered to do so, allowing the producer a fair return on his investment. Prices could be easily arrived at by using average cost and quality, and requiring a standardized system of cost accounting.

"The commission should from time to time publish such facts concerning the working time of mines, earnings of the men, cost of coal, realization, and other facts which they may deem important for the public to know."

"Governors" Parley Directs Pinchot to Draft Hard-Coal Bill and Push It

Preus and Representatives of Governors of Four Other States Attend
—Pennsylvanian Dodges Questions Before Newspapermen—
Measure to Be Introduced in Congress in January

The second "conference of governors" called by Governor Pinchot of Pennsylvania to consider his suggestions for the regulation of the anthracite industry saw Governor Preus of Minnesota and four representatives of other governors, besides Mr. Pinchot, at Harrisburg on Dec. 13. They discussed the Pinchot outline of a federal bill and his proposed compact of states plan and authorized the Pennsylvania Governor to complete both and mail copies to the governors of the thirty anthracite-consuming states invited to the two conferences.

As matters now stand Governor Pinchot is approximately where he was when he first called the conference in November. At that time some of the governors asked to attend suggested that he mail to them any suggestions he might have. After the first conference he did mail skeleton drafts of his plans and now within a few days he will mail a complete bill, which he promised the conference he would have introduced in Congress, and a complete compact. On the other hand the Pennsylvania Governor lost no ground at the second meeting, for while neither of his suggestions was adopted it was unanimously agreed that something might be gained from a study of the completed idea and there was a decided sentiment among the half dozen conferees that federal legislation is needed.

ADOPT PREUS-PEARSE MOTIONS

Two motions were adopted by the conference. Governor J. A. O. Preus, of Minnesota, offered one which authorized Governor Pinchot to send the complete draft of the federal bill to all the governors of the anthracite-consuming states and that the Pennsylvania executive urge the governors to use their influence upon their Senators and Congressmen to support the measure. The other motion, made by F. M. P. Pearse, secretary to Governor Silzer, of New Jersey, provided that the compact be fully drafted and forwarded to the governors and that Governor Pinchot be empowered to call upon the governors for such assistance in its preparation as he may see fit.

In addition to Governors Pinchot and Preus and Secretary Pearse, there were in attendance at the conference Cyrus Locher, Director of Commerce, of Ohio; Dr. Frank J. Monaghan, Health Commissioner of New York City, representing Governor Smith of New York, and W. E. Snider, of Michigan.

It is not believed there will be further meetings. At least, nothing was said at the conference of Dec. 13 about reconvening the representatives. Governor Pinchot has said repeatedly that

he will have the federal bill presented whether the other states go along with him or not, and while there is little to indicate that many of the states will co-operate with Pennsylvania in trying to adopt the compact, Governor Pinchot is said to have hopes that some of the states will accept this part of his plan. Those that indicate that they favor the compact can be got into line without a meeting, it is said at Harrisburg.

Only one suggestion was made at the second conference in reference to the Pinchot suggestions, and that came from Mr. Pearse, who said that wholesale coal dealers should be licensed under the state regulatory plan.

The same opposition that was manifested at the first conference to the compact developed at the second and it was led by the representatives of New Jersey and Minnesota. In fact these two did most of the talking with Governor Pinchot, the other three remaining quiet through the two-hour debate on the measures.

INVITES PREUS BEHIND BARN

Governor Preus asked whether, if the Pennsylvania Legislature were in session and a bill making the anthracite industry a public utility were introduced, the Legislature would pass it. Governor Pinchot replied to this: "In the presence of newspapermen, I must take the advice of counsel and refuse to answer. However, if you come out behind the barn I can tell you all about it." The Legislature of 1923 defeated a bill, sponsored by Representative Burns, of Philadelphia, which would have made the industry a public utility.

J. J. Walsh, secretary of the State Department of Mines, at the opening of the conference presented figures to show the findings of his inspectors who examined more than 1,000 carloads of anthracite at the mines. The reports showed that from 10 to 16 per cent of bone and slate was found in the coal. He defended the certification law of Pennsylvania and spoke in behalf of the proposed compact. The federal bill was discussed by Philip S. Wells, a deputy Attorney General, and Harold M. Evans, Philadelphia, who aided in drafting the measure. Neither of the Pinchot plans was taken up in detail and when the talk was leading nowhere Governor Pinchot brought it back to the matter before the conference.

"The principal thing, it seems to me," remarked Governor Preus finally, "is to get the federal legislation before Congress as soon as possible."

Governor Pinchot agreed with him and said it should be introduced early in January. The two motions were then offered and quickly adopted.

Lawmaker's Impression of Hard-Coal Legislation

"You will hear the anthracite industry discussed in Congress this winter out of an immensity of ignorance, and I advise you to watch closely what is done, because the fact is the majority of men who will vote upon that question do not know that there is any difference between the conditions under which anthracite is produced and the conditions under which bituminous coal is produced."—Senator Reed, of Pennsylvania, before the Smokeless Coal Operators of West Virginia, in Washington, Dec. 13.

O'Gara Coal Co. Wins Suit

A verdict for \$82,801 was recently rendered against the Chicago, Milwaukee & St. Paul R.R. by a jury in the District Court of Douglas County, Neb., in an action brought by the O'Gara Coal Co. for alleged violation of contract.

The contract, entered into Sept. 2, 1920, covered the entire output of the O'Gara Coal Co.'s No. 11 mine, the output not to exceed 1,500 tons daily nor to fall below 1,350 tons, at an agreed price of \$4 per ton, the damages sought being based upon alleged losses incurred by the coal company because of the failure of the railroad to accept full tonnage covered by the contract during its life of seven months.

Judge Troup, who presided, in his instructions to the jury held that the railroad company, inasmuch as it used a larger tonnage of coal daily than that specified in the contract, could not rely upon 'unusual conditions' as a defense.

The coal company sued for \$165,602.

Silzer and Ritchie Repudiate Pinchot Plan

Governor Silzer, of New Jersey, and Governor Ritchie, of Maryland refuse to have anything further to do with Governor Pinchot's plan for concerted action by anthracite-consuming states to bring down prices. In an address before the Board of Trade and Transportation at New York City, Dec. 12, the New Jersey Governor characterized the Pinchot proposal as impractical and again put the main job of housecleaning the industry up to the State of Pennsylvania itself.

Governor Ritchie of Maryland sent a letter Dec. 12 to Governor Pinchot declining to set up "coal-distribution machinery" in Maryland, in accordance with the plan of the Pennsylvania Governor. The Maryland executive held that creation of a state regulatory commission, with consequent expense and additional officeholders, was not warranted by conditions in his state. The Pinchot plan, so far as it provides for regulation by the State of Pennsylvania, is a matter that can be left safely with the Pennsylvania Governor, Governor Ritchie wrote.

Second National Power Exhibition Proves Bigger Success Than the First

Interest in the annual show of power and mechanical apparatus held at the Grand Central Palace, New York, Dec. 3-8, was even greater than that of last year, when the first national power show was held. Exhibits covering nearly every phase of power generation, power-plant control, and fuel analysis were displayed before the engineers and interested public. The success of this year's show was helped much by the joint meetings of the several engineering societies in New York during the same week.

Naturally most of the exhibits dealt with the production of power from coal and fuel oils. There was, however, a lack of power-generating machines, such as reciprocating engines and turbines. Many of the exhibits showed full-size power plant equipment, which in many cases was supplemented by educational talks and graphic and pictorial illustrations, together with an extensive program of motion pictures.

Starting with a display of the various kinds of wood, coal and oil fuels, it was possible for one to go through the exhibition hall and follow the processes of conveying, preparing and burning the fuel to the smokestack and the ashpit. The exhibits covered every phase of power-plant equipment from furnaces, boilers, burners, control, metering and conveying apparatus to flue-gas analysis. To those following the rapid development of the power plant, new types of stokers for burning small sizes and pulverized fuel were most interesting. One could not help but see that the development of this equipment is pointing the way to the day when fuels once considered waste products and unburnable will be utilized at efficiencies as high as, if not higher than, the best grades of coal are being burned today.

CHANGE IN BOILER DESIGN

In keeping with the advancement made in stokers, there has been a change in boiler construction leading to the use of higher steam pressures, and to withstand these high pressures and high temperatures the most modern power plants are now changing and remodeling much of their equipment. To meet these conditions the valve and fitting manufacturers have designed their products for pressures up to 400 lb. and steam pressures as high as 800 deg. F.

Another interesting part of the show was the complete line of steam and power-house specialties. Many of these accessories have been designed to eliminate the human element, making almost everything about the power plant automatic. In this way plant operation may be carried on at the highest point of efficiency. Many of these appliances may be interconnected and co-ordinated with the rest of the system so as to regulate the furnaces,

boilers, dampers, fans, etc., to obtain the best operating conditions automatically with changes in the load.

A novel device applied to coal and material conveyors on exhibit was the Merrick conveyor weightometer, manufactured by the Merrick Scale Manufacturing Co., of Passaic, N. J. This machine will weigh and record the weight of any material while in transit over a belt, bucket, or pan conveyor, without interrupting the flow.

Another exhibit of interest to the man who must convey coal was the Sandvik steel belt conveyor, made by the Sandvik Steel Co., New York, which was equipped with scrapers for unloading any portion of the material at any required location along the line.

The exhibit of the Fuller-Lehigh Co., of Fullerton, Pa., showed complete details of a coal-pulverizing plant, with pulverizers and blowers for various types of furnaces and boilers.

The Pyramid grate, manufactured by the Pyramid Iron Products Corporation, of New York, showed a novel design of grate, permitting a 30 per cent air space without the loss of even the ordinary small size fuel through the grate.

For emergency and auxiliary power supply the mining man found much interest in the fuel-oil engines of the Climax Engineering Co., of Clinton, Iowa. Several drives of this type are already installed in some of the coal mines for emergency power supply in case of fire or accident.

To the tippie, breaker and washery man, the Smith type friction clutch, made by the Hill Clutch Co., offers a solution to the driving of coal-preparing machinery from a main-drive shaft, or where machinery must be started slowly or inched.

For the mine shop, office, club and recreation hall, the Fellingner & Hebard Co., of New York, had an interesting exhibit of the Bradley washfountain, an easily installed fixture, which better meets the requirements of sanitation, economy and satisfaction than the usual washstand.

Coal Consumption and Power Output of Utilities Higher

Electric public-utility plants consumed 3,546,831 net tons of coal during October, according to a report just issued by the U. S. Geological Survey. This compares with 3,172,534 tons consumed during September, according to corrected returns.

Fuel oil consumed by public-utility plants in October totaled 1,426,620 barrels, compared with 1,335,356 barrels in September. The average daily production of electricity by public-utility power plants during October was 160,400,000 kw.-hr., compared with 151,200,000 kw.-hr. in September.

19-Year Mine Has No Strike, Fatality or Shutdown

Production of over 2,500,000 tons of coal without a fatality, a strike or shutdown and nineteen years under the same active management is the record of the Gay Coal & Coke Co., of Logan, W. Va., according to R. M. Lambie, chief of the West Virginia Department of Mines. The company opened the first mine in the Guyan Valley and made its first shipment of coal on Thanksgiving Day in 1904. Tom Gilpin, one of the three teamsters that helped to load the first railroad car at the mine, is still with the company.

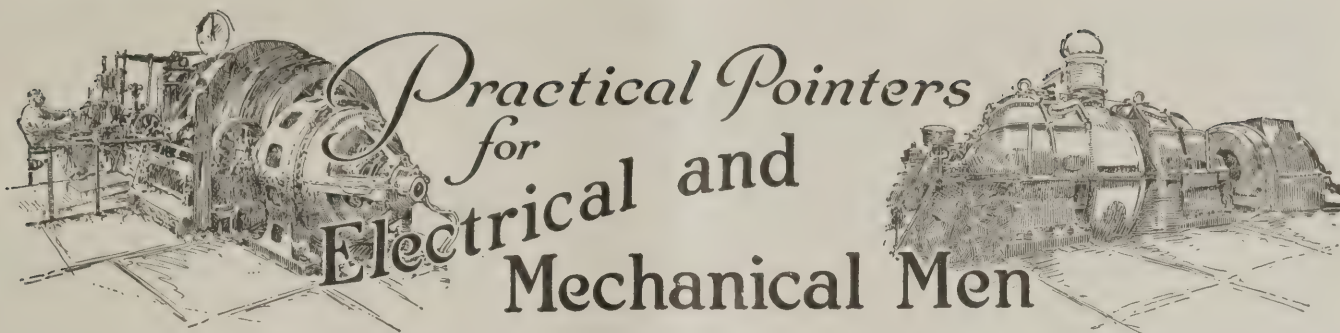
H. S. Gay, Jr., superintendent, attributes the achievement of this record to (1) Strict compliance with the mining law and company rules; (2) unusually good roof conditions; (3) when bad roof has been encountered, all timbering has been done by company men under the supervision of an official; (4) employees have been mostly native West Virginians, who seem to acquire proficiency in mining easily; (5) full co-operation by the men; (6) all operatives of electric locomotives and mining machines served their apprenticeship in the mine; (7) efficient signal system that gives the exact location of all electric locomotives at all times; (8) all transportation is handled as on a modern railroad; (9) proper methods of handling, transporting and using explosives.

Among the many employees of this company during its nineteen years of operation have been Jack Dempsey, world's champion heavyweight boxer, and Don Chafin, Sheriff of Logan County, West Virginia. Both were employed as miners.

To Discuss Mining Industry

Forecasting of business booms and slumps will be the topic discussed at the annual meeting of the American Statistical Association, to be held Friday, Dec. 28 at the New Willard Hotel, Washington.

The program of the mining session, which begins at 2 p.m., Dec. 28, presided over by John Hays Hammond, is as follows: "Fluctuations in Mineral Output," George Otis Smith and others, U. S. Geological Survey; "The Effect of New Technique on the Past and Future Production of Petroleum," Joseph E. Pogue, consulting engineer, New York City; "The Metals," E. H. Robie and F. E. Wormser, assistant editors, *Engineering and Mining Journal-Press*; "The Bituminous Coal Industry in Prosperity and Depression," D. L. Wing, consulting statistician, Washington, D. C., and F. G. Tryon, U. S. Geological Survey. Discussion will follow.



Test for Adhesiveness Of Friction Tape

A much-used specification for determining the adhesive strength of a tape is: "The adhesion between adjacent layers of the tape shall be such that when a strip of tape 2 ft. long is taken from a roll and wound upon a mandrel 1 in. in diameter, under a tension of 10 lb. per inch of width at a rate of 30 in. per minute and allowed to stand for three minutes with the weight attached, a weight of 4 lb. per inch of width shall not cause the plies to separate at a rate greater than 30 in. per minute. The test shall be made at a room temperature not less than 21.1 deg. C. or 70 deg. F. nor more than 23.9 deg. C. or 75 deg. F., the sample having been kept within these limits for at least 30 minutes immediately preceding the time of testing.

"The mandrel shall be so free in its bearings that a weight of 1 oz. will cause it to revolve freely when suspended from a cotton string wound in a single layer on the center of the mandrel."

The conditions of such a specification must be carried out scientifically and exactly in order to obtain reliable data on adhesiveness. A variation of any one of the conditions will entirely alter the results. This essential property of a high-grade tape—adhesiveness—cannot be determined by any casual or superficial means, such as sense of touch, etc.

How an Easy Repair Was Made To a Synchronous Motor

A synchronous motor driving a large air compressor recently gave us trouble. This motor is first of all started as an induction motor and after being brought up to speed it is changed over to a synchronous motor. For some time this motor was becoming more difficult to start, until finally it was impossible to bring it up to the correct speed before changing over to a synchronous motor. The difficulty was that the squirrel-cage starting winding had become loose between the poles, being built into the field poles.

To make a quick repair some soft solder wire was hammered into thin sheets and inserted between the bolted sections of the squirrel-cage winding. When the bolts were tightened the

sheets of solder worked into the rough surfaces at the contacts and formed a good conducting path from one section of the winding to the other. In this way the resistance of the starting winding was lowered so that it was easy to bring the motor up to full speed before changing over to a synchronous motor.

SHOP FOREMAN.

The illustration also shows how the wires are finally brought together and how the outer sheathing may be closed in to complete the splice. Usually the cable will be saturated with wax or some kind of compound to prevent moisture from entering.

W. VIRGINIA.

Trouble That Was Not Trouble

On the afternoon of one of the numerous holidays our company has had recently one of our electrical men went to the power-converting substation at the mine where he was employed and tried to start one of the two rotary converters there and found something that puzzled him and some of his superiors for some time.

These two rotaries were driven by alternating current fed to them by two separate banks of step-down transformers. To start either machine it is first of all necessary to close a switch that puts power on its bank of transformers. Our electrician closed this oil switch in the usual manner but noticed that the ammeter on this circuit gave a sudden indication of very high current just as the switch was closed. In fact, this current was about twice full-load current for the transformers. Without going any further with the operations necessary for starting the rotary connected to these transformers he tried the same thing again, with the same results—a high initial inrush current. Next he tried the oil switch for the other rotary converter, but it showed only a small initial inrush current.

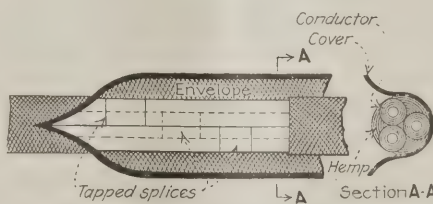
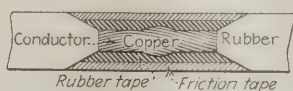
From these observations it appeared as if there was trouble with the first bank of transformers. It was easy to come to this conclusion because the transformers were located outside and had been transferred to the mine after lying idle in another section of the region for over a year.

It was finally decided that there was a breakdown in the first bank of transformers and this break flashed to ground only when the transformers were thrown on the line; the flash, occurring in the oil, was quickly smothered almost as soon as established. Preliminary investigation of the transformers exposed no sign of a breakdown so a "Megger" was obtained and all the transformers tested. The tests showed

Splicing 3-Conductor Cable

The good workman is always endeavoring to make his last piece of work better than the previous one, but he is always ready to try out a new method if it looks practical and will accomplish something in a little better way than it was ever done before. Therefore I wish to submit to *Coal Age* readers the following method for splicing a three-conductor cable:

First of all the sheathing is split open in a line running with the cable. This sheathing is opened up and carefully handled so as not to be torn or broken. The three conductors are then exposed and the hemp or jute filler removed. Each conductor is next cut so as to be joined as shown in the illustration. By arranging the splices in the individual conductors as shown, a neat splice can be made in the cable.



SPLICE FOR THREE-CONDUCTOR CABLE

Each conductor is carefully spliced and taped before the outer envelope is closed around to complete the splice.

In splicing the individual conductors much care should be taken because the joint should be electrically perfect and mechanically strong and at the same time should not be bulky. The upper part of the illustration shows how the rubber insulation has been tapered off and also how the taping is applied. Note that the outside diameter of the conductor at the joint is no larger than the main section of the same wire.

that the particular bank of transformers supposed to be in trouble showed a higher resistance test than the other.

This beclouded the matter still further and by night time nothing new was found. The next morning the chase after the trouble was resumed and by starting from the beginning of the supposed trouble it was found that the high initial inrush current happened depending upon the instantaneous value of the voltage of the line wire that the meter was in when the oil switch was closed. Both banks of transformers showed high and low initial inrush currents depending upon the instantaneous voltage of the line and the quickness with which the switch was closed.

ELECTRICAL ENGINEER.

Starting a Synchronous Motor-Generator Set

We recently experienced some trouble in starting one of our motor-generator sets and after careful examination found that all the electrical circuits and everything in connection with the operation of the machine was correct, yet it was not possible to bring the machine up to speed before throwing over on the full line voltage.

This motor-generator set consisted of a synchronous motor and a 250-volt direct-current generator. When the motor was thrown on the starting voltage it would start without much hesitation but it would not come up to speed sufficient to throw over on the running voltage without an abnormal initial-current inrush.

It so happened that this synchronous motor was excited from the direct-current generator which it drove and as the generator is started it feeds current into the synchronous field of the motor. The result of this action was that the exciting current built up a field in the motor which exerted a dragging effect upon the revolving element. By putting all the field resistance into the field circuit of the motor we were able to bring the machine up to speed on the starting voltage. After this it was possible to put the machine on full running voltage without any difficulty.

SUBSTATION.

Effects Produced by Electric Current

When electric current flows in a given conductor it may be used to produce one of several effects. Principally these are, chemical, heating and magnetic.

The first—chemical effect, also known as electrolysis—takes place when a current is made to pass through a liquid containing a metal in solution, or where a liquid and metal come in contact with each other. In the usual method of applying electrolysis the current causes metal to be deposited on a metallic object suspended in solution. This is known as electroplating.

The second effect—heating—is the

transformation of electrical energy into heat energy, which takes place when current flows through a conductor. Generally the conductor used for making heating appliances is made up of wire or grids having a relatively high resistance. A soldering iron is a typical example. A more common use of the heating effect of electrical current is that of the incandescent light. In the electrical circuit of the lamp the current passes through a filament of high resistance and this filament becomes heated to incandescence, thus giving off light. Electric welding is another application of the heating effect of electric current.

The third and perhaps most important effect produced by electric current is magnetic. A conductor carrying electric current has around it what is known as a magnetic field. To strengthen this field it is common practice to wind the conductor in the shape of a coil and place inside the coil an iron core. This iron core tends to intensify the effect of the magnetic field. The electric motor is an important illustration of the application of the magnetic effect of electricity. It is the attraction and repulsion of the magnetic field in the armature and the field poles of electric motors which makes possible the operation of the motor.

Finding the Cause of Armature Burn-outs

It is sometimes difficult to locate troubles with electrical equipment and sometimes hard to remedy them but here is one that was remedied very easily—by eliminating the cause.

One of our locomotives was always giving us armature trouble. I can remember many a day when the electrical workmen labored hard during the day to change armatures in this locomotive and then again late at night to repair the armature.

After considerable and careful inspection of all the equipment on this locomotive the trouble still persisted. Some time later another locomotive was put into this section of the mine and the troublesome one was transferred. Soon the new locomotive began to develop trouble and the old locomotive operated in another section with little or no trouble.

At first we were at a loss as to what was causing the trouble, but one day near the noon hour I was passing through the section in which we were having all this trouble and I went over to see how things were going. When I got near the locomotive everything appeared to be as normal, but I waited around a little while and soon noticed smoke coming from the resistance. I immediately started to investigate the trouble, and much to my surprise I saw a piece of burned bread on the resistance. The motorman had locked the wheels of the locomotive with the brake and had turned on the power to heat the resistance to toast his bread. This was the cause of our burned com-

mutator segments, burned-off armature coils and high cost of repairs. The cause was removed; the motorman is working for another company now.

MINE ELECTRICIAN.

Keep the Power-Demand Charge Down

To obtain the advantage of a high load factor, or, in other words, to keep our maximum demand as low as possible, at one of our mines where we are purchasing power we have tried to do whatever work we could at off-peak times.

Quite naturally we laid out one of our largest pumping stations so that pumping could be done at night. In order to do this we made a large sump area and could hold water in this sump until night time during the usual mining high water season. Somehow or other the men at the mines could not get the idea of pumping at off-peak times and the result was that the pumps were started and run when we had our other peak loads.

After considerable time and education on the subject at the mines, we thought we had everything understood, but occasionally someone would start the pumps to test them or inspect them at the wrong time.

Our work seemed hopeless, for the pump demand always seemed to be on our monthly power bills. One day a happy thought occurred to us and we put a time switch on the control. This time switch is set to cut off power to the pumps except during the night time. Now our troubles are over and the saving on the power bill is about \$200 a month.

ENGINEER.

Heating of Conductors In Mines

Can you tell me where I can get some information regarding the heating of rubber-covered single conductors, double braided, carrying 3-phase A.C. when in iron or steel conduit? The problem is fully covered for lead cables, but I have been unable to find anything on three individual conductors.

The problem seems to be impossible of purely mathematical solution, due to the fact that some of the heat is undoubtedly carried from the wire to the surrounding iron by convection. Figures neglecting the convection currents and considering the body of air inside the pipe as dead, give results entirely too high to be of any value.

As an example, with three wires carrying 440-volt 3-phase 60-cycle current of 200 amperes in 2-in. conduit in the mines where the ambient temperature is fairly constant at 55 deg. F., a 1/0 wire is sufficiently large for voltage drop, but will it be sufficiently cool at the above temperature to protect the rubber insulation?

B. K. SHANER,
Assistant Electrical Engineer.
Trackville, Pa.

Problems In Underground Management

Timbering Methods That Will Save Lives, Coal and Lumber

Timber Should Be Recovered—Mistake to Forbid Use of Axe in
Removing Props—Protect Men in Pitching Bed
by Use of Battery of Lagging

BY JAMES GRAY
Newcastle, Washington

In drawing pillars, or in longwall retreating, all timber that can be safely recovered should be withdrawn as the work proceeds. If in removing pillars the gob or waste is filled with props and cogs, the weight of the roof is thrown down on the coal face, so that the roof tends to break over the top of the pillar, thereby making the roof dangerous to work under. This also breaks the coal, increasing the percentage of slack.

All timber should be drawn to within 12 or 15 ft. of the coal face in order to allow the roof to cave in. Such roof falls make the mining of coal much easier and provide conditions favorable to the production of a larger percentage of lump. Cogs also should be drawn if possible, or, better yet, they should not be erected unless absolutely necessary, and then only as skeleton or empty cogs. When they are not filled they can be more easily taken out. The idea is to allow the roof to cave in behind, thereby taking the pressure off the coal face. I have had charge of mines in Scotland, Nova Scotia, Canada and Australia where every prop was pulled out of the waste which could be safely removed, and much of this work was done on contract.

CHOPPING OUT CAP-PIECES

All props were set with a good cap-piece on top so that when the prop had to be drawn this cap-piece could be chopped off with a good sharp axe. Sometimes a wedge, made for the purpose, was used for splitting the cap, if the roof was not too heavy. If the roof was weighty, we dug around the bottom of the prop or split off as much of the cap-piece as we could with safety; then a prop puller was used to pull out the timber. Only experienced men were employed for recovering props and cogs.

The method we adopted was as follows: After the first lift of coal was taken off the pillar, we set our first row of props—good stout timbers with cap-pieces 4 in. thick by 9 in. wide by

18 in. long. We kept putting in rows of props every 4 ft. apart until we had four rows in line. Whenever there was room for the fifth row we pulled the first row of props and moved them behind the last row. We kept on doing this, always keeping four rows of props behind the miners, until the roof took its first break and came down. This took the weight off the face.

After the first break we used only two rows of props, always advancing the back row as soon as room was made for them. We did not set the props so tight that we would have trouble in pulling them. If one chanced to stick, we generally got it out by the use of the prop puller, and seldom did we have to shoot it out. When we had occasion to put in a cog we built it up like a cage, entirely without rock. The foregoing work was done in seams that were nearly flat.

On a seam pitching 25 deg. or more, more care would have to be taken. This could be done by placing behind the miners a battery which need be only

3-in. x 12-in. x 9-ft. timber laid against the second row of props to keep any material from falling down on the miners at work. I feel confident that all or nearly all, the timber could be taken out of a pitching seam as well as a flat seam, and for this reason: The props need not be set at right angles to the full pitch. Set a little away from the perpendicular to the seam it would not be hard to dig around the bottom on the front side of the prop and pull it out by the use of the prop puller.

WHY THE DIFFERENCE IN LAWS?

This reasoning is true both for anthracite and bituminous mines. Rule 55 in the anthracite mine law, which prescribes that props shall be blasted and not cut out, should be changed to agree with the terms of the bituminous mine law. I fail to see sufficient difference in conditions to justify the variation in the enactments.

The mining laws should be amended so as to make it compulsory to pull out all timbers in coal mines where it can be done with safety, but the law should be so worded that operators would be allowed to employ only practical and experienced men to do this kind of work. Much timber and cost would certainly be saved thereby. In pulling pillars on a pitching bed, I would add one row of props to the two rows I have recommended for use with a flat bed, especially if the lift of coal is to be taken up on the angle as a wing, instead of across the top of the pillar.

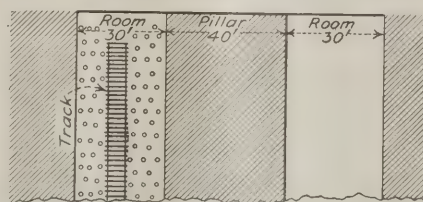


FIG. 1

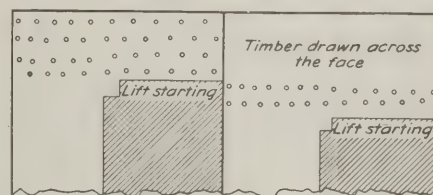


FIG. 2

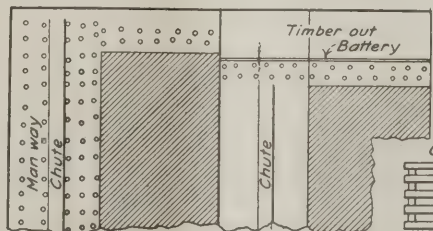


FIG. 3

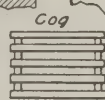


FIG. 5

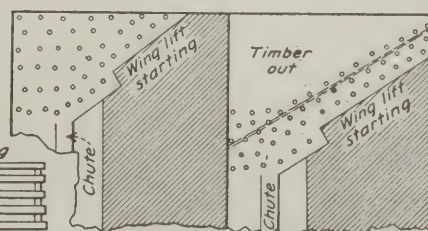


FIG. 4

FIGS. 1 TO 5—HOW TO TIMBER ROOF SYSTEMATICALLY

Fig. 1 shows room and pillar. Pillar of working on left of Fig. 2 is just commencing to be drawn. Four lines of props are left, the fifth line being set by props progressively withdrawn from the first line. In the room on the right is shown the method adopted after the first break. Here only two rows of props are used. On the right of Fig. 3 a timber battery protects the miners. Fig. 4 shows the rib being mined on a slope and Fig. 5 a skeleton or unfilled cog.

McAuliffe Increases Safety in U. P. Mines; Installs Loaders

A number of mechanical and management changes now in process of development in and around the Wyoming mines of the Union Pacific Coal Co. are expected to increase safety as well as the output of the properties. The installation of mechanical loaders, which has already drawn criticism from inspired sources, is one of the improvements. Eugene McAuliffe, president of the company, recently explained what is going on in the mines thus:

"A double reinforcement of past safety effort in this company is about to be put into effect. On Oct. 1, A. W. Dickinson, an engineer experienced in the operation of coal mines and the conduct of safety work, was appointed safety engineer, in charge of accident-prevention work. Mr. Dickinson has adopted a new slogan, 'Make It Safe,' as keyword of the safety department.

"The Union Pacific Coal Co. has for years maintained first-aid and rescue crews, keeping up the work of training men, providing new and modern apparatus, etc. At the present time many items that tend to make mine work safer are either complete or are under way, included among which might be mentioned the preparation and posting at mines of ventilation maps which show the direction of all air currents, a definite reading of the volume of air passing through the last crosscut on each entry made and recorded daily, special men being assigned to this work.

GAGES RECORD AIR PRESSURE

"Recording gages actuated by clock-work have been ordered for every mine fan. They will provide the mine foremen with a positive record of ventilation during each 24-hour period, and this record will be inspected by the foreman before the men enter the mine each morning, and the fan chart for the day will be filed for record. Where coal dust is a hazard, the roadways and rooms will be sprinkled twice as frequently as heretofore and rock-dust barriers are being installed to localize any accident that might occur.

"In addition, dry mines are being equipped with sprays to moisten the air entering the mines, and the use of black powder is entirely stopped. As a preventive of fires all unnecessary accumulations of wood and other combustible foreign matter have been taken out of the mines and fire-prevention appliances have been installed in each inside hoist room. The outside fire-prevention safeguards have been reinforced. All mines known to generate explosive gas will be put strictly on an electric-lamp basis. As soon as the lamps can be obtained, open lights will be eliminated.

"At Hanna No. 2 a denial of the smoking privilege led a few men to leave their work, but the substantial men have expressed their approval of the additional safety afforded them by the entire elimination of open lights

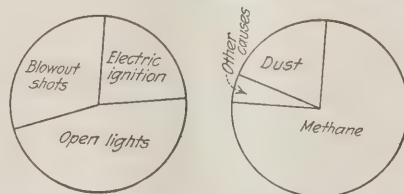
and matches. Where fans at mines making gas were electrically driven the motors have been disconnected and the more reliable steam-engine drive substituted, though the cost of power has been doubled or trebled thereby. Of late every safety lamp used for mine inspection is magnetically locked, requiring the fireboss to go to a lighting station before he can open his lamp for relighting. For the prevention of fires caused by short-circuits due to falls inside the mine electric circuit breakers have been purchased and will be installed as rapidly as possible.

"The Union Pacific Coal Co. management expects gradually to substitute mechanical loaders for the present method of hand loading within the mines, not in order, as has been suggested by a certain mine superintendent now much talked of in the public press, to make 'mindless machines of its employees' but instead to translate the job of producing foot-pounds with a shovel into that of operating a machine where the man can use his brains more and his back muscles less, and where the steel fingers of the loading machine will take the crushing that is now the lot of human fingers.

"In substance, the Union Pacific Coal Co. is officered by men who do not subscribe to the theory that 80 or 90 per cent of its employees lack the capacity of clear thinking and the ability to do more than shovel coal into a pit car."

Why Coal Mines Explode

In addressing the Rocky Mountain Coal Mining Institute D. Harrington declared that the ignition of methane is the initiating cause of probably 75 per cent of the coal-mine explosions in the United States, yet only in rare instances is there a widespread disaster in which methane furnishes all the fuel. Coal dust alone supplies the starting



PRIMARY AND SECONDARY CAUSES OF EXPLOSIONS

Wherever there are two causes there are two defenses. Thus with electric ignition we can suppress the spark (Defense No. 1) and remove the methane or wet down the dust (Defense No. 2).

material for probably less than 20 per cent of our coal-mine explosions; on the other hand, it furnishes the propagating fuel for nearly all of the larger explosions of the present day and probably is responsible for much more than two-thirds of the loss of life which explosions cause.

Open lights have been the igniting cause of well over 50 per cent of our explosions, methane generally being the fuel, though under certain conditions coal dust can be ignited by the flame of a carbide lamp. Plain safety lamps,

chiefly in the hands of firebosses or safety men, have caused several explosions with heavy loss of life; usually the lamps have been wrongly assembled or have been otherwise misused. While electricity has been the igniting agency in but a small percentage of our past explosions, it constitutes an ever-growing menace, and it is probable that at least 25 per cent of the present-day explosions are due to electric ignition. Electric arcs are particularly dangerous when fine dry coal dust is suspended in the air. Blown-out shots have caused at least one-third of the explosions that have occurred in the coal mines of the United States and in some coal-mining regions which have numerous explosions two-thirds of them may be ascribed to blown-out shots.

Clean Out Slack in Undercut To Get Lump Coal

BY W. J. GERMAN

Technical Representative,
E. I. duPont de Nemours & Co., Ltd.

Larger coal would be obtained, less explosive would be used, labor would be saved in preparing coal for loading and danger could be decreased by reason of the lessened use of powder or dynamite if the undercuttings made by machines were properly cleaned out.

If the undercuttings are not removed the coal does not have space in which to break down and consequently the explosive cannot do as much work as it should. At a few plants the miners have long-handled flat shovels for cleaning the cut, but more often they have no such tool, and many miners figure that they would rather use an extra stick of dynamite or a few more inches of powder than scrape out the cut.

Mine officials take care that the places are cut, but only a few of them see to it that the cuts are cleaned out so that full benefit of the cutting can be derived. Thus, although the coal mines have gone to a big expense to put machines in the mines to cut a space into which the coal can give way, half of this space frequently is lost by blasting the coal before the cuttings are cleaned out. As a result, a heavier charge of explosives must be used and mining costs are necessarily increased.

THE LEGALITY of bringing Indiana mines employing fewer than ten men under the jurisdiction of the State Department of Mines and Mining was discussed at a recent conference of the members of the mining board and U. S. Lesh, Attorney General of Indiana, says Cairy Littlejohn, secretary of the board. As a result of the conference the board has decided that no action can be taken at present, but the members of the board expressed willingness to attempt to bring about action by the next Legislature which would give the board the right to bring the mines employing fewer than ten men under the jurisdiction of the department.

Discussion

Says Sentiment for Oil Fuel Already Is Passing

The consumption of fuel oil in the territory that is served by the Colorado coal operators has considerably increased during the past three or four years. The installation of oil apparatus has taken quite a hold on the general public and we now find this sort of equipment being put into industrial plants as well as in the modern home.

The arguments for burning oil are: Cleanliness—no ashes, no clinkers, no soot, no dust—and automatic control of heat units, also the belief that oil is cheaper in the long run than coal, with the glittering promise held out that oil will remain at its present very low figure.

The facts of the case are these: Fuel-oil burning does not lessen the janitor's expense, but exacts a more technical and expensive service. Fuel oil does away with dust from ashes and worry of clinkers, but in place of those you have the filmy grime of oil in your home, which is more destructive to the hangings and decorations than that of coal and I have never yet come in contact with oil-burning apparatus which does not give off a distasteful smell, and constant noise and other inconveniences which are far more objectionable than that which comes from coal.

Now in regard to the cost: It takes about four barrels of oil, which delivered at the consumer's door, will average about \$2.50 a barrel, to equal a ton of coal. In addition to this, you usually burn what is called a gas pilot, which will cost about \$2.50 per month, or electricity for motor to pump oil, which will cost about \$3 per month, and a failure of either of these delicate mechanisms to work means flooding your cellar with oil, which is a muss forlorn indeed.

In addition to this equipment depreciation, which is of a mechanism as sensitive and intricate as an automobile engine, oil-burning equipment is still in an experimental stage and its installation simply means additional plumbing bills, and outside of a few stations in temperate climates, the safety of being protected against cold snaps is very remote. Last year, during the cold snap, practically every oil burner east of the mountains failed to meet the test.

The present activity in oil fuel is without doubt due to the intensive selling campaign which has been put on by the manufacturers of oil-burning apparatus. The cost of these installations vary from \$100 to \$1,200 in residences and small apartments, and from \$2,000 up for large heating units, and the depreciation must be reckoned with the service cost.

Taking these things into consideration, and from a survey made from installations that have been adapted in some of the industries and dwellings of this state, I feel certain that fuel oil will never displace coal. Like many other things that come along, it offers flattering prospects, but we have yet to find anyone who has installed the oil and used it for any length of time that will say that it is equal to coal for the purpose intended. I have in mind one town where forty-one fuel-oil installations were made last year, and nineteen of these have already gone back to coal.

Everyone knows that the oil industry has been, and is now, subject to greater manipulation of prices than any other industry and we feel certain that an explanation of these conditions to consumers will cause them to pause before changing from coal to oil.

F. R. WOOD,
President, Temple Fuel Co.
Denver, Colo.

What the Mine Inspector Can, May and Often Will Do

A large company that had been having trouble in bringing its workmen to co-operate with it by following safe practices decided to employ a company inspector. On his first visit he found many workmen who were breaking sound safety rules. When reprimanded the miners busied themselves to do as instructed. All went well till the workmen discovered that this new safety inspector was employed by the company and not by the state. Then they

took an antagonistic attitude, and many left the company rather than do as the safety inspector desired and demanded.

This unpleasant situation has been satisfactorily met by asking the mine inspector to work with the company inspector in inducing the hard-headed workman to do as safety and the law demands. The state inspector is asked to take a hand in disciplining any recalcitrant provided he is worth the disciplining, and this he does without involving the company in any way. In this manner a good producer is made an all-around good workman, and the company profits in every way.

Many coal companies would get better results if they would take the initiative and bring problems of this kind before the state inspector, who is recognized as an arm of the law and respected accordingly. If the coal companies co-operated with the state inspector in this way safety practice would make a rapid step forward.

Pikeville, Ky. GEORGE EDWARDS.

Half Loaf Better Than No Bread

Though the application of water to the cutterhead of a machine described by John Walls, Sr., in the issue of *Coal Age* of Nov. 8, p. 710, is a most effective means of wetting coal dust and rendering it harmless, it is not necessary to continue our risky methods of dry undercutting even if we do not happen to have equipment for remodeling our machines so as to apply water in this manner.

In most cases the dust should be sprinkled as soon as the face is cut and the coal should be shot down before the dust has become dry. The coal should be sprinkled again before loading is commenced.

Gans, Pa. R. W. LIGHTBURN.

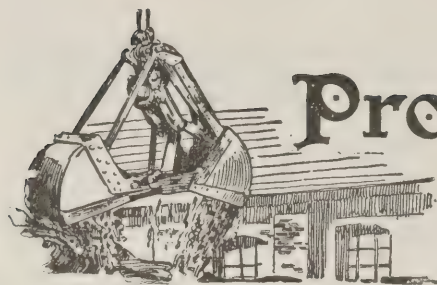
Rivals of Job

Coal operators need a wonderful sense of humor to get along. Either that, or they have been kicked so long and so often that a protective numbness deadens them to their difficulties in having to handle a hazardous and uncertain seasonal business, combining the vicissitudes of mining, transportation, and marketing, with public, politicians and labor unions making the job as hard for them as possible.

In this connection we learned the other day from newspapers that coal miners in the Hocking Valley were suffering from lack of work. A pathetic picture was painted of their deprivations, of their hardships, and of the wonderful feeling of brotherhood that glowed helpfully through their murky community like another light from Bethlehem. It was, indeed, an affecting pen picture. No work, no funds, no human aid but their own devotion and charity to each other.

Later we heard, quite incidentally (and you can wager safely that we didn't read it in a newspaper) that a certain coal mine in this same Hocking Valley had tried desperately and in vain to get its miners to work on the first day of the rabbit-hunting season. It was declared a holiday. That same week they refused again to work because it was Armistice Day.

Coal operators could make more money marketing the brand of philosophy which enables them to bear up under conditions such as these than they can, usually, by trying to keep people warm with their coal.—
Cleveland Topics.



Production and the Market



Weekly Review

Seasonal inactivity in general industry has caused less spot buying of soft coal, with contract coals moving in good volume. Weather conditions dominated the markets last week and while little improvement was noticed in the wholesale trade, retail conditions were better. With consumers' inquiries constantly increasing indications point to heavier buying in January. Reports of wage reductions in non-union mines are current and while some have been reported in various West Virginia mines no general reduction has taken place yet nor is any now contemplated by operators. The greatest activity in the soft coal market is centered in the demand for screenings.

Production of soft coal continues to decline and seems to have settled definitely into a downward trend, as the Geological Survey estimates output during the week ended Dec. 8 to be 9,828,000 net tons, which, while an increase of 885,000 tons over the previous week, which contained a holiday, was 332,000 tons less than the week ended Nov. 24. As in the previous week lack of demand was the dominant factor in limiting production. Preliminary reports indicate a further cut in production last week.

Prices Show Firmer Tendency

Prices were a trifle stiffer last week, *Coal Age* Index showing 181 as of Dec. 17, a gain of one point and a return to the level of Dec. 3. The average price was \$2.19. There were increases in southern Illinois, Mt. Olive, Clearfield, Somerset and Standard districts, with decreases in Kanawha and eastern Kentucky.

There is a little better tone in the Midwest markets due to reduced production, lower temperatures and the nearness of Jan. 1. Domestic coals from Illinois and Indiana move steadier but at low prices. Steam coals in all sections of the Middle West are firmer. The market at St. Louis continues quiet with the movement

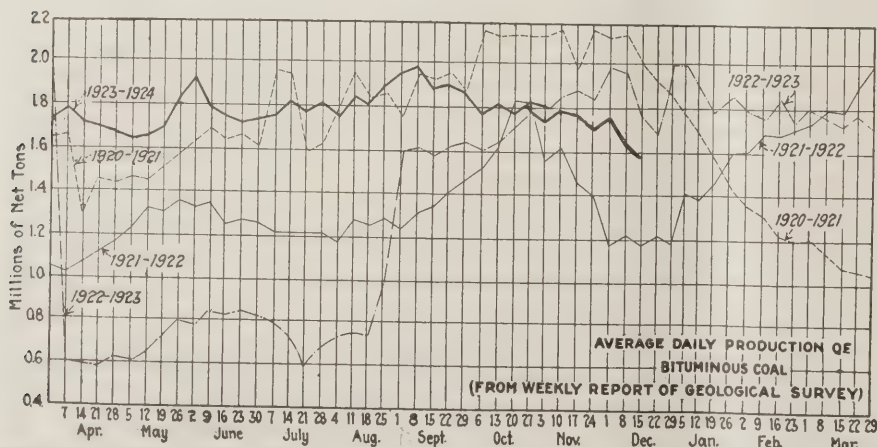
of coal depending on weather conditions. Screenings are the feature of the Kentucky markets and prices have advanced.

The Ohio markets felt the effects of more seasonable weather and although wholesale buying did not show any heavy increase, retail dealers were more active. New England reports a better tone, while the Atlantic seaboard market is dull and lifeless.

Hard-coal output fell short of 2,000,000 net tons by about 100,000 tons during the week ended Dec. 8, the Geological Survey estimating the production at 1,899,000 net tons. This was a gain of 151,000 tons over the Thanksgiving Day week, but 201,000 tons less than the week before. A strike last week at some of the large mines will affect the total output. Domestic coals are plentiful and quotations for independent product are easier. Stove and chestnut coals are more plentiful than egg and pea, while the steam coals are hard to move.

The lake season of 1923 virtually closed in the week ended Dec. 9, shipments of soft coal for that week amounting to 109,275 net tons of cargo coal and 7,451 tons of fuel coal. Total shipments of soft coal for the season, according to the Geological Survey, amounted to 31,296,778 net tons, of which 29,678,116 tons was cargo coal and 1,618,662 tons vessel fuel. During the 1922 season total shipments were 19,277,774 net tons; 1921, 23,171,449 tons, and 1920, 23,667,138 tons. Shipments of anthracite for the season amounted to 3,495,582 net tons, which was 153 per cent ahead of 1922, 18 per cent behind 1921, and 13 per cent less than in 1920.

Export shippers are receiving many inquiries but there is not much actual business being booked. Dumpings at Hampton Roads for all accounts during the week ended Dec. 13 amounted to 283,168 net tons, as compared with 308,305 tons the previous week.



Estimates of Production (Net Tons)

BITUMINOUS		
	1922	1923
Nov. 24.....	11,100,000	10,160,000
Dec. 1 (a).....	10,387,000	8,943,000
Dec. 8 (b).....	11,495,000	9,828,000
Daily average.....	1,916,000	1,638,000
Calendar year.....	376,932,000	516,660,000
Daily av. cal. year.....	1,302,000	1,789,000
ANTHRACITE		
Nov. 24.....	2,213,000	2,100,000
Dec. 1.....	1,852,000	1,748,000
Dec. 8.....	2,075,000	1,899,000
Calendar year.....	48,793,000	89,958,000
COKE		
Dec. 1 (b).....	298,000	245,000
Dec. 8 (a).....	291,000	257,000
Calendar year.....	7,190,000	17,194,000

(a) Subject to revision. (b) Revised from last report.

More Life in Midwest Now

Low production, cooler days, and the approach of Jan. 1 have combined to give the Midwest coal market a little better tone. Domestic coals produced in Illinois and Indiana are moving more steadily but in very small volume at the present low prices. Southern Illinois prime lump at \$3.75, though unpopular with many dealers who stocked before the recent cut, is barely attractive enough to start movement, and Indiana No. 4 lump at \$3.25 and central Illinois lump at \$2.75@3 show about the same degree of activity. Smokeless mine-run, competitor of these coals, is stiffening up somewhat. The old \$1.40@1.50 smokeless prices have about disappeared; \$1.75 was the average at the end of the week and the trend was upward.

Steam coals everywhere in the Midwest are firmer. Southern Illinois Association producers are trying to reach the \$2 mark with screenings during this week, and were running from \$1.75 to \$1.90 by the end of last. Central Illinois screenings—what there is available after the Standard Oil \$1.25 contracts have been filled—move readily at \$1.50. Indiana steam coals also have improved about 10c. and are

scheduled to go much higher, especially in view of the shut-down of three more big mines and another handful of small ones. There is much inquiry about storage coal to be shipped after Jan. 1. Many buyers are convinced that there is to be a strike, but operators are saying little.

In the Mt. Olive field there are no price changes. A little domestic is moving and screenings are in good demand, but nut and egg are slow. Generally, business in that field is far below what is considered bad. In the Standard field screenings are strong and the small sizes of nut are moving, but domestic is still poor. A little moves, but so little that it is hardly a factor. Cars are plentiful. Railroad tonnage in the Mt. Olive and Standard fields is running light. Mines work from one day in two weeks to as many as four days in rare instances.

St. Louis Idle but Noisy

Business continues quiet in St. Louis. Chilly weather moves a little coal of the cheaper grades in small lots. Demand is light for anthracite, smokeless and coke, and Carterville is slowing up. Retailers who stored heavily on

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Dec. 18 1922	Dec. 3 1923	Dec. 10 1923	Dec. 17 1923†
Smokeless lump.....	Columbus....	\$6.30	\$4.10	\$3.75	\$3.25@3.50
Smokeless mine run.....	Columbus....	6.00	2.10	2.10	2.00@2.25
Smokeless screenings.....	Columbus....	5.50	1.30	1.25	1.20@1.35
Smokeless lump.....	Chicago....	7.75	4.10	3.35	3.25@3.50
Smokeless mine run.....	Chicago....	6.60	2.00	1.75	1.65@2.00
Smokeless lump.....	Cincinnati....	7.00	3.10	3.50	2.75@3.50
Smokeless mine run.....	Cincinnati....	5.80	2.00	2.00	1.75@2.25
Smokeless screenings.....	Cincinnati....	5.30	1.35	1.50	1.25@1.75
*Smokeless mine run.....	Boston....	7.85	4.60	4.50	3.35@4.50
Clearfield mine run.....	Boston....	4.15	1.85	1.85	1.60@2.25
Cambria mine run.....	Boston....	4.55	2.50	2.35	2.00@2.75
Somerset mine run.....	Boston....	4.10	2.10	2.10	1.85@2.50
Pool 1 (Navy Standard).....	New York....	5.75	3.00	3.00	2.75@3.25
Pool 1 (Navy Standard).....	Philadelphia....	5.35	3.00	3.00	2.75@3.20
Pool 1 (Navy Standard).....	Baltimore....	5.75			
Pool 9 (Super. Low Vol.).....	New York....	5.15	2.35	2.25	2.00@2.50
Pool 9 (Super. Low Vol.).....	Philadelphia....	4.85	2.30	2.35	2.25@2.50
Pool 9 (Super. Low Vol.).....	Baltimore....	5.05	2.05	2.25	2.25
Pool 10 (H.Gr.Low Vol.).....	New York....	4.50	2.00	1.95	1.75@2.25
Pool 10 (H.Gr.Low Vol.).....	Philadelphia....	4.15	1.85	1.85	1.75@2.00
Pool 10 (H.Gr.Low Vol.).....	Baltimore....	4.55	1.90	2.20	2.20
Pool 11 (Low Vol.).....	New York....	3.50	1.65	1.80	1.50@1.75
Pool 11 (Low Vol.).....	Philadelphia....	3.55	1.70	1.65	1.60@1.75
Pool 11 (Low Vol.).....	Baltimore....	4.10	1.75	1.90	1.90

High-Volatile, Eastern

Pool 54-64 (Gas and St.).....	New York....	3.20	1.60	1.60	1.50@1.75
Pool 54-64 (Gas and St.).....	Philadelphia....	3.35	1.65	1.60	1.55@1.75
Pool 54-64 (Gas and St.).....	Baltimore....	3.85	1.70	1.85	1.85
Pittsburgh sc'd gas.....	Pittsburgh....	5.25	2.55	2.55	2.50@2.60
Pittsburgh gas mine run.....	Pittsburgh....		2.25	2.25	2.20@2.30
Pittsburgh mine run (St.).....	Pittsburgh....	2.60	2.00	2.05	2.00@2.10
Pittsburgh slack (Gas).....	Pittsburgh....	3.25	1.30	1.50	1.50
Kanawha lump.....	Columbus....	5.35	3.00	3.00	2.75@3.00
Kanawha mine run.....	Columbus....	3.00	1.85	1.85	1.50@1.75
Kanawha screenings.....	Columbus....	2.80	.80	.80	.90@1.00
W. Va. lump.....	Cincinnati....	6.25	2.75	2.85	2.50@3.25
W. Va. Gas mine run.....	Cincinnati....	3.35	1.50	1.60	1.50@1.75
W. Va. Steam mine run.....	Cincinnati....	3.10	1.50	1.60	1.50@1.75
W. Va. screenings.....	Cincinnati....	3.00	.50	.85	.65@1.00
Hooking lump.....	Columbus....	5.15	2.95	2.95	2.85@3.00
Hooking mine run.....	Columbus....	2.60	1.85	1.85	1.75@2.00
Hooking screenings.....	Columbus....	2.55	.80	1.05	1.10@1.25
Pitts. No. 8 lump.....	Cleveland....	4.35	2.55	2.45	1.90@3.00
Pitts. No. 8 mine run.....	Cleveland....	3.20	1.90	1.95	1.90@2.00
Pitts. No. 8 screenings.....	Cleveland....	3.05	1.40	1.35	1.60

Midwest	Market Quoted	Dec. 18 1922	Dec. 3 1923	Dec. 10 1923	Dec. 17 1923†
Franklin, Ill. lump.....	Chicago....	\$5.25	\$4.10	\$3.60	\$3.50@3.75
Franklin, Ill. mine run.....	Chicago....	4.10	2.35	2.35	2.25@2.50
Franklin, Ill. screenings.....	Chicago....	2.70	1.55	1.70	1.75@1.90
Central, Ill. lump.....	Chicago....	4.25	3.10	3.00	2.75@3.25
Central, Ill. mine run.....	Chicago....	3.10	2.10	2.10	2.00@2.25
Central, Ill. screenings.....	Chicago....	2.00	1.35	1.45	1.50
Ind. 4th Vein lump.....	Chicago....	5.10	3.35	3.25	3.00@3.50
Ind. 4th Vein mine run.....	Chicago....	3.85	2.60	2.60	2.50@2.75
Ind. 4th Vein screenings.....	Chicago....	2.25	1.55	1.65	1.65@1.80
Ind. 5th Vein lump.....	Chicago....	4.75	2.50	2.50	2.25@2.75
Ind. 5th Vein mine run.....	Chicago....	3.60	2.10	2.10	2.00@2.25
Ind. 5th Vein screenings.....	Chicago....	1.95	1.30	1.45	1.50
Mt. Olive lump.....	St. Louis....		3.10	3.00	3.00@3.25
Mt. Olive mine run.....	St. Louis....		2.25	2.25	2.50
Mt. Olive screenings.....	St. Louis....		1.25	1.55	1.75
Standard lump.....	St. Louis....	4.10	3.05	2.85	2.75@3.00
Standard mine run.....	St. Louis....	2.10	2.05	2.05	1.90@2.00
Standard screenings.....	St. Louis....	1.35	.55	1.15	1.25@1.50
West Ky. lump.....	Louisville....	3.85	3.00	3.00	2.75@3.25
West Ky. mine run.....	Louisville....	2.25	1.70	1.70	1.50@2.00
West Ky. screenings.....	Louisville....	1.80	.70	1.00	1.00@1.35
West Ky. lump.....	Chicago....	3.85	2.85	2.85	2.75@3.00
West Ky. mine run.....	Chicago....	2.60	1.75	1.75	1.50@2.00

South and Southwest

Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@4.00
Big Seam mine run.....	Birmingham..	2.35	1.95	1.95	1.75@2.15
Big Seam (washed).....	Birmingham..	2.60	2.35	2.35	2.25@2.50
S. E. Ky. lump.....	Chicago....	6.25	3.10	3.10	3.00@3.25
S. E. Ky. mine run.....	Chicago....	3.85	1.85	1.85	1.75@2.00
S. E. Ky. lump.....	Louisville....	6.35	3.35	3.35	2.75@3.50
S. E. Ky. mine run.....	Louisville....	3.35	1.75	1.75	1.50@2.00
S. E. Ky. screenings.....	Louisville....	3.25	.80	.75	1.00@1.35
S. E. Ky. lump.....	Cincinnati....	5.85	3.00	3.10	2.50@3.25
S. E. Ky. mine run.....	Cincinnati....	3.15	1.50	1.55	1.35@1.75
S. E. Ky. screenings.....	Cincinnati....	2.75	.65	.95	.75@1.25
Kansas lump.....	Kansas City..	5.25	5.10	4.75	4.50@5.00
Kansas mine run.....	Kansas City..	3.60	3.25	3.25	3.00@3.50
Kansas screenings.....	Kansas City..	2.50	2.00	2.00	2.00

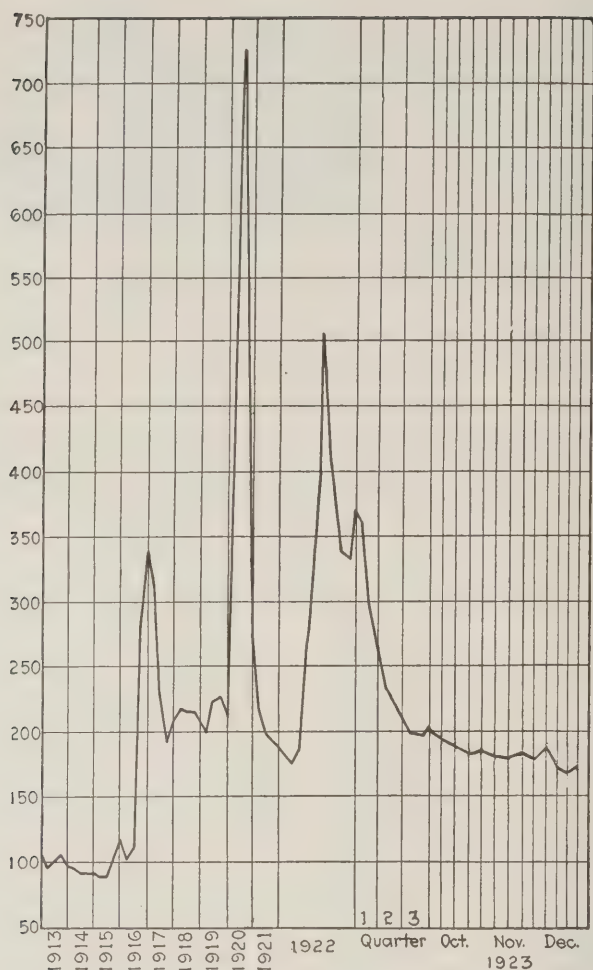
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922	Dec. 10, 1923	Dec. 17, 1923†
Broken.....	New York.....	\$2.34	Independent \$9.00	Company \$7.75@8.25	Independent \$8.50@10.00
Broken.....	Philadelphia....	2.39		7.90@8.10	Company \$8.00@9.25
Egg.....	New York.....	2.34	9.25@12.00	8.00@8.35	8.75@9.25
Egg.....	Philadelphia....	2.39	9.25@11.00	8.10@8.35	9.85@12.20
Egg.....	Chicago*.....	5.06	12.50@13.00	7.20@8.25	9.60@12.50
Stove.....	New York.....	2.34	9.25@12.00	8.00@8.35	9.85@12.00
Stove.....	Philadelphia....	2.39	9.25@11.00	8.15@8.35	9.85@12.20
Stove.....	Chicago*.....	5.06	12.50@13.00	7.35@8.25	9.60@12.50
Chestnut.....	New York.....	2.34	9.25@12.00	8.00@8.35	9.85@12.00
Chestnut.....	Philadelphia....	2.39	9.25@11.00	8.15@8.35	9.85@12.20
Chestnut.....	Chicago*.....	5.06	12.50@13.00	7.35@8.35	9.60@12.50
Range.....	New York.....	2.34		8.25	9.00
Pea.....	New York.....	2.22	7.00@11.00	6.15@6.30	6.15@6.65
Pea.....	Philadelphia....	2.14	7.00@8.00	6.15@6.20	6.35@6.60
Pea.....	Chicago*.....	4.79	7.00@8.00	5.49@6.03	6.00@6.75
Buckwheat No. 1.....	New York.....	2.22	4.00@5.00	4.00@4.10	2.00@3.00
Buckwheat No. 1.....	Philadelphia....	2.14	5.00	4.00	2.25@3.50
Rice.....	New York.....	2.22	3.00@3.25	2.75@3.00	1.35@2.50
Rice.....	Philadelphia....	2.14	2.50@2.75	2.75@3.00	1.75@2.50
Barley.....	New York.....	2.22	1.75@2.00	1.50@2.00	1.25@1.50
Barley.....	Philadelphia....	2.14	1.00@1.75	2.00	1.00@1.50
Birdseye.....	New York.....	2.22		2.10	1.25@1.45

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Dec. 17	Dec. 10	Dec. 3	Dec. 18
Index	181	180	181	336
Weighted average price	\$2.19	\$2.18	\$2.19	\$4.07

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Franklin County coals are doomed to take a heavy loss on the Dec. 8 cut in mine price. The feeling generally is not kindly to the operator who makes it possible to buy coal cheaper in midwinter, when screenings are low, than in midsummer, when screenings were high and working time better. Meetings of dealers in St. Louis, Springfield and other places made this a topic for much discussion.

The feature of the week in Kentucky was the advance in the price of screenings, which has mounted to a level starting at \$1 a ton, with some operators refusing anything under \$1.10 and ranging to \$1.35 for nut and slack, the latter grade bringing 15c. or 20c. a ton more than pea and slack. Mine-run and prepared sizes remain unchanged and the advance in screenings is bringing the mine-run average up to a level where the field will reduce its losses materially. Eastern Kentucky screenings are in line with those of western Kentucky, while the latter fields has an advantage of 43c. to 63c. over eastern Kentucky in getting into the Louisville market, and a good movement South, West and North.

Cold weather is finally at hand, with snowfalls reported over the state, and prospects of some business are now apparent. Retailers are getting more inquiries, and placing just a little better volume of business. If the mines that are now down stay down all month, the market will be

much stronger by Jan. 1. Car supply is excellent. The landslide which shut off Hazard field a week ago is now cleared.

Northwest Ready for Strike

The last cargo of coal for the 1923 season arrived at the Head-of-the-Lakes on Dec. 11. Stocks on docks at Dec. 1 were 5,873,000 tons of soft coal and 236,000 tons of hard coal. The soft-coal stocks leave a plentiful supply against any possible shortage by a strike in April. Stocks of anthracite are a disappointment, especially as most of the desirable sizes are missing. Prices are unchanged.

The tendency of the screening market is stronger, this being due to a shortage, which is more feared than manifest at present. The demand for soft coal is light, and it is obvious that the buyers are waiting for a break in the market. The general opinion is that a break will come because of the stocks on hand and the fact that many consumers are well supplied.

At Milwaukee the demand, which fluctuates with weather conditions, is hardly up to what would be expected at this season. Prices remain steady. The last cargo of coal of the season was docked on Dec. 11. The total cargo receipts since the opening of navigation in May aggregated 971,824 tons of anthracite and 3,233,122 tons of soft coal, or 4,204,946 tons in all.

Western Business Spotted

The coming of real winter weather brought more business to Salt Lake City retailers than they have had heretofore this season. They are able, however, to take care of all demands. As a rule the dealers show no desire to stock up for an emergency but are trusting the operating companies to make deliveries as needed. Supplies in local yards are down to about 35,000 tons.

Colorado noted little change in the coal market during the week, the only demand being for domestic sizes. The majority of the operators are still reporting "no market." Prices in the Trinidad district have dropped 50c. so that lump is now \$4@4.50. Labor seems plentiful and the transportation situation is good.

With Southwestern mines working three and four days a week, "no bills" still are accumulating. In the last few weeks there has been a pronounced increase in the surplus of domestic sizes. The surplus of screenings is lessening, but earlier experiences of the year have shown such relief to be only temporary. Operators insist that with screenings at their present price many industries would cut back from oil to coal were it not for the uncertainty of supply.

Lower Temperatures Stimulate Ohio Trade

Slightly colder weather had a stimulating effect on the Ohio coal markets. At Columbus, however, the demand for domestic coals is not active and retail dealers are cleaning up before placing new orders, as they have considerable high-priced coal on hand. Smokeless grades weakened, as well as Ohio-mined coals. Steam trade is slow because of heavy reserves, while purchasing agents are looking for bargains. The Southern Ohio Coal Exchange reports a total output of 131,602 tons during the week ended Dec. 1, with 446 mines reporting, with a full-time capacity of 582,149 tons. "No market" was responsible for a loss of 408,595 tons. Smokeless business at Cincinnati is in a rut as far as prepared sizes are concerned. Reports of mines closing continue to be received in that city and it is said that several operations in Logan County, West Virginia, have announced that they will not turn a wheel from Dec. 20 to Jan. 1. Mild weather has forced the domestic prices down, and consigned and distress coal has been well cleaned up. There has been no change in retail prices.

There has been a demand for slack in the Cleveland market, accompanied by an advance in prices. The only other betterment noted in the situation is a slight improvement in the retail market, due to lower temperatures. Mines in eastern Ohio produced 317,000 tons, or about 45 per cent of capacity, during the week ended Dec. 8.

The Pittsburgh market did not grow any worse last week, nor did it seem to have improved materially. There may, however, have been a slightly heavier demand, chiefly on

account of more domestic distribution. Steel mills are running a trifle lighter, but that is attributed to seasonal conditions, and expect to be operating more heavily next month. Production in the Pittsburgh district is now running at about 60 per cent of rated capacity. Low prices are ruling in nearby non-union regions, presenting more competition for sellers of regular Pittsburgh coal.

Business in central Pennsylvania is dull, although some operators in and about Johnstown think there has been some improvement. Improvement in orders received for immediate shipment has resulted in increased working time.

There was a small stir in demand for slack in and around Buffalo, but it was not of considerable moment. Consumers do not appear to be interested, although colder weather is due.

Better Tone to New England Market

While quotations in New England are as yet little changed there is a rather better tone to the market so far as price is concerned. No. 1 Navy Standard grades can still be had at \$4.35@4.50 per gross ton, f.o.b. vessel at Hampton Roads, but on cars at Providence, Boston and Portland the various distributors are asking more money and in some instances are making sales at \$6 on cars, a level that is 25c. to 50c. higher than a week ago.

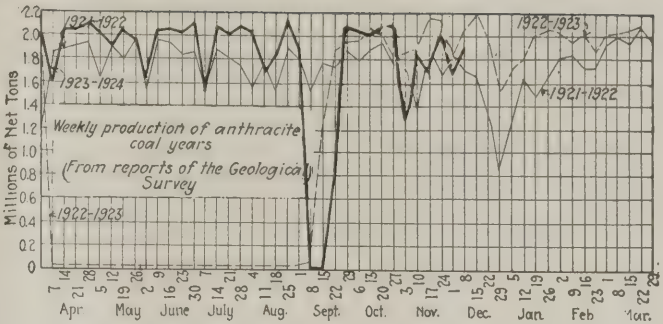
Accumulations at Hampton Roads are still large in proportion to current output. Several groups of mines are operating only two or three days weekly but yet there is a surplus far exceeding present requirements. Practically all the rehandling factors are carrying heavy stocks and the agencies at Hampton Roads are at a loss to know where to place January coal. The industries in New England show no substantial improvement, and until there is pronounced strike talk in bituminous for next April it is not probable that there will be any marked increase in demand.

For Pennsylvania coals the prospect is no more inviting than at any time during the last sixty days. Quotations are at a minimum. Bituminous traffic via New York and Philadelphia piers has shown a further shrinkage since Dec. 1, and aside from moderate deliveries on season contracts there is little tonnage moving.

Seaboard Market Dull

There are no signs of an awakening in the soft-coal trade along the Atlantic seaboard. Demand remains quiet and with the exception of a few small orders salesmen report "nothing doing." Receipts at the New York tidewater docks are somewhat heavier while inquiry shows comparatively little improvement. Cars reported at the various docks on Dec. 14 amounted to 1,983, while daily dumpings for the first five days of the week ended Dec. 15 averaged 371. Consumers are "feeling" the market and operators are hopeful of better conditions after Jan. 1. At Philadelphia there are no visible signs of better conditions in the near future. It is believed that the bottom in prices has been reached. Tidewater trade at Philadelphia remains inactive. Bunkering is light and there is little coal at the piers. Conditions at Baltimore have not improved and dealers do not see any immediate change for the better ahead.

Whatever change has taken place in West Virginia has been confined for the most part to slack, which in the southern high-volatile fields ranged during a few days last week



from 90c. to \$1, and in northern West Virginia from \$1.25 to \$1.40, and in some instances as high as \$1.50. The market at Birmingham is slow and sluggish. General demand for spot steam coal is light while the domestic situation is controlled by weather conditions. Production in the Birmingham field for the week ended Dec. 1 was reported as 340,000 net tons.

Independent Anthracite Quotations Lower

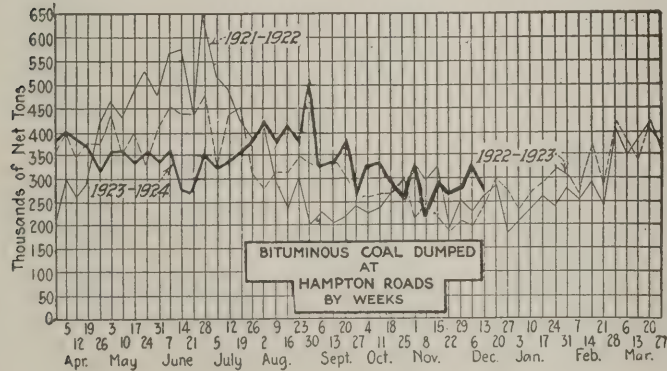
Demand for the domestic sizes of anthracite is much easier, especially for independent product, and there has been an accompanying drop in quotations in the New York market. Company coals are going to the retail dealer in larger tonnages and some operators and shippers of independent product have found it necessary to look for orders. Egg and pea coals are the hardest to move, some shippers of the latter size finding it necessary to sell it in conjunction with either stove or chestnut size. Colder weather and a slight snowfall, the first of the present season, created a little better but temporary retail demand both at New York and Philadelphia. Most retail dealers have all sizes for immediate delivery and in New York some retailers have their books well cleaned up and are ready to book new business. The steam coals are moved slowly. Barley is the shortest of the three coals and is in better demand than either buckwheat or rice.

Production of beehive coke during the week ended Dec. 8 is estimated by the Geological Survey to have been 257,000 net tons, a gain of 12,000 tons over the previous week. Output of beehive coke during November was 1,103,000 net tons and of byproduct coke 2,942,000 tons, as compared with 1,290,000 tons and 3,099,000 tons, respectively, during October. Last week the Connellsville coke market failed to develop any additional activity. Spot furnace coke was quotable at \$4, with foundry coke for spot or prompt shipment at \$5@5.50. Two producers of high-grade coke have quotations out for the first quarter, one at \$6.50 and the other at \$6.

Car Loadings, Surpluses and Shortages

Week ended Dec. 1, 1923.	Cars Loaded	
	All Cars	Coal Cars
Week ended Dec. 1, 1923.	835,296	156,608
Previous week	990,217	182,158
Same week in 1922.	840,412	183,510

Nov. 30, 1927.	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Nov. 30, 1927.	153,057	80,756	1,336	605
Same date in 1922.	5,595	2,026		
Nov. 22, 1923.	111,797	58,490	1,866	907



Coal Recovered and Lost in Mining

		Per Cent		Tons Lost per Ton Produced
		of Coal in Mine Lost	Recovered	
Anthracite	1850.	75	25	3.00
	1880.	60	40	1.50
	1921.	38.9	61.1	.64
	Future.	30	70	.43
Bituminous	1850.	64	36	1.78
	1880.	50	50	1.00
	1921.	34.7	65.3	.53
	Future.	15.3	84.7	.18

Looking back 70 years, few industries can show the progress recorded in these figures for the coal industry.—From U. S. Coal Commission Report on Engineering and Management.

Foreign Market And Export News

Improvement in Welsh Coal Market; Output Declines Slightly

Some improvement is noted in the Welsh coal market. Long delayed tonnage is coming to hand freely, and operators and consumers realize that deliveries, owing to the prolonged stormy weather, and the consequent delays of tonnage have fallen behind. The docks are filled with ships and loading operations are proceeding as rapidly as possible.

France is buying well, but with other near-by Continental countries there is no marked activity. Trade with Italy and South America is steady, and a feature of the market is a keen inquiry on the part of buyers seeking to cover fully their requirements to the close of the year. Up to the present Germany's coal credits have not stimulated business in that direction.

The six months trial period of the three shift system at the South Wales ports has expired, but, according to a newspaper dispatch, the tippers have consented to continue at work until Jan. 5, pending further negotiations.

The Newcastle coal market continues to improve. There have been heavy bookings for shipment up to the end of the year and the supply of tonnage has been good.

The report of the loan to Germany to buy steam coals for the railways has been followed by heavy contracts being made all over the country.

Active inquiry from abroad is supplemented by increasing domestic trade demands now that the shipbuilders are resuming work, and the iron and steel operators are extending their operations to meet an expanding trade.

Production of coal by the British mines during the week ended Dec. 1 was 5,719,000 tons, according to a cable to *Coal Age*, a decline of 7,000 tons when compared with the previous week.

Ruhr Industrialists Make Agreement

Announcement has been made in France that agreements with the Ruhr industrialists were made on Nov. 23 to remain effective until April 15 next. They include payment of about 279,000,-

000 fr. as coal tax due from the date of occupation to the time the agreement was made; payment of 10 fr. per ton of coal sold as a tax from Nov. 23; during the period of reorganization of the mines and plants which it is expected will be completed on Jan. 15 next, 18 per cent of the coal produced will be assigned to the Allies as reparation deliveries; free deliveries to begin Jan. 15 next of the monthly supplies prescribed by the Commission for Reparations, in accordance with the peace treaty; free deliveries of by-products; delivery to the Allies of the coal necessary for the needs of the occupation armies as well as for the railroads; acceptance by the German industrialists, according to established regulations, of the control of the mines by Allied engineers; maintenance of export licenses and limitation of exports in the Ruhr.

Export Market Lightens Gloom At Hampton Roads

Business was dull at Hampton Roads last week, with prices showing little change, and with inquiries slackening. Some improvement in export business was shown, although the coastwise trade barely held its own.

The Virginian Ry., partially tied up for several weeks by its engineers' strike, moved slightly more coal, while usually favorable conditions on the Norfolk & Western enabled large volumes of coal to move and to ward off any scarcity of the product.

No outstanding feature was seen in the market. The export cargoes reported were shipped at exceedingly low figures, mainly in an effort to keep coal off demurrage. The tone of the market was dull, and the prospect for the next few weeks was reported as not bright.

Coal Paragraphs from Foreign Lands

Imports of coal into Rio de Janeiro during September amounted to 58,808 metric tons as compared with 85,654 tons during August. Of the total tonnage the United States furnished 7,522 tons and Great Britain 51,286 tons, according to the United States Depart-

ment of Commerce. Imports of coal during the first nine months of this year were 720,314 metric tons, as compared with 689,798 tons in 1922, and 558,344 tons in 1921.

Coal shipments for the season from Spitzbergen were about 400,000 metric tons, according to Consul George Nicolas Ifft, at Bergen, Norway, in his report to the Department of Commerce at Washington. These reports are based on returns from the principal coal companies operating on the island. Shipments are ended for the season.

Export Clearances, Week Ended Dec. 15, 1923

FROM HAMPTON ROADS

	Tons
For Brazil:	
Amer. SS. Robin Hood, for Rio de Janeiro	8,459
For Mexico:	
Nor. SS. Skogheim, for Vera Cruz	3,899
For Porto Rico:	
Amer. SS. Beatrice, for San Juan	4,662
For Uruguay:	
Grk. SS. Aghios Marcos, for Montevideo	5,819
For Cuba:	
Amer. Schr. Laura Annie Barnes, for Manzanillo	1,073
For Virgin Islands:	
Br. SS. Berwindvale, for St. Thomas	7,647
For Jamaica:	
Amer. SS. Annetta, for Port Antonio	202

FROM PHILADELPHIA

For Cuba:	
Am. Schr. Irma, for Niquero	
For Brazil:	
Br. SS. Dovenbay Hall, for Rio de Janeiro	

FROM BALTIMORE

For Porto Rico:	
Am. SS. Major Wheeler (coke)	497

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Dec. 6	Dec. 13
Cars on hand	1,581	2,200
Tons on hand	92,373	125,575
Tons dumped for week	123,709	108,643
Tonnage waiting	15,375	12,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,246	1,244
Tons on hand	71,850	73,950
Tons dumped for week	31,924	65,493
Tonnage waiting		1,040

C. & O. piers, Newport News:		
Cars on hand	1,316	1,560
Tons on hand	67,458	78,515
Tons dumped for week	119,640	78,693
Tonnage waiting	5,950	690

Pier and Bunker Prices, Gross Tons

PIERS	Dec. 8	Dec. 15†
Pool 9, New York	\$5.00@ \$5.25	\$5.00@ \$5.25
Pool 10, New York	4.75@ 5.00	4.75@ 5.00
Pool 11, New York	4.50@ 4.75	4.50@ 4.80
Pool 9, Philadelphia	4.90@ 5.20	4.90@ 5.20
Pool 10, Philadelphia	4.50@ 4.90	4.50@ 4.90
Pool 11, Philadelphia	4.25@ 4.60	4.25@ 4.60
Pool 1, Hamp. Roads	4.60@ 4.75	4.50
Pools 5-6-7 Hamp. Rds.	4.15@ 4.30	4.15@ 4.30
Pool 2, Hamp. Roads	4.25@ 4.40	4.25

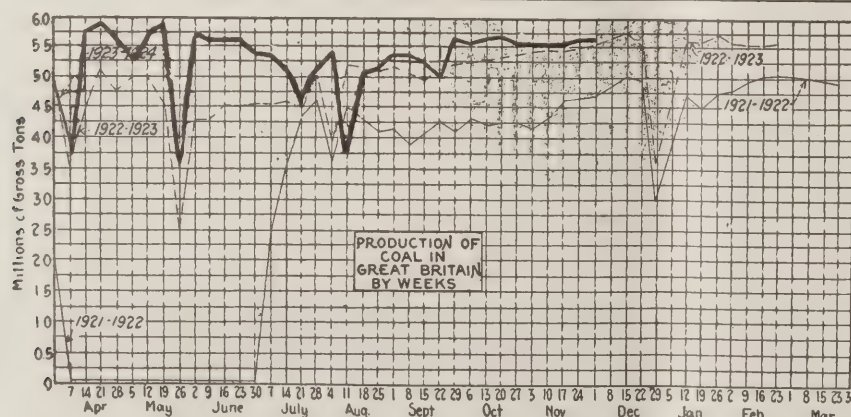
BUNKERS

Pool 9, New York	5.30@ 5.55	5.30@ 5.55
Pool 10, New York	5.05@ 5.30	5.05@ 5.30
Pool 11, New York	4.80@ 5.05	4.80@ 5.15
Pool 9, Philadelphia	5.15@ 5.55	5.15@ 5.55
Pool 10, Philadelphia	4.90@ 5.25	4.90@ 5.20
Pool 11, Philadelphia	4.65@ 4.90	4.65@ 4.90
Pool 1, Hamp. Roads	4.60@ 4.75	4.50
Pool 2, Hamp. Roads	4.25@ 4.40	4.25

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to <i>Coal Age</i>	Dec. 8	Dec. 15†
Admiralty, large	29s. 6d. @ 30s.	29s. 6d. @ 30s.
Steam smalls	20s. @ 22s.	22s. 6d. @ 25s.
Newcastle:		
Best steams	24s. 6d. @ 26s. 6d.	26s. 6d.
Best gas	23s. 6d. @ 24s.	24s. @ 24s. 6d.
Best bunkers	22s. 6d. @ 24s. 6d.	23s. @ 24s.

† Advances over previous week shown in heavy type, declines in *italics*.



Traffic News

Virginian Ry. Authorized to Extend Guyandot River Branch

The Interstate Commerce Commission on Dec. 14 granted permission to the Virginian Ry. to construct an extension of its Guyandot River branch in Wyoming County, West Virginia, for 1.19 miles to serve new coal mines. This reversed its order of June 25, which denied the road's request.

The construction cost of the extension is estimated by the applicant at \$63,012, of which \$40,812 has been expended for work done in 1917 and 1918. Gross system revenues to be derived from traffic created by the proposed construction are estimated by the applicant at \$226,000 for the first year, increasing to \$1,130,000 for the fifth year. After the first five years the minimum annual revenues are expected to equal those of the fifth year. The increase in net railway operating income is estimated at \$77,309 the first year and \$393,234 the fifth year.

The commission originally denied the application on the ground that the Vir-

ginian had not been able to supply the mines in operation on its lines and that, in addition, there were more mines in the country than was consistent with the most efficient use of equipment.

Application was filed by the railway company for a reopening of the case and the railway was joined in this move by the Pocahontas Fuel Co., Inc., the properties of which were to be served by the proposed extension.

The evidence taken shows that the tractive power of locomotives owned by the Virginian road on Jan. 1, 1922, has been increased 16.4 per cent by the purchase of fifteen Mallet locomotives, which were delivered between July 1 and Sept. 1, 1923. On April 13, 1923, the railway ordered 1,000 steel coal cars of 120 tons' capacity, and 500 of seventy tons' capacity, which will add 30 per cent to its coal car capacity. A contract has been made to electrify part of the lines, and this will add materially to the carrying capacity.

Defer Assigned-Car Order Again

The Interstate Commerce Commission has again postponed the effective date of the assigned-car order, this time from Jan. 1 until Feb. 1.

Suspends New Switching Rate

The Interstate Commerce Commission has ordered suspension until April 3 next of schedules proposed to increase from \$3.60 per car to \$8.10 per car the switching charge of the Wheeling & Lake Erie Ry. on coal and coke received at Toledo, Ohio, from other lines and destined to industries located in Toledo switching limits upon the line of the Wheeling & Lake Erie Ry.

All Freight Records Broken

The railroads of the United States handled 386,027,840,000 net ton-miles of freight traffic during the first ten months of 1923, breaking all past records and an increase of 2.4 per cent over the corresponding period in 1920, when freight traffic amounted to 377,025,000,000 net ton-miles, the previous high record, according to the Bureau of Railway Economics. Compared with the first ten months last year, the total for the same period in 1923 was an increase of 84,495,486,000 net ton-miles, or 28 per cent.

For the month of October this year alone the freight business of the railroads amounted to 42,209,395,000 net ton-miles, which has been exceeded only

in August, 1920, when it amounted to 42,734,000,000, and in October, 1920, when it was 42,570,000,000. Compared with October last year, it was an increase of 2,922,541,000, or more than 7 per cent.

October this year was the eighth month in history when freight traffic on the railroads has exceeded 40,000,000,000 net ton-miles. This mark was attained once in 1918, again in 1919, and four times in 1920. It was not reached in 1921 or 1922, but so far has been reached twice in 1923.

Dates Set for Lignite Hearing

The Interstate Commerce Commission on Dec. 14 set dates for hearings of the protest filed against proposed increases on lignite rates out of North Dakota. The first hearing will be held at Aberdeen, S. D., on Jan. 7, and a second at Bismarck, N. D., on Jan. 10. Governor Nestos of North Dakota recently urged President Coolidge to assist coal interests in that state in resisting the increase, whereupon the new rate schedules were promptly suspended.

New Connection for Ohio Mines

The struggles of a number of small operators near Dover, Tuscarawas County, Ohio, for railroad connections which would enable them to market their product, started a year ago have been crowned with success. The Ohio Utilities Commission has ordered the

Pennsylvania R.R. to make the necessary connections. The case was carried to the Supreme Court by the railroad company but that tribunal upheld the order of the Ohio Utilities Commission.

Would Build Alabama Line

The Muscle Shoals, Birmingham & Pensacola Ry. has applied to the Alabama Public Service Commission for a certificate of convenience and necessity for the construction of a railroad from Kimbrough, the present northern terminus of the line, to Jasper, Ala. It is contended that the new line will shorten the distance between central points and the gulf and will also open coal and ore fields and timber tracts in North Alabama not now served by any railroad.

Ford Seeks 43-Mile Cut-Off

The Detroit, Toledo & Ironton R.R., Henry Ford's road, asked the Interstate Commerce Commission Dec. 15 to authorize a new forty-three-mile line between Wauseon, Ohio, and Durban, Mich., for which permission was sought to issue sufficient mortgage securities for financing. The chief purpose is to reduce distances of the Ironton road into Detroit. According to the map filed with the commission, the cut-off would be absolutely straight for the entire forty-three miles.

Pennsylvania to Improve Docks

The Pennsylvania R.R. will expend \$500,000 in the improvement of its dock facilities at Erie, Pa., according to advice received in New York Dec. 13.

Coal Legislation Hopper

Two bills for the creation of a Department of Mines, with a Secretary and Assistant Secretary at its head, have been introduced in the Senate. One is by Senator Oddie, of Nevada, chairman of the Senate Committee on Mines and Mining, and the other is by Senator Shortridge, of California, and differs slightly from Senator Oddie's bill. Both measures have been referred to Senator Oddie's committee.

Representative Bacharach, of New Jersey, has introduced in the House a bill to improve the navigability of waters of the United States by preventing their pollution by oil.

Representative Davis, of Minnesota, has presented a bill proposing the establishment of an International Exposition of the United States of America, in the interest of mining, agriculture, labor, etc.

Representative Vinson, Georgia, has introduced a bill to amend the Interstate Commerce Act so that it would be unlawful for any rates, fares or charges to exceed those in effect on Feb. 28, 1920; also that "Nothing in the Transportation Act, 1920" shall diminish or extinguish the jurisdiction of any state or any agency thereof, of any common carrier or railroad, or the rates, fares, charges, classifications, regulations, or practices of any such carrier or railroad.

Representative Hawes, Missouri, has introduced a bill similar to one introduced by him in the last Congress, intending to create seven regional committees to consist of three members each, located in seven regions, practically similar to the regions in existence during governmental operation of the railroads. The Interstate Commerce Commission would remain at Washington under this bill as a sort of a Supreme Court of Commerce.

News Items From Field and Trade

ALABAMA

Recent incorporations in Jefferson County include the **Neill Coal Co.**, with a capital of \$20,000, of which \$8,000 is paid in, and of which John C., Ab. and H. C. Neill are the organizers.

The **Hilliard Coal Co.** is arranging to reopen its **Hilliard mine**, west of Jasper on the Frisco R.R., which has been idle for some time. The mine was developed some time ago at considerable expense and is owned by James Ensor, Brady Earnest and Manly Johnston, of Cordova, and T. B. Dilworth, of Jasper.

The **Pratt-Warrior Coal Co.**, of Jasper, is making arrangements to erect twenty-five new tenement houses for employees at their Ivy Bluff Mines, in Walker County. The mines were recently leased to the Gulf States Portland Cement Co., of Demopolis, which is now operating them and taking the entire output. Motor haulage was recently installed in the mine and the new houses will enable the company to obtain additional employees for the increased output needed. The mines are located on the Warrior River, on which stream the plant of the cement company also is situated, and all coal is moved by barges to destination.

ILLINOIS

The **Middle Fork Mine**, one of the best and largest collieries near Benton, owned by the **United States Fuel Co.**, has been closed down, throwing approximately 800 men out of work. The shutdown was brought about by a refusal of the "drivers" to take a small reduction in their daily wage, the company deciding it can buy coal cheaper than it can mine it under the present conditions, as the **Standard Oil Co.** decided at its two Illinois mines, now down. The output of the **Middle Fork mine** was used at steel plants operated by the company at Joliet.

Both shafts of the new **Nason mine** at Nason are now in coal. "B" shaft reached it Dec. 4 at 735 ft. About 150 ft. of main entry was driven in the first two weeks after the first shaft was finished. Development is going on day and night. "B" shaft, which measures 12 ft. 6 in. by 32 ft. 6 in., is one of the largest in the country and upward of 1,000 tons may be the daily tonnage by April 1. By Jan. 1, 1925, mine experts think this mine will break all records for quick development with a 5,000-ton daily output.

No direct responsibility has been placed yet for the flooding of the **Radium mine** at Belleville on Dec. 6. The report shows that the operators of the **Chester mine**, abandoned some 25 years ago, failed to chart its workings correctly. The survey of the coal leases held by the **Radium mine** indicated that there remained at least 500 ft. of coal between its nearest working face and the old mine. Evidence is reported to the effect that coal was taken long ago from leases not reported by the **Chester mine**. At present the pumping is equal to the rising water in the **Radium shaft**. The three bodies were recovered the day following the flood. New pumps are being installed that are expected to pump out both mines in two weeks' time and work will be resumed when an examination of the old mine is made to guard against a repetition of the accidental breakthrough.

Roscoe B. Starek has left the **Binkley Coal Co.** to become vice-president in charge of sales for the **Leland Coal Co.** of Chicago, a company which now holds Illinois, Indiana and Kentucky properties. H. A. Stark, long with the **Bogle Coal Co.** before L. G. Binkley acquired the **Bogle properties** in Indiana, now succeeds Mr. Starek as vice-president in charge of sales for the **Binkley Coal Co.**

The **Quaker Mining Co.**, 37 West Van Buren Street, Chicago, has been incorporated by H. A. Huskey, George G. Haase and R. L. VanHoose.

A loss of \$200,000 was suffered by the **Taylor Coal Co.** in its Dec. 1 fire, which destroyed the recently rebuilt washery and wooden tippie at Herrin.

M. F. Peltier, vice-president of the **Peabody Coal Co.**, Chicago, returning from a trip of inspection among the **Sheridan Coal Co.** mines in Wyoming, said conditions in the coal industry in the West have seldom been less auspicious than they are now.

The appointment of a receiver for the **Kolb Coal Co.**, of St. Louis, which was made on Oct. 16, was vacated ten days later by the Circuit Court of Appeals, at Chicago, which also ordered that the operation of the order for the appointment of the receiver and all proceedings thereunder should be stayed pending the hearing and determination of the appeal and that all property of the **Kolb Coal Co.** should be returned to it. The appointment of the receiver was made on the application of P. H. Sauter to the U. S. Court for the Eastern District of Illinois, against the coal company and others, the bill alleging that there was a dispute between the plaintiff and certain of the defendants relative to the ownership of 1,200 shares of the capital stock of the company. There were no allegations in the bill that in any way reflect upon the **Kolb Coal Co.** or its solvency or financial condition, and no relief of any kind or nature is sought against it.

The **Kathleen mine**, at Dowell, operated by the **Union Colliery Co.**, of St. Louis, smashed its own hoisting record twice in a week, hoisting a total of 5,232 tons the second day and 4,902 the first day. The first record was made Dec. 12 and the second on the 14th. The mine has been in operation about four years and is expected to produce around 6,000 tons daily after development work has been fully extended. I. N. Bayless, of Dowell, is superintendent of the plant, and John Hays is mine manager.

IOWA

The **C. M. & St. P. R.R.** is building a double track spur one mile from its main line at Madrid, to the new mine of the **Madrid Coal Co.**, which previously has been only a wagon operation.

Prof. S. W. Parr, of the University of Illinois, in an address before the Illinois and Iowa members of the American Chemical Society recently, enthused Iowa operators by promising that Iowa would become one of the great fuel-producing states of the country in the next fifteen to twenty years. He described low temperature carbonization, the best process by which the poor grade of coal that lies under twenty-three Iowa counties can be converted into high-grade coke—"the most desirable fuel in the world today"—and declared there is a great future for this process.

KENTUCKY

Harlan reports that the **United Mine Workers** have established an office in that town, and are working hard in an effort to unionize the southeastern Kentucky field, a drive having been under way in the Pineville district for some time, with recent discussion of moving district offices from Knoxville, Tenn., to Pineville.

W. B. Gathright, general manager of the Louisville wholesale and retail departments of the **St. Bernard Mining Co.** of Earlinton, has resigned effective Jan. 1, after being with the company since he was a boy.

It is reported that additional mines in the **Harlan and Middleboro districts** have cut wages during the past few days. Mines on **Clover Fork** are said to have been the first to cut, and reductions have been quite general of late as a result of many mines being down, hundreds of men out of work and others willing to accept cuts if it will keep them on the payroll.

An interesting Geological Survey report from Washington on Dec. 10, showed that machine-mined coal in Kentucky ran much larger than most coal men believed, the report showing 71 per cent, or 33,322,271 tons, machine cut out of 42,134,175 tons mined in 1922. A total of 5,355,037 tons, or 12.7 per cent, was shot off the solid, and 4.2 per cent, or 1,766,963 tons, was hand mined.

Stripper operations in western Kentucky produced 468,845 tons, or 1.1 per cent, and 1,221,059 tons or 2.9 per cent carried no specification as to how it was mined.

The **City of Henderson** is now enjoying the cheapest coal in Kentucky. Last week a local mine reduced prices on lump from 18 to 16c.; nut from 18 to 15c. and slack from 10 to 8c., delivered. Prices are 3c. lower at the mine. The quotations are the lowest since 1916.

Illustrating the coal-mining activity recently in **Muhlenberg County**, Inspector M. H. Blythe's report shows that the **Beech Creek Coal Co.**, of Drakesboro, opened a new mine, **Beech Creek No. 3 $\frac{1}{2}$** , on the Louisville & Nashville last March. During September one mine shut down permanently because it was worked out—**Williams No. 9**, of the **Beaver Dam Coal Co.**, of **Beaver Dam**—and in November four mines opened up. These were the **Morrison** and **Curshaw strip properties** of the **Morrison Coal Co.** and the **Curshaw Coal Co.**, both of **Centertown**, and two mines belonging to the **Beaver Dam Coal Co.**—**Sackett No. 9** and **Black Cat No. 11**, both at **Beaver Dam**. In that one county three strip mines opened during the summer and autumn. These were the **Harris strip mine** of the **Harris Coal Corporation** of **Island**, which began shipping on the **L. & N.** in June, and the two strippers mentioned earlier in this paragraph.

MISSOURI

Announcement has been made of the sale of stock in the **Central Coal & Coke Co.** owned by C. F. Fox, investment banker of Philadelphia, to a syndicate composed of Charles S. Keith, Kansas City, president of the company; Henry F. Hall, Kansas City, a director, and John Henry Kirby, of Houston, Texas. Mr. Kirby bought the greater portion of the stock sold. This consisted of the entire Fox holdings in the company, 11,675 shares. The price paid was \$126 a share, or \$1,471,050 cash for the entire transaction. "The deal gives the purchasers undisputed control of the company," Mr. Keith said. "Mr. Kirby bought the largest portion of the Fox interests. About 50,000 of the 70,000 shares of stock in the **Central Coal & Coke Co.** are now owned by Western men. There will be no radical change in policy. Mr. Kirby will take the place of Mr. Fox on the board of directors. The officers will remain the same." This is considered to dispose of the story that Eastern interests controlling the U. S. Distributing Corporation were to buy control of this coal company.

NEW YORK

The **Mahoning Railroad Co.**, on Dec. 11 declared a dividend of \$10 a share on its common stock, payable Dec. 28 to stockholders of record Dec. 21. Dividends of \$10 a share were also paid in October, June and April of this year. In addition, the directors declared the regular semi-annual dividend of \$2 a share. The regular quarterly dividend of \$1.50 a share was also declared on the preferred stock.

A special meeting of stockholders of the **Consolidation Coal Co.** has been called for tomorrow to vote on a proposed amendment to its charter permitting a change in the par value of its capital stock and the issuance of \$10,000,000 7 per cent cumulative, redeemable preferred stock, from the sale of which it is planned to reimburse the treasury of the company for capital expenditures in the acquisition of properties and to provide new working capital.

Directors of the **Island Creek Coal Co.**, on Dec. 11 declared an extra dividend of \$1 a share on the common stock of the company and the regular quarterly dividend of \$2. The regular dividend of \$1.50 a share was declared on the preferred. All dividends are payable Jan. 2 to stock of record Dec. 21.

Governor Smith on Dec. 11 appointed a fair price coal commission for **Poughkeepsie**, as follows: Clinton H. Laurence, representing the coal dealers; Otis Sherman, for the general public, and William T. Ward.

Emerson E. Davis of **Saratoga Springs**, has been appointed by Governor Smith as the third member of a fair-price coal commission for that city to serve with William E. Benton and Eugene E. Hayden, appointed by Acting Mayor Sherman. Mr. Benton is manager of a theater and Mr. Hayden is secretary of the **Saratoga Coal Co.**, representing, respectively, the consumers and the coal dealers. Mr. Davis will represent the state.

OHIO

A new trial of the Hopper-Mankin Fuel Co. against the Matthew Addy Coal Co. has been asked in the U. S. District Court. The Hopper-Mankin company was denied judgment for \$81,000 for coal delivered to the Matthew Addy Steamship Co., Judge Hickenlooper instructing the jury that the Matthew Addy company could not be sued for a debt contracted by the steamship company.

All bids, which were received by E. L. McCune, clerk of the Columbus Board of Education, Nov. 8, for furnishing and delivering 1,000 tons of Hocking nut, pea and slack to the site of the New Central High School, were rejected at a recent meeting and will be readvertised. The date as yet has not been set. The following were low bidders: Euga & Stinchcomb, \$2.91; Reliable Coal & Supply Co., \$2.98, and the J. C. McIntyre Coal Co., \$3 per ton delivered.

OKLAHOMA

The International Fuel Corporation has taken over the Champion mine at Louisville, formerly operated by the Republic Fuel Co. This mine is not running at full capacity, but the operating company hopes to have a good output within the next few weeks.

A close examination of the coal deposits near Oklahoma City will be made by experts in the near future. It is believed that the examination will prove the existence of extensive deposits of high-grade coal. Coal was mined in the Fourteen Mile Creek locality many years ago and more recently work has been done by persons who leased a portion of land from Indian citizens. An attempt will be made to interest wealthy operators in the mining of the coal, in case a large deposit is found.

PENNSYLVANIA

Delegates representing the United Mine Workers of District No. 2, which includes practically all of central Pennsylvania, will go to the International convention in Indianapolis, Ind., on Jan. 17, standing behind two demands as to the next scale contract. The first is for a six-hour workday and the second is for a 20 per cent increase in wages.

By agreement of counsel at Sunbury on Dec. 4 the Lehigh Valley Coal Co., and the Susquehanna Collieries Co., in their appeal from assessments on anthracite lands in Northumberland County, which has been pending more than a year, it is announced that the former will pay taxes on an increased valuation of 40 per cent on approximately \$15,000,000 worth of coal land; the Susquehanna on \$11,000,000 worth. These appeals had been in the hands of the court for adjudication. The Philadelphia & Reading Coal & Iron Co. has already agreed to a 40 per cent rise in taxable valuation on \$26,000,000.

Shipments of anthracite for the month of November, 1923, as reported to the Anthracite Bureau of Information, Philadelphia amounted to 5,828,754 gross tons, as compared with 6,564,526 gross tons during the preceding month, a decrease of 735,772 tons, or 11 per cent. This decrease can be attributed to holidays observed during the month. The average daily shipment for the time the collieries were in operation during the month of November exceeded that for the month of October. Comparing November shipments of this year with the corresponding month in 1921, the latest normal year, an increase of 514,740 tons is shown, or 9.7 per cent. Shipments by originating carriers were as follows:

	November 1923	October 1923
Phila. & Reading....	1,038,340	1,205,425
Lehigh Valley	1,006,983	1,174,768
Jersey Central.....	493,915	564,471
Del., Lack. & Western	937,222	1,017,231
Delaware & Hudson...	820,301	861,705
Pennsylvania	509,457	576,345
Erie	623,101	707,076
N. Y., Ont. & Western	153,075	174,707
Lehigh & New Eng...	246,360	282,798
Totals	5,828,754	6,564,526

The fire which recently damaged the plant of the Phillips Mine & Mill Supply Co., Pittsburgh, was confined to one portion of the buildings and was not as serious as at first reported. The company announces that within a week or ten days it will be able to handle all business with its usual expedition and dispatch.

WEST VIRGINIA

Further trials of those who participated in the armed march against Logan in 1921 will be held in Fayette County, Monday, Feb. 11. There was a change of venue from Greenbrier to Fayette County in November. The first defendant to be placed on trial will be William Blizzard, president of sub-district 2, of District 17, who is charged with being an accessory to murder. C. F. Keeney, president of the district, and Fred Mooney, secretary of the district, also are under indictment. The cases will be tried before Judge Early and it is expected that 250 witnesses will be in attendance, about 200 of whom will appear for the defense. Officials of the miners' union will be represented by H. W. Houston and T. C. Townsend, of Charleston. The state will be assisted in the presentation of its case by George Love, prosecuting attorney of Fayette County, and by C. W. Ossenton. Fayette will make the fourth county in West Virginia in which trials of some of the armed marchers have been held. The first trials were held in Jefferson. Then there was a change of venue to Morgan, then to Greenbrier and finally to Fayette.

Announcement has been made that the Wheeling Steel Corporation is negotiating for 10,300 acres of coal land in Mason County, extending from New Haven to Letart, on the Ohio River.

The Ideal Manufacturing Co., has just been organized by Charleston capitalists, and will establish a plant in Charleston. The company has been chartered with a capital stock of \$5,000 for the purpose of manufacturing mining machines. Incorporators of the new company are John G. Bulmer, of Lory; James W. Smiley, S. L. Walker, A. S. Jenkins and R. Stewart, all of Charleston.

The Kelly's Creek Colliery Co., one of the large concerns operating in the Kanawha District, the main office of which is at Cleveland, has been granted authority to increase its capital stock from \$1,900,000 to \$2,000,000. The Paisleys, of Cleveland, are largely interested in this company.

Plans have been perfected for the erection in Huntington of the Coal Exchange Building, to cost approximately \$1,000,000. It will contain 325 office rooms where many of the coal companies of the tri-state region will have headquarters, applications for space in the new building having been made even before construction work had been started. The building is to be thoroughly fireproof and is to be built of steel, terracotta, stone, concrete and brick. The Huntington Coal Exchange began to plan for the building about the time the coal exchange was organized.

WASHINGTON, D. C.

The new Senate Committee on Mines and Mining is composed of the following: Republicans—Oddie, Nevada, Chairman; Elkins, West Virginia, Phipps, Colorado, Cameron, Arizona, and Frazier, North Dakota; Democrats—Walsh, Montana, Ashurst, Arizona, Pittman, Nevada, and King, Utah. Senators Norbeck, South Dakota and Couzens, Michigan, Republicans, former members, were not retained, and all of the Republicans except Senator Oddie are new on the committee. Senator King is a new Democratic member on the committee.

Senator Borah, Republican, Idaho, is chairman of the Senate Labor Committee, new members of which are Brookhart, Iowa, and Dale, Vermont, Republicans; and Ferris, Michigan, and Copeland, New York, Democrats. Senators dropped from this committee are Warren, Wyoming; Shortridge, California; Republicans; and McKellar, Tennessee, Democrat.

The U. S. Supreme Court on Dec. 3 reaffirmed the decision it handed down in June declaring unconstitutional the West Virginia law which would compel natural-gas companies piping gas from that state to supply needs within the state before sending gas into other states in periods of shortage. The vote of the court was five to three, one justice not participating, as was the case in the original decision. In its original decision the court declared that natural gas which has been piped into other states assumes the character of interstate commerce. A rehearing was granted West Virginia. The latest opinion merely recites that nothing was presented to change the first opinion of the court. The decision was on consolidated suits brought by Pennsylvania and Ohio against West Virginia.

President Coolidge has sent to the Senate the names of Mark W. Potter, of New York, and Frank McManamy, of the District of

Columbia, as members of the Interstate Commerce Commission for seven-year terms beginning Jan. 1 next.

CANADA

William and George Hastings, members of the coal firm of Hastings & Sons, Woodstock, Ont., were fined \$25 and costs each at an adjourned sitting of the police court for having sold as coming from Alberta coal mined in the United States. The difference in the price was refunded by the company to those who had purchased the coal.

If Canada consumed coal from Alberta instead of going outside the Dominion for it, 60,000 jobs at \$1,500 per annum each would be maintained, according to Commissioner Howard Stuchbury. "We are paying out each year the equivalent of \$300,000,000, or the equal of the national debt in eight years," he said. "The West cannot pay its debts to Ontario because it has no money and, therefore, cannot buy Eastern products. But it has the coal wherewith to pay. Premier Ferguson stated recently that we are going to get a rate on Alberta coal before we are through."

Association Activities

The Northern West Virginia Coal Operators Association has filed with the Interstate Commerce Commission a brief urging adherence to its original decision in the assigned-car case. It is declared in the brief that the decision of last June is sound and logical inasmuch as it assures equality of treatment to all shippers regardless of size and power. It is pointed out that mines having cars assigned to them are afforded a full supply, reduce the cost of production at such mines, but cause an increase in the cost of production at other mines. The Association, through its executive vice president, George S. Brackett, also is actively opposing any change in the rates through the Potomac Yards, near Washington, in conjunction with the Upper Potomac Association.

The annual meeting of the Winding Gulf Operators Association held at White Sulphur Springs, W. Va., on Dec. 12, was featured by an address by H. L. Gandy, executive vice president of the National Coal Association. E. E. White, president of the E. E. White Coal Co., of Glen White, was chosen as president of the association for the fifteenth consecutive year. Other officers chosen were: P. M. Snyder, Mt. Hope, W. Va., vice president; George Wolfe, of Beckley, W. Va., secretary; A. W. Laing, of MacAlpin, W. Va., treasurer; members of executive committee, E. E. White, P. M. Snyder, A. W. Laing, W. G. Caperton, of Slab Fork; C. H. Mead, of Beckley, W. Va.; George R. Collins, of Charleston; Fred G. Wood, of Amigo, W. Va.; W. B. Beale, of Fireco, W. Va.; F. W. Lee, of Alpoca, W. Va.; W. H. Ruby, of Whitby, W. Va., and T. H. Wickham, of Beckley. Mr. Gandy reviewed the present coal situation and the prospect of legislation affecting the industry. He expressed himself as strongly opposed to any organization which attempted to set itself above the law. In calling attention to the present oversupply of coal, he stressed the necessity of being in a position to produce the peak load. The association endorsed the efforts to obtain such rates that would permit the movement of smokeless to Eastern states by rail.

Coming Meetings

Tug River Coal Operators' Association. Annual meeting Jan. 4, 1924, Bluefield, W. Va. Secretary, C. C. Morfit, Welch, W. Va.

New England Wholesale Coal Association. Annual meeting Jan. 8, 1924, Boston, Mass. Secretary, R. S. Townsend, Boston, Mass.

Engineers' Society of Western Pennsylvania. Annual meeting Jan. 15, 1924, Blue Room, William Penn Hotel, Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

American Wood Preservers' Association. Annual meeting Jan. 15-17, 1924, Hotel Buehlebach, Kansas City, Mo. Secretary, P. R. Hicks, Chicago, Ill.

Northeast Kentucky Coal Association. Annual meeting Jan. 24, 1924, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

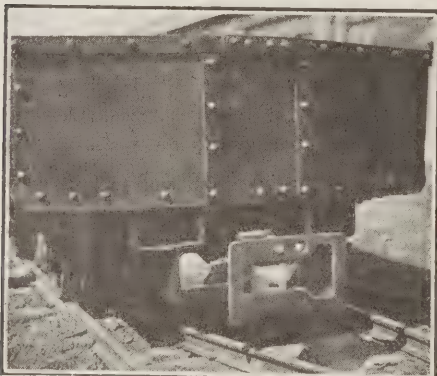
New Equipment

Automatic Mine-Car Coupler

The introduction and use of heavy all-steel mine cars of four tons or more capacity together with corresponding increase in size of all other equipment, such as rotary dumps, hoists, haulage locomotives, etc., has been effected with a view toward efficient high-speed production and low cost per ton.

During this period of development considerable time and study have been given to almost every detail connected with the production of coal, many machines having been perfected to operate with complete automaticity. The Ohio Brass Co. has, therefore, developed the Tomlinson automatic coupler for use on mine cars. This coupler has been applied to steam and electric railways for many years.

The coupler is completely self-contained, having no loose parts to become mislaid or lost. It is always ready for coupling either on straight track or curves, thus eliminating the necessity of anyone stepping between the cars



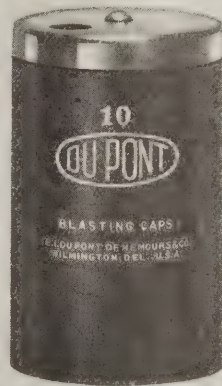
CAR WITH AUTOMATIC COUPLER

to adjust any part of the coupler. Heavy steel draft gear relieves the car body from abuse and shocks, thus prolonging the life of the equipment. A ball and socket type of anchorage permits operation of the car on a rotary dump, and ready means for uncoupling and transposing from a coupler to a bumper makes it suitable for hoisting operation.

Safe Blasting-Cap Container

Built like the cartridge chamber of a six-shooter, the new du Pont blasting cap container, illustrated here, is the most recent blasting accessory offered by the duPont Company. It meets a real need of blasters who, for lack of a service container, have heretofore carried detonators loosely in their pockets or in the tin boxes in which they are sold. This practice has frequently resulted in serious and sometimes fatal injuries. By the use of this new device the likelihood of such accidents will be greatly minimized.

The body of the container is made of vulcanized rubber. Drilled at regular intervals into its thick side walls are ten holes, each large enough to



CONTAINER FOR BLASTING CAPS

accommodate a blasting cap. The polished brass top cannot be removed, but can be rotated around the rivet pin which firmly secures it, so that the vent exposes the ten compartments one at a time. You fill the container with blasting caps just as you would load a six-shooter with cartridges. After filling, the top can be turned so that the vent is effectually closed over a blind hole. Incidentally, this top is designed to prevent accidental turning.

The legend—"Blasting Caps—Dangerous—Handle Carefully"—is embossed in white letters on the back of the container along with the following safety rules:

Do not remove caps with wire or nail.

Don't tap or otherwise investigate them.

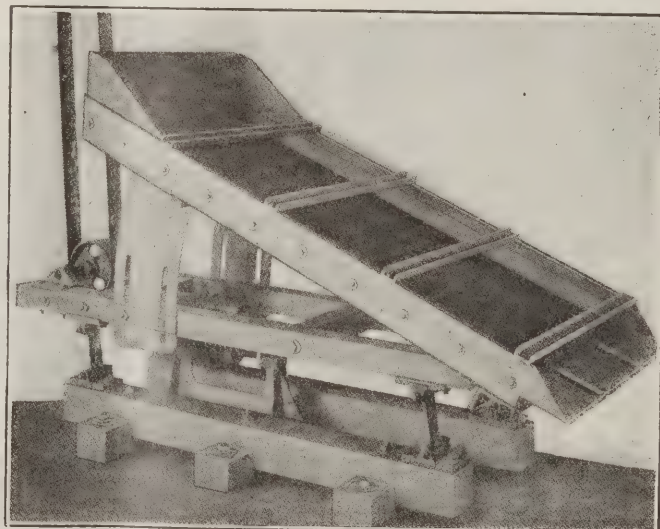
Don't carry caps loose in pocket.
Don't store in residence.
Don't smoke near caps.
Don't shoot into caps.
Attach caps to fuse with cap crimper, not with knife or teeth.
Keep in a dry place.
Keep open lights away.
Containers are made for No. 6 caps and for No. 8 caps.

Screen That Both Shakes And Vibrates

Two types of a screen that both shakes and vibrates are made for either coarse or fine screening by the Southwestern Engineering Co., Los Angeles, Calif. It is used both for wet and dry material. When the material is dry and fine the screen may be enclosed so as to prevent dust from flying in the air and lighting on the sills, ledges and floor of the tippie or other building and air suction may be applied to draw away the finest particles.

This screen, which is known as the Cottrell, consists essentially of a screen frame or frames, rapidly vibrated by the rotation of an unbalanced pulley. Excessive speeds have not been found necessary, 400 to 1,000 r.p.m. being sufficient for practically every screening condition, according to the manufacturers. The screen cloth is said to last longer than in most types of screens because it is not put under great tension, for both the screen frame and the screen cloth are vibrated. For rough work, perforated metal screens may be used in place of screen cloth.

One, two or three screen decks may be used. The screen in type A can be set at angles from 10 to 30 deg. from the horizontal and it will therefore move at an angle to the screen frame. In type B, which may be used for any material coarser than 20-mesh and is run at 200 to 400 r.p.m., the screen has a motion at right angles to the screen surface. This bumping movement is ordinarily between one hundredth of an inch and 1½ in.



SCREEN WHICH SHAKES AND VIBRATIONS KEEP FROM CLOGGING

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24

NEW YORK, DECEMBER 27, 1923

Number 26

Presidential Years

WHAT are we to infer from the recent broadsides proclaiming and proving that the generally accepted conviction that a presidential year means poor business is both false and foolish? L. P. Ayers, vice-president of the Cleveland Trust Co., a statistician of national reputation, and Congressman Martin L. Davey have separately and independently hit that old theory a bump. We have never had a shred of belief in the theory that presidential years made or unmade business or that changes in administration have a tangible influence on the business cycle. It is good to have it proved, however. Perhaps when we have more businessmen with trained minds mixing in the political game there will be less resort to such old adages that one party or the other brings prosperity just because a good crop in a presidential year following a poor crop may re-elect the party in power.

Since 1880, it seems, there have been five lean presidential years and five fat ones. Colonel Ayers' indexes show the presidential year has an even break as between above and below normal. Now there is much talk these days about the influence of the coming presidential year on a new coal-wage contract for next April. Just what influence can it have?

In the first place the influence, if any, must be pronounced and exerted in advance, because the negotiations open in January to renew a contract that expires with the end of March. At that time the political aspects of 1924 will still be in flux. Conventions are months away, policies in the making, Congress a Roman arena for bloc fights. Now it is granted that the powers that be, and perhaps as well those that hope to be, would be in a sorry plight were they to be obliged to stage a presidential campaign under such stress as the coal strike produced in the summer of 1922. One can well imagine that the administration would gladly have such a contest postponed. The memory of the ineffectiveness of Washington in the 1922 conflict is altogether too fresh to invite a repetition.

What brings about a strike? Is political influence any more likely to avoid or postpone such an event than to bring prosperity or decree depression, raise a bumper crop or introduce plague or drought? Hardly. An overheated imagination might picture some power behind whispering to the coal operators that there must be nothing to ruffle the calm sea of 1924 prosperity, and directing that they go forth and give the union miners whatsoever they may demand, but coal operators don't throw their business away after that fashion. No one supposes either that the United Mine Workers will listen to advice from Washington in 1924 any more than in 1922. Their course of action, like all organized labor's course in the country, is not dependent on party politics. The miners will strike or refrain from striking at the dictation of no political group.

No, the government or the party cannot by edict or

by pressure control this situation. Whatever influence the fact of a presidential year may have on labor relations in soft coal will flow from the natural conservatism of individuals who would shrink from stirring up more trouble than is already in prospect. The greatest hope for peace in coal in 1924 lies in the very evident desire of both parties to avoid a dispute, and in no wise is to be attributed to the magic influence of a presidential year.

Business Statistics

HOW much of the stability that has characterized business this year is to be attributed to sounder knowledge of the course of industry cannot be ascertained with precision. The better knowledge afforded by the regular collection of trade information by the Department of Commerce and published through the Survey of Current Business has met with the hearty approval of industry. The steady drive for continuous operation, the mitigation of unemployment and the softening of alternate booms and slumps, in which Herbert Hoover has been the outstanding leader, is bearing fruit. Beyond doubt what Mr. Hoover did in 1923 is more largely responsible for the even tenor of soft-coal production this year than any other factor.

It must be remembered that all the results so far obtained have been from statistics voluntarily supplied. The trade associations have been encouraged to co-operate with the government. In view of the decree recently entered in the Tile Manufacturers case by which the field of these voluntary trade reports is greatly restricted, if not indeed reduced to the request of some government department, there is raised the larger question as to whether the policy of the Department of Justice is not directed toward the total extinguishment of trade-association effort. Some would devise a method of forcing a showdown between the policies of the departments of Justice and Commerce, but there is the fear that if the question of legality were raised there would inevitably follow a period of uncertainty that would be sure to wreck what even now is left and thus remove the few props that business has.

The coal industry, save for the incomplete co-operation now afforded the Geological Survey, is at a standstill in the statistical field. Groups here and there are seeking a way of increasing the effort on a voluntary basis. The sentiment in favor of making all participate is strengthened by the knowledge that altogether too many coal men are seemingly opposed to any form of publicity of accounts. From a purely selfish business standpoint the coal industry, particularly the soft-coal industry, needs more current information as to its general condition. If it is not willing to undertake voluntary even though incomplete reporting, it must always face attempts to compel the collection of these data.

It is agreed that there is little or no legal ground on which the government can compel such reports, but it must not be forgotten that time can remedy that remissness in the law.

A Lesson in Power-Plant Design

THERE are two aspects to the subject of power generation of vital interest to coal men: The cost of power to them as consumers, and the decreased demand for coal as efficiency in its use mounts. The direction of movement today is toward utilization at mine power plants of what otherwise would be waste and the demand from distant power plants for the higher grade fuel.

The power-plant engineer who visited the recent Power Show held in New York has gone back to his work with a new vision of the future. The time once was when the power plant was laid out and erected with no thought of the efficiency with which the plant was to operate. This was a question which was supposed to depend more upon the ideas of the operating organization than the equipment put into the plant. Power plants were built and experimentation carried on afterward. Today every detail of the plant and its operation is figured out first and every item and piece of equipment must fit into the plan for most efficient operation. Long before the plant produces power close approximate operating data are available.

The most uninitiated engineer could not help but be impressed with two important facts as he viewed the Power Show exhibits. The first is that the generation of power is developing into a highly specialized industry with hundreds and thousands of pieces of apparatus designed to obtain the highest degree of efficiency in the handling and burning of all kinds of fuel. The second important fact is the rapid stride made in the utilization of the small sizes of coal. Stokers, pulverizers, furnaces, boilers all are being adapted and perfected for the utilization of what we have always considered waste. With the perfection of this equipment and advancement in control and metering accessories we are seeing the power plant revolutionized. Power plants now ten years old are obsolete and must go to the scrap heap unless revamped.

Keep an Eagle Eye on Mine Supplies

THERE is a more or less exact level at which every coal mine's stock of supplies should be maintained. Keeping it there is more of an art than many a veteran mining official may imagine. And because he does not imagine it he also probably never thinks of computing the cost of carrying too much stock—or too little. Yet all the while his company may be paying heavily for this omission.

The generous habit of buying a gross of brake shoes at a time, even though it takes a year to use that many, simply means that a certain number of dollars that might be working elsewhere for a mine company are kept "frozen" in brake shoes. This loss might be greater than the discount obtained by quantity buying. Who knows, if nobody in the company takes the trouble to figure out after a time study of brake-shoe consumption by that particular company?

On the other hand, penurious buying, aimed to prevent the loss of capital working value, might reduce the stock of brake shoes too low. This would not only deprive

the company of the quantity-purchase discount but also might easily cause the tie-up of equipment waiting for shoes. Here again a loss would ensue, so that the total loss would be greater than that caused by overstocking. This situation is applicable to almost any line of supplies in the whole stock at a mine. The subject is worthy of closest study, especially by those operators who have never delegated a good man to make a careful survey of the problem as it applies to each particular property.

One authority says the cost of carrying excess and obsolete stock in this country amounts to as much as 3 per cent a month, which means \$360 a year on every \$1,000 invested in stock! Mr. Hutchings, in his article in this issue, points to this astonishing expert opinion and urges mining men to watch their stock turnover, to protect the supplies on hand from depreciation, and to find out what their excess stock losses are. It is sound counsel.

West Virginia and New York

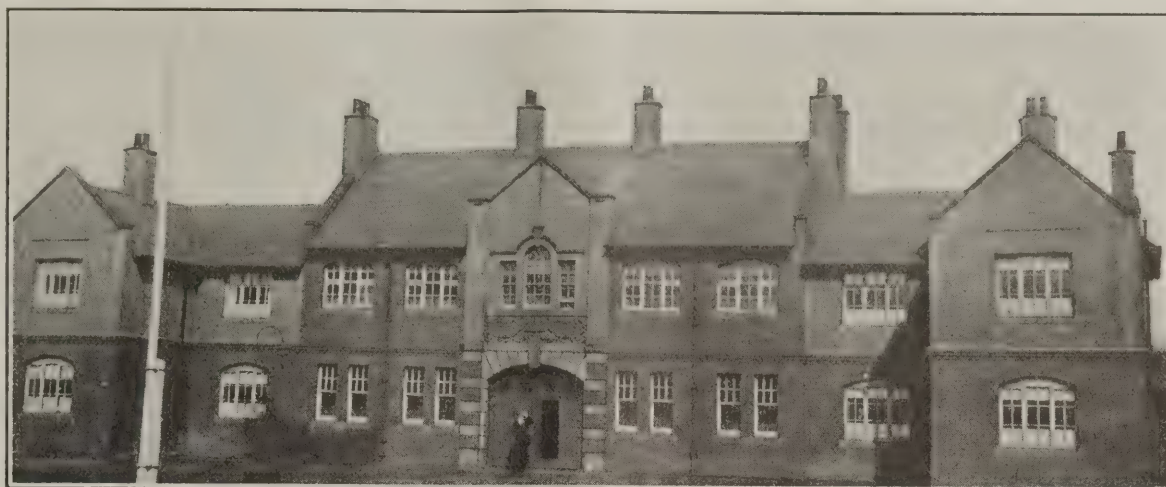
AN ATTRACTIVE little booklet, excellent propaganda, favorable and unfavorable, truthful yet not recriminative, broad minded and convincing, has been written by Phil M. Conley, managing director of the American Constitutional Association, Charleston, W. Va., an organization on which serves Governor E. F. Morgan and I. C. White, the well known geologist of Morgantown, W. Va., and several representative citizens of West Virginia towns. The book is entitled "Life in a West Virginia Coal Field," and it studies conditions in fifty-eight Kanawha and Coal River villages.

Reading it, one feels disposed to wonder if the people of New York do not need some counter propaganda to spread about the valleys of the Kanawha and Coal River. So much has been written about its bandits, its robberies, murders and arson, its night life, tango lizards and giddy whirl of fashion, its mayors and aldermen, the high death rate on the city streets, the squalor of its tenements, its cold-blooded capitalists and its bucket shops, its missing children, its loveless homes and its divorces, its illicit bars and its dope fiends, its crowded schools and its not-too-clean politics, that it also needs a vindicator.

It surely needs to convince the inhabitants from Charleston to Thurmond and to Raleigh and beyond that the people of New York really are home-loving, industrious and dependable, with self-respecting homes, a happy, kindly even religious folk, the kind of men and women whom to know is to like, whom to meet is to trust. They need to undo the work of the moving-picture houses and the press, which takes almost pornographic delight in ferreting out evil rather than virtue.

We propose therefore that the American Constitutional Association survey New York also and deliver for the denizens of that city that same unvarnished tale that they have written of the coal fields contiguous to Charleston. For New Yorkers also are traduced and misunderstood. Their evil all report, their good qualities few recall.

Yes, they need Phil Conley to come to their rescue and let the world know that after all is said New York City is as good as Kanawha, Fayette, Boone, Raleigh, Logan and Putnam counties in West Virginia and that having a larger and so a more adequate police force it has a better, if indeed not any too complete, a hold over its small but active criminal population.



Rotherham Rescue Station, Rotherham, England.

Coal Mining Institute Seeks

Cure for Frequently Recurrent Mine Explosions

Ryan Gives an Account of His European Trip — Ashley Seeks Simplification of Coal Standards and Holbrook a Standardization of Mining Equipment — Chester Describes Air-Conditioning Apparatus

SHOT through and through in every part of the sessions of the Coal Mining Institute of America in its meeting of Dec. 19-21 in Pittsburgh and vicinity was the thought of safety provisions against the recurrence of the many mine explosions which recently have caused a large loss of life. The study concluded with a visit to the U. S. Bureau of Mines' Experimental Mine, where a test explosion gave once again conclusive evidence of the dangers of coal dust.

Alterations to the auditorium of the Chamber of Commerce Building, in the downtown section of Pittsburgh, which for several years has been the meeting place of the Coal Mining Institute of America, shifted this year's sessions to the lecture hall in the building of the U. S. Bureau of Mines. On the first day about 100 men attended the morning session and 250 men the afternoon session. H. D. ("Joe") Mason, secretary and treasurer, reported that the institute has been swelled to an enrollment of 2,631 members by the addition of 543 new members, 180 of whom were obtained by President Richard Maize. He reported that the bank balance was \$2,139.78 including \$1,000 in Liberty bonds. The total expenditure during the year was \$5,112.03. The tellers declared that M. D. Cooper was elected president and Nicholas Evans, Richard Maize and Dr. E. A. Holbrook were elected vice-presidents for 1924. The vote also showed that H. D. Mason had been elected secretary-treasurer.

After a brief address from the president, Richard Maize, in which he gave his ideas as to "What is the matter with the coal business," Dr. George H. Ashley, state geologist, of Harrisburg, Pa., delivered an address on "A Practical Classification for the World's Coals,"

in which he assumed 7 per cent as the normal ash and divided the coals according to their percentages of fixed carbon, equating those portions of the coal which were not ash to 93 per cent. He classifies the coals according to their carbon content, each class covering a variation of 7 per cent in that content. Thus midvolite was 63 per cent of carbon, and the classes above and below are lovolite, with 70 per cent of carbon, and hivolite, with 56 per cent.

The various classes of coal according to Mr. Ashley are anthracite, semi-anthracite, loorvalite, lovalite, midvolite, hivolite, hiervolite, moistvolite, himoistite and lignite. A committee was appointed to confer with Mr. Ashley relative to the preparation of a coal classification, the membership of which is as follows: A. C. Fieldner, U. S. Bureau of Mines; W. E. Fohl, consulting engineer; A. R. Pollock, general manager, Ford Collieries Co.; E. A. Holbrook, dean, School of Mines, State College, Pa.; F. B. Lockhart, coal broker, and J. J. Rutledge, chief mining engineer, Maryland Bureau of Mines.

In the discussion Dr. Ashley was asked if analyses could be used to identify seams and he replied most unqualifiedly "No," because the analysis of any seam varies greatly from place to place. W. L. Affelder asked why the coal in the upper part of the Pittsburgh seam is higher in sulphur than in the lower part. Dr. Ashley said he believed the cause of the phenomenon is leaching.

In answer to a question by W. E. Fohl as to whether coal can be classified as to caking qualities he said that actual test was required to determine that property. Dr. Fieldner approved of the simplicity of Dr. Ashley's

classification, as no figuring was needed in making use of it. He asked if the moisture content taken is that found in the coal when received, Mr. Ashley replying that for court cases it would be necessary to establish some standard specific method of determining the moisture content of the coal.

The first query in the question box was, "Does dynamite exert a greater force downward or does it exert the same force equally in all directions?" It was quickly answered, Jesse K. Johnson, of Bolivar, Pa., leading the discussion.

W. L. Affelder asked if tests have been made to determine the relative directions of force. C. S. Jones answered that dynamite in exploding acts equally in all directions. J. E. Crawshaw, of the U. S. Bureau of Mines, referred to Dr. Monroe's tests in which blocks of compressed guncotton were detonated on and under iron plates. The same results were obtained in either case. Dynamite produced the same relative effect in blocks of lead regardless of its position with respect to the sides of the cube.

Dr. E. A. Holbrook, of Pennsylvania State College, explained to the meeting the work of the American Engineering Standards Committee, formed in New York to standardize materials and practices (1) in general engineering, (2) at sea and (3) in the mines. He said that the national engineering societies are behind the move. The purpose of his committee is to study and formulate rules for explosives, underground electrical systems, safety lamps, etc.

As chairman of the committee on the correlation of mining materials and practices, he invited the institute to appoint a committee of two to work with his committee. Its main aim is to set standards of safety. The committee appointed consisted of Thomas A. Mather, state mine inspector of Tyrone, Pa., and Rush N. Hosler, superintendent, Pennsylvania Rating Bureau, of Harrisburg, Pa., with Dr. E. A. Holbrook as chairman.

J. T. Ryan then read his paper on "Some Observations on Mining in Europe," using about a hundred

lantern slides. He laid much stress on the safety methods of Europe, especially in regard to the avoidance of coal-dust explosions. He said:

"One of the outstanding safety measures in Great Britain and France is corrective of the hazard of coal-dust explosions. This subject has been given much attention and study by their technical and research men. Their investigations have determined that it is impossible and impractical under their conditions to render coal dust inert by wetting, and these conclusions were the basis of general regulations effective July, 1920, in Great Britain, which are as follows:

"(a) That the roof, floor and sides of the roadways, to within 10 yd. of the working face in dry and dusty mines shall be treated with incombustible dust, so as to insure that, throughout, the mixture does not contain more than 50 per cent of combustible matter; or

(b) They shall be so treated with water as to assure the dust being always combined with 30 per cent, by weight, of water in an intimate admixture."

"Rapid compliance with the provision has been given and, in consequence, in many instances roads are being stone-dusted right up to the working face. In my opinion it will be impossible for an explosion, once initiated, to extend any great distance in any mine complying with this regulation. The mine inspectors check up the condition of the dust by taking samples from the roadways, which samples are then analyzed by the Mines Research Testing Station.

"In France, regulations are somewhat similar, except that the dust must contain 70 per cent of incombustible matter, as against 50 per cent in the British regulations.

"Our practice in this country at the present time has been to depend upon wetting or humidification. In Europe they do not think this is dependable enough. There is one good reason, however, why they cannot resort to humidification in many of their deep mines, and that is the temperature, for at the present time it is about at the limit in which men can work. The temperature in some of the mines runs from 75 to 85 deg., and if air that warm were highly humidified, it would be impossible for men to work in it.

"Another important safety precaution taken in those European countries is the almost exclusive use of closed lights. In Great Britain in 1922, with 921,737 men employed underground, there were in use 584,404 flame safety lamps, 294,593 electric hand lamps and about 2,000 electric cap lamps. The British were slow to take up the electric lamp, but they are now rapidly replacing the flame lamp, and the electric cap lamp is just beginning to come into favor, and Scotland is the country that is showing this sign of progress.

"Rescue apparatus and mine-rescue training is made compulsory by regulation in all of these European countries, and in Great Britain these regulations date back to 1913. Briefly, they require that all coal mines and all oil-shale mines shall have the protection of approved rescue apparatus and trained brigades. Each mine may have its own individual rescue station, the number of men to be trained being regulated by the number of employees, or a group of companies may combine to form a central rescue station, the requirements being that this station maintain a permanent rescue corps which will serve all mines within a radius of ten miles from the station. The central rescue station is popular and most of the mines operate under such protection."

In the discussion of the paper Mr. Ryan was asked



JOHN T. RYAN

Mr. Ryan came back from Europe convinced that that continent was on the right track in advocating and enforcing the stone-dusting of mine entries.



COAL MINING INSTITUTE OFFICIALS, 1924

From left to right—Richard Maize, president, 1923; vice-president, 1924; M. D. Cooper, president; Nicholas Evans and E. A. Holbrook, vice-presidents.

if rock dusting could be used to advantage in the United States as it is in Europe. Mr. Ryan replied, "Absolutely." He said that the argument for stone dusting was well exemplified by the conditions at the mines of a company in an arid region of this country. There a complicated humidification system had been installed which will cost 29c. per ton of coal mined. Rock dusting would not cost more than 5c. per ton.

Question 2, "Which type of safety lamp wick gives a flame that is the more sensitive to gas—the flat or the round wick?" being presented, J. W. Paul, of the U. S. Bureau of Mines, remarked that with 2½ per cent of gas the round wick and with 3 to 4 per cent the flat wick gave the better showing. At low percentages there was no difference.

Question 3, "Is radio proving of any practical use in coal mining or for mine rescue work?" was answered by J. Jackowsky, of the U. S. Bureau of Mines. Mr. Jackowsky said that the telephone was a satisfactory way of transmitting messages except after an explosion, and it was hoped that radio might be developed to serve in its place under these conditions, but practically none of the present apparatus is sufficiently moisture- and water-proof for continuous exposure to the mine atmosphere.

A radio receiving set that had been left underground for about six hours became exceedingly inefficient. The Bureau of Mines has been using (1) ground-conduction methods; (2) induction signaling of both high and low frequencies; (3) wired radio over underground power and telephone lines, trolley wires, rails and pipes; (4) radio; and (5) electrical geophone and auxiliary signal equipment. In Mr. Jackowsky's opinion wired radio utilizing compressed-air or water piping, car rails, etc., as the conducting media is to be preferred. Dirt and water over these conductors and numerous breaks on the metallic circuit do not prevent the transmission of signals.

At the banquet in the evening speeches were made by Dr. Daniel L. Marsh, Captain Irving O'Hay and a comedian representing himself as the Hon. Abe Potash, a coal operator of Brunswick, N. J. The addresses were

unusually notable, Captain O'Hay especially ingratiating himself with his audience.

At the morning session of Dec. 20 W. E. Fohl, as chairman, opened up the meeting with a discussion of question 4, "What precautions should be taken in the installation of an electrically driven exhaust fan at a mine giving off methane, to prevent the gas in the return air from becoming ignited by the motor when re-establishing ventilation after the fan has been stopped for a sufficient time to allow the mine to fill up with gas?" The report of this important and lengthy discussion will appear in next week's issue.

The next question was: "What is the practical limit to the splitting of air currents?" D. N. Hubbell, mining instructor, said that the splitting should be done so as to supply at least the legal quantity of air to each split but also so as to afford each split enough air to prevent harmful accumulations of deleterious gases. Within these limitations he would advise as much splitting as possible, as splitting reduced the resistance of the air.

The sixth question was:

"What changes in roof, bottom and coal are met when approaching a fault?" Joseph Williams, state inspector at Altoona, Pa., said that petrified wood often was found when approaching faults in the First Coal Basin and Dr. Thiessen requested that such finds be sent to him. Much petrified wood is found in Europe but in the United

States such material was unusual. He would be much pleased to have an opportunity to examine it. Mr. Williams was of the opinion that the wood was of a date much more recent than the coal which was faulted.

Speaking of "faults" of erosion, or wants, R. D. Hall said that as they were excavated in the seam they often were accompanied by drift matter which had lodged as drift wood even now does at the bank of a stream. This drift has later been filled with shales or sands and as a result the coal is covered by material filled with vegetable matter. This material gave a most uncertain roof and he recalled a man being killed in a heading purposely driven narrow toward a want. The material which fell was full of the imprints of ferns. He had noted that as a rule in a certain want the ferns lay, not as they had fallen, with the maximum diameters in all directions, but as they had been rearranged by the stream, with their major axes in the direction of stream flow.

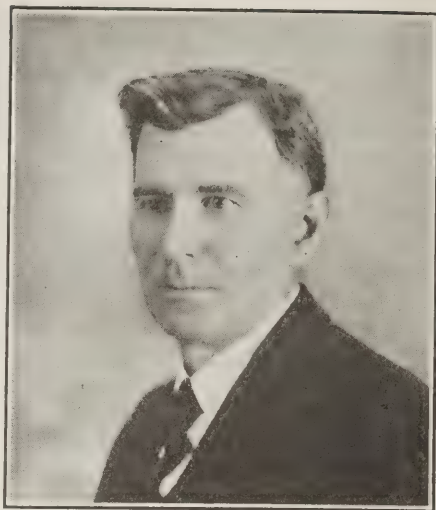
He added that at this particular want the coal at one place suddenly thickened from 3 to 6 ft., as if the bed of peat had been torn away bodily and dislodged, landing entire on the top of another area of eroded peat. Without attempting any accuracy he thought the area of the displaced and deposited peat block would cover roughly an acre.

Joseph J. Walsh, Secretary of Mines, State of Pennsylvania, then addressed the institute on "Mine Fires and Some Methods of Extinguishing Them." He advocated the use of flue gas as cooled in a tubular cooler and then sprayed by falling water. He said the



W. E. FOHL
Consulting mining engineer,
Pittsburgh, Pa.

purpose was to supply so much incombustible gas that no air could enter the fire area. He believed this to be possible if the right precautions were taken to close in all openings as far as could be arranged. He advocated closing the return first and never the intake. He said that there had been twenty - seven coal crop fires



JOSEPH J. WALSH
Secretary of Mines, State of Pennsylvania; advocate of flue gas for extinguishing mine fires.

in the anthracite regions; one was sixty years old, one twenty years. However old they might be, none of them had hitherto been extinguished and many means had been tried in every instance—flooding, direct fighting and sealing. One mine was sealed for eighteen years and no sign of any fire remained till an attempt was made once again to enter the fire area. The fire that had slumbered for years then awoke again and soon raged as menacingly as ever. He declared that, with 100 per cent excess air in the furnace, flue gas containing 5 per cent of oxygen could be generated, and in such an atmosphere no fire would continue to burn.

In the afternoon session of Dec. 20, Thomas Chester, Mining Engineer, American Blower Co., Detroit, Mich., read a paper entitled "New Data Concerning the Humidification of Mine Air," in which he described the Lide method of conditioning air and driving the air thus treated by an auxiliary fan into the intake entry fan drift would have to be concrete.

The conditioned air is at the temperature of the mine and fully saturated at that temperature. Mr. Chester said that the conditioning of air had been proved possible in the manufacture of matches, where the heads were dried in a factory the air of which had been conditioned. It had also been used in motion-picture film factories.

Questioned as to the cost, he said that an installation to condition 100,000 cu.ft. of air per minute would cost, including the fan but exclusive of the second drift opening, about \$3,000. The operating charge would be equivalent to the cost of about 0.6 ton of coal per hour plus the labor involved, which would be small. In addition there would be the power involved in driving a 10-hp. motor, which would be ample, as the water gage needed to drive the air through the conditioning apparatus would be about $\frac{1}{2}$ in.

Mr. Chester said that stone dusting the entries would not solve the problem of making a mine safe, for the fine dust tended to settle not in the main entries but rather in places where the current was relatively sluggish. The high-speed currents dried the mine and also carried the dust. Thus in the more quiet places the finest and most dangerous dust was constantly being deposited.

Asked whether it would be necessary to concrete the fan drift he replied that no great heat was required at

any place and consequently the natural strata did not tend to disintegrate. For this reason no part of the fan drift would have to be concreted.

He also said there would be no fog if the temperature of the conditioned area was kept continuously at 60 deg., for it would then be at the temperature of the mine itself. This would not wet down the mine, for the air would never be supersaturated, but it would prevent the mine once wetted down and containing natural moisture from drying out.

Should the pressure of the fan of the conditioning apparatus be made high enough to compel the air to leave by the portal of the mine, this air, being cooled in winter by the outside air, would cause a fog at the drift or shaft mouth. The same fog would be caused there as at the chimney of the main fan, but as it would be a surface fog it would not occasion inconvenience.

He declared that when no men were in the mine the air could be conditioned to a temperature of 75 deg. In that case a fog would be formed, as the mine would not sustain such a temperature. Under these circumstances the mine would become wet with water dripping from the air. It might be well to condition the air at this higher temperature out of working hours.

J. W. Paul said that the injury to the roof by the crude methods of moistening usually adopted was due not so much to the heat as to the changes in temperature, which caused the roof at one time to expand and at another time to contract.

He added that even where the air was incompletely saturated it had been found that droppers and globules of water appeared in the roof. These globules were frequently ascribed to water deposited by condensation, but he believed that in most cases, as the air was not saturated, they came from the moisture of the workings themselves. Edward Steidle believed that rock dusting might profitably be used in connection with some such process of air conditioning as Mr. Chester had described.

Under the leadership of Nicholas Evans, state mine



M. D. COOPER
Newly elected president of the institute; assistant general superintendent, Hillman Coal and Coke Co.

inspector, of Johnstown, Pa., three questions were considered. The first of them was: "Where does the most dangerous dust lie—on floor, ribs or timbers?"

One of the members connected with the Keystone Coal Co. said that he had sprinkled his roadways day and night and still they were not as damp as he would wish. He thought the haulageway dust the most menacing of any. R. E. Kirk said that since the Gates disaster the H. C. Frick Coke Co. had classified its mines into dusty and non-dusty mines, and in the former allowed no shooting off the solid and required that the room be sprinkled before cutting, before shooting and after shooting.

J. O. Durkee said that at the mines of the Bethlehem Steel Co. the dust at the face was the cause of the greatest apprehension. Water cars and the sprinkling of coal cars took good care of the haulageways, but the rooms were kept free from dry and dangerous dust only with difficulty. In many of these, pipes had been carried to the working faces, and as a result the officials at the mine were able to keep the dust wet.

Someone from the Oak Creek Mine, Routt County, Colorado, described the conditions at that mine, where the men could not see one another's light across a 40-ft. face. Now by the use of a sprinkling line on the cutter bar the dust is satisfactorily wet down so that it is no longer dangerous.

Nicholas Evans much regretted that any one should have invented the use of the word "sprinkling" because "drowning" the dust was what was intended. Mr. Paul said that as the finer dust was the more sensitive to explosion it was the kind most to be feared. It lodged in gobs and on timbers and was exceedingly dangerous.

The dust on the lower half of the mine rib in steep and mule-haulage roads and especially on those that were wet was relatively harmless. In fact in some mines the ribs are splashed with mud for some distance from the floor. It must be remembered that two one-hundredths of an ounce of coal dust per cubic foot of entry will be enough to make an explosive mixture of coal dust and air. This much dust would just cover a silver quarter.

The British requirement of 30 per cent of water in a place which did not have to be sprinkled was a requirement with which few sections of any mine could comply. All the recent explosions in Great Britain have been in damp places, and these have been stopped only where shale dust areas have been reached.

Question 9: "What are the most common causes of the ignition of gas in coal mines?" was answered by



THOMAS CHESTER

Advocated that the air entering the mine be conditioned as to moisture and temperature so that it would keep the mine wet yet free from fog.

that was ignited by safety lamps which were either defective or unlocked, and 400 by ignitions of gas or dust by electric arcs. Two hundred men had been killed by explosions due to ignition of gas by men who were smoking or preparing to smoke. He said that all open lights should be abolished.

A spirited discussion arose as to Question 10: "How tight should posts be set in rooms and entries?" Crawford Wilson remarked that the height of the seam, the nature of the overburden and the pitch had much to do with the problem. He believed that props should not be set too tight but certainly should be set sufficiently snug that they would not be knocked out.

Edward E. Girod, state inspector, of Masontown, Pa., remarked that some persons put in props so tight that they were almost broken by the strain of setting. Some men put up a prop and fail to make it tight, expecting later to wedge it tight or hoping it will get tight later. That also is wrong, as someone or something may cause it to fall, with consequent injury.

Still it is dangerous to prop a roof that has sagged or drawn, so as to lift the rock. The strain of forcing the rock back into place may cause it to break. It would be more permissible to post solid rock tightly. He recalls a case where a foreman was extending a side-track and making the roadway wide for that purpose.

The foreman put a row of extremely tight posts up the center of the roadway. Mr. Girod warned him of the consequences. Some time after about 180 carloads of rock were removed and about 200 more were lying in the roadway. The props had broken the drawslate.

About 200 members attended the demonstration of Dec. 21 at the U. S. Bureau of Mines' Experimental Mine, Bruceton, Pa. An explosion of dust from the West Kentucky Coal Co.'s No. 9 mine was successfully produced by a blown-out shot in which 4 lb. of black powder was used. The tunnel was provided with 1 lb. of the dust described per lineal foot of entry, 20 per cent of the dust passing a 200-mesh screen. The flame shot 400 ft. beyond the dust bed, but was stopped by a Rice barrier. No gas was present to aid ignition.

A test was made to show that permissible explosives used in proper quantity will not ignite dust. Powder was tested also with the ballistic pendulum. Another test showed how a keg of black powder could be ignited by contact with electricity, and another exhibited the fact that coal dust blown into the air may be ignited by an ordinary flame.



REAR VIEW, NEW RESCUE STATION, LENS, FRANCE
A station that would cost in America about \$300,000.

It Is Easy to Waste Money on Mine Supplies

Buying More Stock Than Is Needed and Allowing It to Depreciate on Hand a Costly Leak in Many Organizations—Computing That Cost a Little-Known Science But Worthy of Close Attention

BY NEILL HUTCHINGS
Birmingham, Ala.

WHAT is the cost of carrying a stock of supplies at a coal mine? And, more important, what is the cost of carrying too much of such stock?

Here is one of the important cost elements of business, yet it is a little-known element because it is rather intangible and difficult to put into figures. Many a wide-awake mine manager gets a more or less definite idea of whether he has on hand too many machine parts, too much wire rope and the like, by watching turnover. But even a live manager may not realize how much the company suffers by losing the working value of dollars expended for dead material. Nobody has worked out an exact system for him to follow, but it is worth while for every mining company to study the matter. An illuminating statement on this subject was made recently by a man who since the close of the war has engaged in reducing and liquidating the inventories of one of the largest concerns in our country. He says the cost of carrying money in excess and undesirable stores and supplies rather than in active business amounts to as much as 3 per cent per month! This is 36 per cent a year and means that for every dollar's worth of supplies bought and kept for a year, 36c. is lost. For every \$100 worth the loss is \$36; for every \$1,000 worth, \$360, and so on. This cost is made up of such factors as the earning power of a dollar actively employed in the business, losses from depreciation, obsolescence, shrinkage, expense of handling, caretaking, watching, renting, accounting. In addition, there is the cost of added storage room for surplus material and the waste in use which naturally comes from having plenty to draw on, thus dulling the exercise of economical use of supplies and materials.

This man probably has come very close to computing the cost of carrying dead stock. If he has, then no doubt many concerns are losing big money. For an inventory devoid of surplus, obsolete or excess material is hard to find nowadays.

There are two schools of thought regarding the charging of supplies and materials to mine costs. One, which is the older method, is to charge cost with materials as they are purchased. In this plan there is no inventory of stock on hand. Everything is charged out. Many of the older men in the mining game remember when this plan was general. A man thought twice before he signed an order for a carload of costly supplies. He knew his cost would have to stand it. This was the plan's best feature, for the cost sheet of

a coal mine is its manager's pocketbook. He wouldn't buy until he had to.

But it had many objectionable features. One month's cost was charged with materials used in later months. Such a plan destroyed comparative cost value. It really meant that only yearly costs reflected facts. A man could not tell what his cost would be from month to month and so he never knew exactly the relation of his income to outgo for any given month.

This older plan has been supplanted by a generally modern one founded on the principle that monthly cost should be charged only with materials actually consumed and used in that month. It is the better plan of the two. Still its practice value has certainly been less-

ened by the fact that mine managers who always pay chief attention to the cost sheet have paid too little heed to the volume of cash tied up in stock.

This modern plan requires a stock inventory. It has been, and always will be, the most natural thing in the world for the operator of a mine to insist that his storekeeper keep on hand all the things the mine will need, not only for current operations but for every conceivable emergency. He feels about his storehouse stock like the man in Texas used to feel about his gun. He did not need it often, but when he did need it he needed it bad. So under this method stocks grow. Instead of ordering one or two pieces of repair parts the buyer orders a half dozen. Maybe they come a little cheaper that way. Instead of one month's supply the storekeeper is told he had better order two, the excuse being "We will use it anyway and you'd better keep plenty on hand." This plan as a rule soon accumulates some excess, surplus, semi-obsolete and even worthless stock on hand.

Yet this plan is right. Cost should be charged only with the materials used in each cost period. It is the correct principle. But it does mean eternal vigilance over plant requirements carried in inventory. What is really needed to make the plan more nearly perfect is a definite system of ascertaining the cost of carrying stock.

Calculating turnover is a good way of getting at stock carrying costs but this process involves innumerable factors, such as proximity to market, seasonal requirements and variations in market prices as affecting purchases; so turnover is, after all, only a rough guide.

Applied common sense is the essential thing. By this is meant the use of common sense to determine how

FIND OUT

Does your mining company lose \$360 every year on every \$1,000 invested in mine supplies in stock? In this article an authority is quoted by Mr. Hutchings as saying that this astonishing rate of loss is suffered by many a concern. The fact that few mine managers know what their dead-stock losses are is reason enough to convince them that they should *find out*. There are suggestions here to guide them.

much stock of this and that shall be carried. Somewhere in every mining concern big enough there is a man with this kind of sense. Applied common sense simply means putting him at work on the problem. He is the fellow who sooner or later will prove what a dollar invested in dead stock costs. This fellow will show how poor a guide turnover is, by proving that in a majority of stocks 75 per cent of disbursement value is for material representing less than 25 per cent of total stock. He will do more than that. He will search out the excess and surplus and scrap it or sell it. By hard work he will determine, item by item, the lowest possible limit to carry without hurting operations. That really will be the cream of his work, for it is the only practical thing to do.

An operator can not set an average cost for the stock as a whole. His "common-sense man" will eventually keep him from buying excess supplies. That man will soon be authorized to O.K. all purchasing orders, both to see what he can do in the way of substitution for materials already bought and to buy less than somebody has ordered. He won't let the company buy anything that *might* be needed. The cost of this is too high. It is too much like letting a man name his own salary regardless of his ability.

The cost of carrying surplus supplies is an intangible thing and probably it is not a definite cost figure. Even if we assume 3 per cent a month to be entirely too high and call it 2 per cent a month, some very interesting calculations can be made. For example, suppose a mine concern has a total inventory of supplies of \$500,000. Assume further that the excess stock—i.e., supplies bought and on hand in advance of actual need—is \$50,000. Then it follows that the monthly cost of having this surplus stock is \$1,000.

Carry this thought further along and think of two concerns having this same amount of surplus stock. They begin to liquidate it at an even rate. The one that can get rid of it in six months while the other takes twelve will save \$6,000 more than the latter. This is the earning power of the money released by this process.

ALL LIKE TO PICK NEW "STUFF"

In connection with this thing of too generous buying, carrying surplus supplies and suffering actual monetary loss as a consequence, it is not surprising that American industry, like present-day individuals, has wandered far afield from old-fashioned thrift and saving principles. It is not an uncommon thing to find even at the most modern mining plants a lack of care in providing proper storage facilities for supplies. Costly wire rope sometimes is exposed to weather until some of the strands have rusted through. Iron and steel stock often is left exposed until rust has pitted and injured it so badly that it is useless. It is a natural instinct with all of us to like to use new and shiny material. Mine mechanics, electricians and blacksmiths will take the newer stuff every time if they can get it. It pays to keep material in attractive condition, lest it be left to spoil.

Another thing productive of considerable economy in the storing and handling of mine supplies is to concentrate. Don't permit supplies to be scattered all over the mine plant. Put them in one place, as much as possible inside a central storehouse building, and the rest under fence right around it. To permit materials to be unloaded and stored just anywhere that happens to be convenient is to deliberately invite loss. The stock

is likely to be used indiscriminately, stolen or allowed to suffer by reason of neglect.

Protect heavy supplies that must be kept in the open, from weather. Both sun and moisture are directly detrimental to certain materials. Light, for example, has a tendency to rot belting. Consider mine supplies as just another form of money and treat them as money.

Mine foremen, electricians, mechanics, blacksmiths, superintendents, managers, can do their concerns a lot of good by studying closely the care and use of mine supplies and materials. After all is said and done, they are the men who create stock, and if there is such a loss as 2 or 3 per cent a month on surplus and excess stores, they are the men responsible for it. Next time one of these men orders or draws a requisition, possibly he can do without something he is buying and cut down the order to fit immediate needs. It will reduce the stock-carrying loss and will increase the worth of that man to the concern and enhance his own self-respect. In fact, whenever a man learns to work for a concern and care for its dollar as much as he does for his own earnings, he has started on the trail that leads to his own individual success.

Electric Signaling Devices

Mines Operated Electrically Must Adopt Electric Signals—Signals for Emergency and Time Calls

By T. R. HAY

WITH the gradual passing of steam drives for machinery around the coal mines and the increased application of electricity to old and new fields there has arisen a necessity for some efficient type of signaling device for alarms or for other purposes.

The natural trend of development has been to electrically operated sound signaling, as such a device can be made automatic, may be installed in any location and operated with but a limited amount of attention.

The electric siren with its peculiar penetrating quality of tone gives a distinctive call for help—a fire emergency or danger signal—that is instantly recognized as such. Its very sound is a warning, a rallying call for assistance, because it is so different from all ordinary factory whistles, fire bells or other alarms. The application of an electric signal does not find itself limited to the field of emergency calls, but in many

places it is used to great advantage as a time signal.

At coal-mining operations a whistle may be used as a work signal, an emergency fire or accident signal, or for both. At many coal-mining operations the miners often live at a distance from the mine workings. Because of the distance element, there may

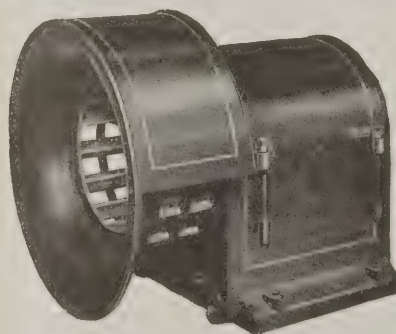


FIG. 1—SINGLE-HORN SIGNALING DEVICE

Some of these signals are made with two horns, one on each end of the drive shaft. The small sizes have one horn, and the largest sizes two horns, in this style of construction.

be more or less irregularity both in starting and quitting work, especially the former. With, say, 100 men employed, if an average of 50 per cent are tardy ten minutes each day in starting to work, 500 work minutes, or $8\frac{1}{2}$ hours per day, are lost. This comes to something over 160 work hours per twenty-day month. In terms of tonnage lost due to tardy attendance, this means a considerable item over a long period. Punctual attendance is worth real money. In the winter period, when coal is in demand, when the price is relatively highly, and when, on account of uncertain car supply, it is desirable to make maximum use of the hours when the mine does work, this matter of punctual attendance becomes more important than in the summer months, when demand and price are relatively low and car supply fairly dependable.

PROVIDE PROTECTION AGAINST WEATHER

The electric siren whistle consists of a small motor with the shaft extended on one or both ends, depending on whether it is of the single-head or the double-head type. A slotted aluminum rotor on this shaft extension revolves under a conical-shaped steel slotted "horn." The air is taken in at the ends, which are of cast iron, and the sound comes out on the periphery of the "horn." A sheet-steel cover, usually bolted to the horn or horns, protects the motor and bearings from rain or from any foreign material. The motor leads are brought out through this cover, which for one type at least is permanently fixed in position. Oil cups, located on the outside of the case have spring caps, thus making oiling convenient and at the same time protecting the bearings and keeping the oil free from water. The motor base



FIG. 2—SIGNAL IN POSITION

For long-distance service, it is important to mount signals well up in the air so that the sound waves will not be reflected by buildings or other structures.

is substantially made and is of cast iron.

The siren commonly used about coal-mining operations is made in the single-head and double-head types. The single-head siren can be heard over a radius of approximately three-quarters of a mile. The double head siren, which is the one most commonly used, can be heard over a radius of a mile and a half to two miles. At many installations the siren can be heard a greater distance than stated above.

For best results the siren should be installed at least 40 to 50 ft. in the air and 10 to 15 ft. above any roof or other flat surface. It should

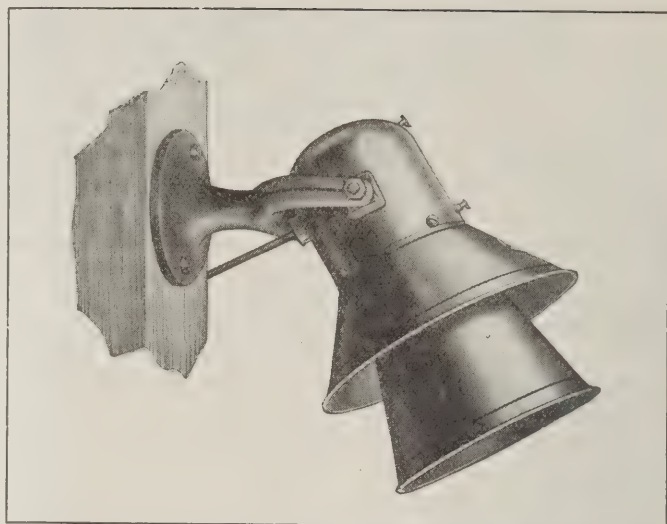


FIG. 3—A LOCAL SHORT-DISTANCE SIGNAL

Where the signal is to be used for short distances and yet be heard over the noise of running machinery, the above type frequently is used. Hoisting signals operated electrically give most satisfactory service at the coal mines.

be above near-by buildings or trees. The reason for such installation is because a roof or other flat surface directly below a siren acts as a sound-board and throws the sound waves up in the air instead of distributing them over an extended area. A good method of installing sirens is to set them on a crosspiece or tripod connecting the tops of two or more telegraph poles. The siren may be located on the top of a mine tippie, above the hoist sheave, or on a platform above a flat tippie or substation roof. The axis of the siren should be at right angles to the direction in which it is designed to distribute the sound. This is because, as previously explained, the air is taken in at the end through the cast-iron "horn" and the sound is forced out at right angles through the steel slotted portion of the "horn."

The siren may be operated by means of a knife switch located in the substation or at any convenient point. It also may be operated by means of a remote-control device, consisting of two or more "start" and "stop" momentary contact pushbutton switches, together with a magnetically operated circuit breaker. The use of this remote-control switch device enables the starting and stopping of the siren from more than one locality, such as the tippie, the substation, the superintendent's office or commissary.

The tone of the siren may be varied and a "wildcat" call obtained by manually opening and closing of the control knife switch. This "wildcat" call may be obtained automatically by using a motor-operated make-and-break switch. To get the proper effect, whether by hand or automatically, it is necessary to allow a sufficient time interval between the breaking and making of the motor circuit to enable the siren to slow down sufficiently to give a distinct tone difference.

The single-head siren weighs approximately 250 lb. and the double-head siren weighs approximately 350 to 400 lb. The siren is simple in design and construction and can be connected up without any special difficulty. All that is necessary is to install it on a secure base and connect the motor leads to the power supply. These sirens are supplied to operate on single phase, 110 or 220 volts, and polyphase, 110 to 550 volts. They can be used on either 25- or 60-cycle circuits.

Sirens also are furnished to operate on direct current

of any voltage, from 110 to 600 or 700. Operation on any phase a.c. or on d.c. at 220 volts or more is preferable because of lower starting current and better voltage regulation. The single-phase siren is equipped with a repulsion type motor with brushes; the polyphase siren is equipped with a squirrel-cage induction type motor; and the direct-current siren is equipped with a series-wound d.c. motor.

Coding or call signaling can be obtained with greater satisfaction with the polyphase a.c. motor or the d.c. motor than with the single-phase motor. The last-named type is not so satisfactory as the others because it is necessary for the brushes to lift from the commutator in order to obtain satisfactory tone effects. This requires that the siren slow down too much to give the desired results.

In addition to the single- and double-head siren discussed above, a small siren designed for local use, which can be installed indoors or outdoors, is manufactured. It is distinct in tone and because of its construction there are no parts to wear or get out of order. It has only two bearings, one at each end of the armature shaft with oil cups of sufficient capacity to require oiling only two or three times a year. The sound penetration is approximately 400 yd. and it is being used with success at many coal-mining operations where only local sound penetration is required.

Ejected Cement Gives Life and Strength to Mine Structures

Stoppings Readily Constructed with Concrete Sprayed from Nozzle—Gunite Frequently Substituted for Concrete in Lining Shafts and Slopes

BY A. F. BROSKY

Assistant Editor, *Coal Age*, Pittsburgh, Pa.

OF RECENT years projected concrete has been extensively used in the building of stoppings for ventilation or for sealing abandoned workings. Of the many types of stoppings constructed with the use of this material perhaps the most common one is a pack wall of slate or sandstone laid without mortar and sealed by shooting it with gunite on one of its exposed faces. Care should be taken to form an airtight seal, especially around the outer edges of the stopping. This is accomplished by extending the coating material beyond the points of contact by shooting the liquid mass over the ribs and roof. In consequence no air can pass through the coal at the side of the stopping or through the roof at the top of it.

Permanent and airtight stoppings are built in the Tropic mine of the Tropic Mining Co. (Ohio) by fastening a reinforcing mesh on props wedged so as to stand vertically against either rib. Behind this mesh is placed tar paper, which serves as a backstop for the shooting of the gunite, which is projected to a thickness of 2 in. After standing five years these stoppings are as intact as the day they were erected wherever the roof has held up. Under weak roof it would seem that a thicker wall would be desirable. In that case an alternative method of construction may be utilized.

Stoppings are erected in the Wolf Summit mine by setting two prepared wooden forms at a distance apart equal to the thickness of the stopping desired, which usually is 8 in. The box thus formed is filled from the top with gravel. The nozzle of the gun is then inserted

downward from the top, and the gravel is impregnated with gunite. After this wall sets the forms are removed elsewhere and the openings at the joints are closed with gunite. This stopping can be erected in 45 minutes of actual working time after all the material is on the job. The completed stopping is shown in Fig. 1. A similar construction (Fig. 2) was utilized in adding a vertical section of 6 ft. to a curtain wall in the shaft of this mine, which was left open at the bottom during the early stages of development.

SEAL OFF WATER AND GAS WITH GUNITE

Gunite also was used at this mine to form water dams and to seal off gas. Large quantities of this gas escaped from falls of rock, the roof breaking under the pressure of the gas pent up in feeders. The dams were placed at the dead ends of the two headings and were made 30 in. thick. They were built solid to the roof and ribs in the same manner as the stoppings already described. Behind these dams are water springs and also feeders of gas which showed 28 per cent of methane in tests made before the construction work was completed. This gas which repeatedly caused the limestone which is 15 ft. above the coal to break and fall was bled by boreholes drilled from the surface. The bottom is of soft clay overlaid with a harder material which leaks where broken. Consequently water seeped under the dam and through the fireclay and ran down the dip to lower workings. This seepage will be closed off by drilling vertical holes to a depth of 12 ft. and injecting gunite through them. The water accumulating behind the dams is piped to an open ditch.

Open ditches on the surface in hydraulic projects frequently are lined with gunite and this suggests another use for it underground. Where mine drainage on a large scale is accomplished by open ditches as it is in the mines of the Berwind-White Coal Mining Co., situated in the Wilmore Basin, at Windber, Pa., gunite, besides reducing the resistance to flow, would also facilitate the cleaning of the ditches.

USE OF GUNITE IN SINKING MINE SHAFTS

Shafts sunk through self-supporting formations, which, however, disintegrate in time may be lined with gunite instead of concrete wherever the water problem is not serious enough to require sinking under pressure. The engineers of the Oliver Iron Mining Co., at Hibbing,



FIG. 1—GUNITE-GRAVEL STOPPING AT WOLF SUMMIT

The stopping was made by erecting two forms and filling the intervening space with gravel, which was then grouted with the cement gun. The forms were removed after the mixture had set, and gunite was then placed on the exposed face, making a strong, tight and permanent stopping.

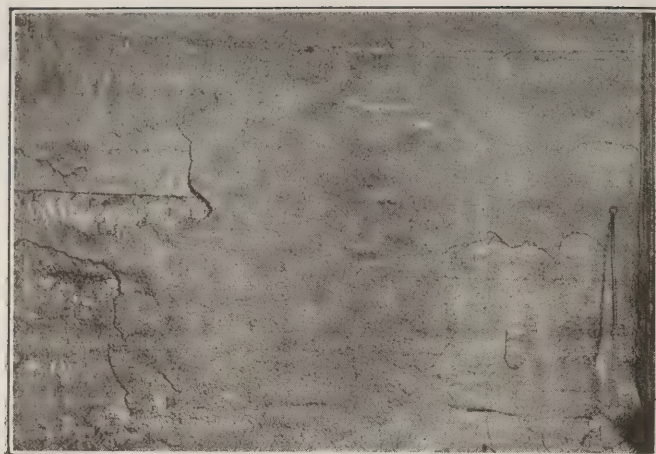


FIG. 2—CURTAIN WALL AT WOLF SUMMIT GUNITED

This wall is located at the foot of the shaft. One advantage of guniting is the ability to seal the edges and corners of the stopping where small leakages with other forms of bratticing allow much air to pass, especially where the water gage is at a maximum, as in this instance.

Minn., closely watched the action of guniting in preventing disintegration of such formation, and the results were so favorable that they are using it in sinking a shaft which will be lined by this method.

A reinforcing mesh is attached to expansion bolts placed on 30-in. centers on the face of the rock. Upon this approximately 2 in. of guniting is placed. This thickness is attained in two layers, the first being just sufficiently thick to come out to the mesh and the second being $\frac{3}{4}$ in. thick; thus the mesh is everywhere covered with at least $\frac{3}{4}$ in. of guniting. The first coating is allowed to set for several hours; it is then wetted down and the second coating applied.

When water occurs in the form of tiny streams or of thin films covering the surface of the rock it prevents the guniting from adhering. However, the small streams of water can be led to weep pipes and the guniting can be applied by coating the points away from the pipes first and then extending the coat toward them. Guniting can be applied successfully to a very wet surface by using a solution of sodium silicate (water glass) instead of water as hydrating agent.

ELIMINATES NECESSITY FOR TIMBER RINGS

To attach the guides, holes are drilled in the rock and in these expansion bolts are placed and grouted. Around these are built pads of guniting projecting sufficiently to act as seats for the base of the guide blocks. This provision eliminates the necessity of using timber rings around the walls of the shaft. Wooden buntons are placed across the shaft. These are attached to reinforced corbels built out with guniting from the sides of the shaft.

The cost of this lining is about 20c. per square foot not including the overhead. The cost of doing a similar job may be roughly estimated by bearing in mind that one bag of cement and 3 cu.ft. of sand will cover 11 sq.ft. to a thickness of 2 in.; that a crew consisting of a nozzleman and his helper, a gun operator and four laborers can apply each day at least 800 sq.ft. of guniting to a thickness of 2 in.; that the cost of drilling holes for bolts is approximately 5c. each; and, finally, that American Steel & Wire triangular mesh No. 068, or its equivalent, will cost about 4c. per square foot in place.

In many cases guniting may be substituted for concrete

in the lining of slopes. The extent to which it may be used on any one job depends upon the depth of the seam of coal below the surface and the nature of the overburden penetrated. Where a slope will stay open of its own accord, as in penetrating thick beds of clay and soft shales, obviously a concrete lining poured into forms must be used, as otherwise the requisite strength will not be attained, but where self-supporting shales and sandstones subject to weathering are penetrated, a guniting lining is used advantageously.

SLOPE HAS 1,200 FT. LINING

In 1918 the slope of the Wilson Mine, owned by the Acme Coal & Coke Co., was lined with guniting for a distance of 1,200 ft. It lies in rock which is subject to weathering when exposed to the air. This is especially true of such beds of fireclay as the slope penetrated. So far the lining has shown no signs of failure, which is a reasonable assurance that the work is permanent.

A more recent job of the same kind was done in the supply and manway slope of the Gibson Mine of the Hillman Gas Coal Co., at Weaver, Pa. For a distance of 550 ft. it was lined with concrete, the remaining distance of 200 ft. to the bottom being left unlined because the rock appeared to have sufficient strength. It was attacked by the air, however, and commenced to flake. The problem was solved by cementing the roof and sides with guniting.

Slopes driven through country rock to flat beds of coal expose successively the various bedding planes. Cracks develop at such points, and the weathering action is accelerated. The disintegration is more rapid in this case than where the slope parallels the bedding planes of the rocks, as in a synclinal basin. Consequently, in driving a slope under such conditions the guniting should be kept close to the face.

POSSIBILITIES IN CONSTRUCTION WORK

Guniting can be used in many places in underground construction and about the surface plant. Sumps already are being lined with guniting where the bottom is soft (see *Coal Age*, April 19, 1923). Overcasts if not built with guniting may be sealed with it where leaks develop. Disintegrated concrete linings in shafts have been successfully resurfaced with it wherever properly applied to a reinforcing mesh, which is used more to bind the coating than to give it strength.

An important use has been found for guniting in fireproofing small supply rooms, motor barns, pumprooms and other permanent underground stations in the coal. Open walls may be built to close in these stations by processes described in the construction of stoppings. On the surface the exteriors of wooden plant buildings and miners' dwellings may be plastered with guniting providing these are backed with a reinforcing mesh.

Where steel trestles are erected in a coal-storage yard, whether at the mine or at an industrial plant, the lower portions of the piers, which are likely to be buried in the coal, may be protected from abrasion and subsequent rusting by a coating of guniting. It is needless to state that moist coal with a high sulphur content will attack any steel structure that may come in contact with it. Paint offers little protection, as it is soon worn off. At Beach Bottoms, W. Va., the steel work in the yard in which was stored coal coming from a mine adjoining the Windsor central station of the West Penn Power Co. was gunited and in this way protected from abrasion and corrosion.

How Many Cars Should We Employ in Mines?

Number Is Based On Tipple Capacity, and Rightly, Because, If That Figure Is Exceeded, Cars Cannot Be Moved



IN DEVELOPING and operating a mine how many cars should be provided? The number of mine cars in actual use in a number of the mines visited is given in Table I. Though the number of cars at any of these mines is not by any means proportional to the capacity of the mine to produce coal, the variations, as shown, are evidently extreme.

As a matter of fact, the determination of the correct number of mine cars that should be available at any particular mine to transport the coal from the face to the tipple has been given extraordinarily small consideration from an engineering standpoint. It was with the greatest difficulty that the officials of most of the mines visited could be induced to discuss or explain in concrete figures the method by which they determined the proper number of mine cars for their own particular mine.

The problem of the proper number of mine cars may be viewed from two opposing points of view. The miner is primarily interested in having enough cars to furnish him with sufficient empties to avoid lost time. The management is primarily interested in enough cars to provide coal for a continuous operation of the tipple. The number of cars necessary for an adequate supply from the miner's viewpoint, when the mine is operating at capacity and under the present condition of understandardized operation, always is larger than the number necessary to produce continuous operation of the tipple.

Because of these facts, the management in most cases is largely governed by the rule of thumb that if, with plenty of labor and barring exceptional accidents, there are tipple delays due to "no loads," buy more cars, but if the tipple continues to operate steadily there are

Sixth installment of report on "Underground Management in Bituminous Mines" made by Sanford E. Thompson and associates to the U. S. Coal Commission. Previous installments may be found in *Coal Age* of Nov. 8, p. 691; Nov. 15, p. 733; Nov. 22, p. 773; Nov. 29, p. 811, and Dec. 6, p. 845. Other sections of this interesting report will follow later.

Table II—Estimates of Number of Mine Cars as Prepared by Mining Officials

	Mine A	Mine B	Mine C
On shaft bottom or outside stand			
Loaded trips.....	1 1/2	2	2
Empty trips.....	1	2	2
Main-line locomotive trips per locomotive.....	1	2	1
Trips per parting.....	1 1/2	1/2	1 1/2
Gathering trips per gathering locomotive.....	0	0	2
Cars per loader.....	1/2	1/2	1/2
Cars under repair.....	12	40	20
Cars for loading rock.....	20	100	15
Total cars figured.....	562	602	632
Number of loaders on which estimate is based.....	298	275	240

plenty of mine cars, even if the miners and foreman may call loudly for more.

Some general managers were candid in outlining such a policy as the determinant of their car supply; others stated that two cars per loader was a rule that worked well in the mines of their district and they bought cars on that basis. Those executives who were finally prevailed upon to furnish data for the determination of the correct number of cars for a particular mine in general based their results on the consideration of eight points, and three typical examples are shown in the Table II.

The principal unit used as a basis for figuring the greater part of the necessary mine cars was the trip, by which in this case is meant the maximum number of cars hauled by one haulage locomotive at one time.

Table III represents the actual condition at time of visit:

This unit, therefore, has been given in making up this table as its variations represent the only real basis of comparison between the methods of figuring cars at different mines. The number of cars in a main-line trip at Mine A was 30; at Mine B, 25, and at Mine C, 22, and in a gathering trip at Mine C, 6. The figures are presented as illustrative of methods used without attempting to present or recommend a general formula

Table I—Number of Cars and Other Data Bearing on Haulage at Twelve Mines

Mine	HL	YT	AS	TP	OW	SP	DS	RZ	GH	TS	RM	DI
Number of mine cars...	1,800	375	400		340	500	561	600	576	500	603	
Tipple capacity, tons...	8,250	1,250	2,000	2,500	4,000	4,000	3,000	5,000		5,000	3,000	3,000
	(2 mines)											
Storage.....	A day's output	Trestle open storage	Storage plant	None	750 ton bin	None	460 tons	1,000 tons	None	None	Surplus mine cars	400 tons in bins
Main line locomotives (all trolley).....	13-ton		13-ton	13-ton	13-ton	10-ton 8 ton T. cable from rooms	13-ton	13-ton	13-ton	13-ton	13-ton	15-ton
Gathering locomotives	{ 13-ton T. } { 6-ton B } Mules		6-ton T.	6-ton T.	6-ton T.	{ 10-ton 8 ton T. cable from rooms } 44	Mule	8-ton T.	6-ton T.	Mule	6-ton B	6-ton B.
Gage, inches.....	48	42	44	44	44		36	42	42	42	44	
Thickness of seam, inches.....	61	52	66	130	43	72	68	120 (102 mined)	60	60	63	86

T.= trolley; B.= battery, in describing locomotives

Table III—Cars at Time of Visit

	Mine A	Mine B	Mine C
Number of cars owned.....	561	602	576
Number of tons produced.....	1,600	1,500	3,200
Number of miners working.....	275	168	257
Trips per car per day.....	2.23	1.32	1.92
Average main-line travel per loaded trip.....	9,000 ft.	5,500 ft.	4,500 ft.

or to indicate all of the variables that should be taken into account in an accurate analysis.

Mine A was operating with two main-line haulage locomotives of 13 tons capacity, one of which was helped by a relay haulage locomotive of 8 tons capacity, having a combined average haul of 9,000 ft. The cars, which were all small—2,700 lb. capacity—were all gathered by mules. These cars traveled from face to tipple and back again 2.23 times per day. The two haulage locomotives were running alternately and very evenly, and the figure of the management of a half trip of loads on the bottom parting was adequate as a haulage locomotive arriving at about that time with a loaded trip took away the trip of empties, so that the total cars at the bottom, both loads and empties, was $1\frac{1}{2}$ trips at all times.

At the relay parting the haulage locomotive dropped its empties and picked up its loads. Thus the management figure on one trip of cars for each haulage or relay locomotive was borne out by the facts, as each of the three had practically continuous traveling. On the arrival of the relay or haulage locomotive at the face parting the full trip on the parting was picked up and the empties left. Thus a figure of $1\frac{1}{2}$ trips per parting resulted in a theoretical assured supply of empties for the mules and loads for the motors.

No allowance for the cars for the mules was made, as it was assumed that the cars on the parting and allowance for one car continually at every other miner's place would cover those actually in transit behind the mules. The above method of figuring cars for the mine under consideration resulted in continuous delivery of coal to the tipple, which was the aim of the officials, and from their viewpoint the method of figuring was therefore correct.

In spite of that, however, both the foreman and the miners were complaining of an insufficiency of cars, and an insufficiency from the miner's standpoint there undoubtedly was, as the plan called for a car at his place only half the time he was in the mine. This is a case, however, of too many men for the mine capacity rather than an insufficiency of mine cars. Though the distance of the main haul was comparatively long (9,000 ft.) and the gathering was done by mules, the average use or turn of the cars per day of $2\frac{1}{4}$ was among the highest noted at any of the mines visited.

HERE FOUR TRIPS WERE ALLOWED FOR BOTTOM

Mine B was operating with three main-line haulage locomotives of 13 tons capacity, and their average length of haul was 5,500 ft. The allowance for a combined loaded- and empty-car supply at the shaft bottom of four trips as compared with only $1\frac{1}{2}$ in Mine A is due to the fact that the arrival and departure of the locomotives were very irregular, and the officials apparently deemed it necessary to plan on such a large supply as an insurance against lost hoisting production caused by poorly dispatched haulage.

The reason that two trips are figured for each haulage locomotive in this mine is that they planned one

trip as being hauled and the other trip waiting to be picked up at the partings. As a result the figure of $1\frac{1}{2}$ trips supply for each parting represents merely the working surplus there. In this mine the cars per loader were estimated at only one-third. If such a plan were actually operated when the mine was running at full capacity it would result in the miners waiting about 50 per cent of their time for cars. The turn of 1.32 cars per day at this mine for a 5,500-ft. haul was among the lowest noted and was in a large part due to the fact that the mine was not operating at over 50 per cent of its capacity.

Mine C was operating with four main-line haulage locomotives of 13 tons capacity traveling an average distance of 4,500 ft. Four trips of loads and empties were estimated as being always at the bottom because in Mine C, as at Mine B, the trips arrived at irregular intervals. The allowance of one trip for each haulage locomotive and $1\frac{1}{2}$ trips for each parting is in line with the theory followed in Mine A, that a trip should be figured for each main-line locomotive and something more, that a trip should be awaiting its arrival at the parting.

The allowance of two trips to each gathering locomotive is in addition to anything figured in the previous two cases and merely had the effect of increasing the cars allotted per man, which is one-half, as in Mine A. Here, however, the men worked in pairs, so that the theoretical effect was to keep a car continuously at each loading place, which represents the ideal condition from the miner's point of view. Practically, however, this condition did not prevail, as not only were the miners here as elsewhere waiting for cars but the tipple was idle 47 minutes in addition to incidental delays in an eight-hour day due to non-receipt of cars at the shaft bottom.

In none of the cases noted was definite allowance made for storage of coal in mine cars overnight to even up a part of the daily irregularity in the car supply. This is a point which is recognized by many mine managers as worthy of practical consideration.

CAR EXCESS WILL NOT SOLVE HAULAGE PROBLEM

This illustration is only one more link in the chain of evidence accumulated in the study of the mines outlined in the report, tending to show that, even in cases where a concrete plan exists for determining the proper number of pit cars for a mine operation, and this plan is liberal in comparison with the standards of similar mines, an adequacy of mine cars is not *per se* a solution of the problem of either continuous tipple operation or the elimination of lost time to the miner.

Planning and dispatching of the haulage not only will go further toward eliminating both, than the purchase of additional cars, but probably in many cases it will make possible a reduction in the number of mine cars in use. Furthermore, it will permit more accurate determination of the minimum capital outlay for the mine cars that will give satisfactory service.

A REPORT has just been issued by the U. S. Geological Survey on the Twentymile Park district of the Yampa coal field, in Routt and Moffat counties, northwestern Colorado. The Twentymile Park district includes only the southeastern part of this great field, but that is now its most important part, as it contains all the commercial mines that have been developed in the field.

Case of Opponents of 1921 Agreement In British Coal Mines



Unfair, They Say, to Make High-Cost Mines Pay Higher Wage Because Low-Cost Operations Earn Profit—Complicated Adjustments Required—Unwarranted Assumptions Enter

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

IN LAST week's article of this series this statement was made in connection with the discussion of the British coal agreement of 1921: "In those cases where the proceeds have been sufficient to meet the standard wages, other costs and standard profits, but insufficient to pay the mine workers the minimum wage, the operators have had to surrender the whole of their standard profits and are not allowed to carry forward against future income any such deficiency in their standard profits." This assertion has been questioned in view of the fact that it is provided in the text of the agreement that "if in any period the ascertained proceeds, after the deductions of costs other than wages and the cost of the standard wages, prove to have been insufficient to meet the standard profits, the deficiency shall be carried forward as a first charge to be met out of any surplus in subsequent periods."

A subsequent ruling on that provision, however, makes it inoperative. The provision is quite similar to agreements that have been reached in this country under which work is to continue until a decision is reached as to wage rates, whereupon it is to be retroactive. The plan is carried through if the decision provides an increase of wages but would obviously be inoperative should a decrease be ordered. No one would expect the miners to return any wages already paid.

It is generally agreed that one of the main objectives of the agreement would be lost were deficits allowed to hang over the more profitable periods. One of the main purposes of the arrangement is to stimulate productivity. A major need of the British situation is to increase the output per man. The only way this can be accomplished is to keep free of encumbrance the possibility of an increased wage at those times when the profit can be pushed to higher levels.

PROGRESSIVE ELEMENT FAVORS PROFIT SHARING

So much has been said in this series of articles in favor of the profit-sharing arrangement that the impression may have been given that there is no great amount of objection to it. Unfortunately there is another side of the picture. It can be said that the overwhelming majority of the forward-looking men in the British industry have great faith in the agreement and are prepared to stand by it. It is only fair, however, that some of the views of those contrarily minded should be set forth.

The agreement, some contend, is very unfair to the high-cost mine. The high-cost mines in a district are called upon to pay a higher wage because the low-cost mines have earned profits. The production of the high-cost mines is essential to the prosperity of the country. Under the agreement, it is predicted, the high-cost mines gradually will be eliminated, leaving in operation only the best situated properties. This would mean

great loss of production and restriction in employment.

There also is objection to the singling out of coal-mine labor and its removal from the effect of the general laws which apply to labor in comparable industries. It is contended by able men that labor must be considered as a whole. Any effort, they believe, to remove one class of labor and set it apart so that general economic principles are regulated in their application to the one group, constitutes a fundamental error which is certain to wreck the coal agreement in time.

Formerly wage advances were calculated in percentages. Under the agreement there is a change to a flat rate. This complicates greatly the maze of adjustments which have to be made under the agreement. One criticism is to the effect that the agreement appears to settle everything, but in fact it has settled nothing and has brought about dangerous confusion in a basic and highly essential industry.

OWNERS OBLIGATED TO HAPHAZARD SCHEME

As one critic puts it, "The coal owners are under obligation to pay certain wages determined by the haphazard amount of wages found to be payable at a certain date, plus, under certain circumstances, another arbitrary amount. Wages are to be determined at a certain figure quite irrespective of the circumstances which may prevail at the time when they have to be paid. The men working in a particular district are to be paid not what the labor of such men is worth in the country at large but such additional sum as may have been found due to them, long after the service has been rendered, after a complicated set of returns has been obtained from their employers and after a yet more complicated set of calculations, based on further assumptions." Even the assumptions are regarded as unwarrantable.

The uniform plan set up for accounting purposes, and which applies to the whole United Kingdom, makes for a series of inequities in certain districts, it is asserted. It is apparent that great difficulties surround the determination of just what constitutes profit in the production of coal. It is very difficult to lay down nationwide rules which do exact justice to every miner. One of the main causes of disagreement between the operators and the mine workers has been in regard to capital expenditures. It is apparent that improvements of a very substantial nature might be justified at a mine with large reserves of unmined coal. It is said that the men object to many expenditures which are essential to the business-like handling of the property. There is a natural tendency among the men to have for immediate division a larger proportion of the income than is justifiable. They are not inclined to take into account the fact that an improvement today will mean increased profits at a subsequent period.

Operators Open Anthracite Economy Show

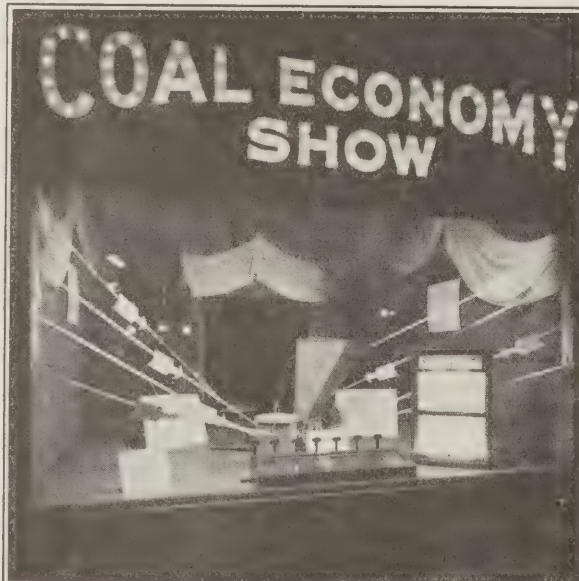
IN ORDER to show how, by the use of proper heating appliances, the smaller and cheaper sizes of anthracite may be burned in household plants, the General Committee of Anthracite Operators in conjunction with manufacturers of heating appliances, has opened the Coal Economy Show at 1017 Chestnut Street, Philadelphia. The main floor, shown in the lower right picture, is given over to appliances and an information booth where fuel experts are in attendance to answer questions. On the main floor, shown in the picture on the lower left, there is a mine car of run-of-mine anthracite. Beside it is a series of seven bins holding the various prepared sizes from egg to barley, thus illustrating the difference between coal as it is mined and as the public gets it. The upper right picture shows a portion of the mezzanine where there is an exhibit of photographs showing various mine operations—breakers, machinery, pumps, maps, houses, schools, etc. There also are placards giving statistics and information

about the industry—models of a breaker, a jig and a mine barrier. At the upper left is a display window.

There is an auditorium where illustrated lectures on coal and mining are given twice daily and where a 2-reel movie will be shown twice a day. Special evening sessions are to be held for associations of architects, builders, plumbers and steamfitters, contractors, high school and college students.

It is planned to open other similar shows in Washington, Boston, and New York.

Among the exhibitors represented are the Molby Boiler Co., Lansdale, Pa.; Abram Cox Stove Co., Philadelphia; W. P. Mackenzie Co., Philadelphia; Philadelphia Steam Heating Co., Philadelphia (Oxykol system); Standard Heater Co. (Spencer heater), Williamsport, Pa.; Keystone Supply & Mfg. Co. (distributors Newport automatic feed heater), Philadelphia; Burn-Buck Co., Philadelphia; Culm-Burn Equipment Co., Inc., Philadelphia, and Domestic Stoker Co. (The Electric Furnace Man).



News of the Industry

Tri-State Meeting at Cleveland Jan. 4 To Begin Work on New Bituminous Scale

Ohio-Indiana-Illinois Joint Conference Issues Formal Call Dec. 21
for Parley—Actual Progress Unlikely Until After
Union Convention, Jan. 22

Negotiation of a new wage agreement affecting mine workers in the bituminous coal mines, to replace the present agreement, which expires March 31, will begin in Cleveland, Ohio, Jan. 4, when a joint meeting of union officials and operators of Ohio, Indiana and Illinois will be held. The call was issued Dec. 21 and was signed by Michael Gallagher, of Cleveland, chairman of the Joint Interstate Conference of Ohio, Indiana and Illinois, and John L. Lewis, president of the United Mine Workers of America.

S. H. Robbins and W. H. Haskins will represent the Ohio operators at the conference, P. H. Penna and M. L. Gould the operators of Indiana, and Rice Miller and H. E. Perry those of Illinois.

Ohio miners will be represented by Lee Hall and G. W. Savage; Indiana miners by John Hessler and William Mitch; Illinois miners by Frank Farrington and Harry Fishwick. Officers of the joint conference besides Chairman Gallagher are: William Green, secretary, and W. L. Robinson, assistant secretary.

Besides President Lewis and Secretary-Treasurer William Green of the miners' union, Vice President Philip Murray may participate.

The call for the meeting was as follows:

"The joint conference of miners and operators, of the States of Ohio, Indiana and Illinois in session in New York City on Jan. 24, 1923, adopted a resolution providing that the chairman of the joint conference and the president of the United Mine Workers of America should designate the time and place for the meeting of the joint sub-committee, signatories to the existing contract; the sub-committee to name the time and place for the formal assembling of the joint interstate conference, to consider the making of a new wage agreement.

"Pursuant to that authorization, the undersigned advise that the members of the joint sub-committee signatories to the existing contract will assemble in Cleveland, Ohio, on Friday, Jan. 4, 1924, at the Hotel Cleveland, at 11 o'clock a.m. It is hoped that all members of the sub-committee or their delegated representatives will attend this conference."

It is doubtful whether the real nego-

tiations will take place before the convention of the United Mine Workers in Indianapolis, Jan. 22, when the miners are expected to formulate their demands and instruct their officers.

To Force Employers to Carry Insurance on Workers

The State Workmen's Compensation Board of Pennsylvania has taken away from the State Department of Labor and Industry the enforcement of the state compensation law in so far as it relates to the mandatory injunction upon employers to carry insurance for their employees. The enforcement of this provision has been in the hands of the department for two years, the law providing that employers who do not obtain compensation insurance shall be fined \$1 a day for each employee. During this period, it was said at a recent meeting of the compensation referees at Harrisburg, not a single prosecution has been brought by the department and no fines have been imposed.

William C. Fisher, actuary of the department, who has had charge of the enforcement of the law's provision, said the State Compensation Board had refused to bring prosecutions. Since August thirty employers a month have been insured, he said, and he explained he had investigated 25,000 cases of employers who were not carrying insurance. T. Henry Walnut, chairman of the Workmen's Compensation Board, who recently pointed out that 80,000 of the 200,000 employers of Pennsylvania carry no compensation insurance, said the board will see that the law is enforced and that notice will be served upon all delinquents at once and they will be fined if they do not comply with the law within thirty days.

Royal Meeker, Secretary of Labor and Industry, has forwarded letters to all insurance companies writing compensation insurance in Pennsylvania and to self-insuring employers, asking them to furnish his department with more detailed information regarding causes of industrial accidents. An examination of the accident reports filed with the department, he said, shows that in a large number of cases the questions asked are incompletely answered "and in fact in some instances no answer is given."

Governors Receive Draft of Pinchot Hard-Coal Bill

Gifford Pinchot, Governor of Pennsylvania, sent copies of his proposed bill to regulate the anthracite industry, Dec. 18, to the governors of anthracite-consuming states, in accordance with instructions contained in a motion passed at the conference, in Harrisburg, Dec. 13. In a letter accompanying the draft of the measure, as well as a brief upon the sources of the bill, Governor Pinchot asks that criticisms or suggestions by the state executives be sent not later than Dec. 31.

Work upon the compact to be adopted by the states will be pushed as rapidly as possible, Mr. Pinchot stated, and invited suggestions concerning its form or contents. "The proposed compact between the states," the Pennsylvania executive wrote, "offers a practical way to reduce prices to the consumers; there can be no dispute as to its legality, and it offers, as no other method can, a uniform and unbroken system of control along the whole line from the mouth of the mine to the consumer's bin.

Portland Cement Output Off in November

Production of portland cement during November, 1923, according to a report by the U. S. Geological Survey, based partly on estimates, totaled 12,603,000 barrels, compared with 11,349,000 barrels in the corresponding month of 1922 and 13,350,000 barrels in October, 1923. Shipments for the month were 10,251,000 barrels, compared with 10,167,000 barrels in November, 1922, and 14,285,000 barrels in October, 1923. Stocks at the end of November amounted to 6,964,000 barrels, compared with 5,320,000 at the close of November, 1922, and 4,612,000 barrels at the end of October, 1923.

C. & I. R.R. Asks Extension

For the announced purpose of opening up for development 75,000,000 tons of bituminous coal, the Cambria & Indiana R.R. has asked the Interstate Commerce Commission for authority to construct and operate an extension of its line in Cambria County, Pennsylvania. The extension is to proceed from a point where the Monroe Coal Co.'s line intersects the company's main line at Revloc. The terminus of the extension is to be at Wilmore Road, near the bridge crossing the north branch of Little Conemaugh River. The length of the extension is to be 5.08 miles.

Says Coal Mining Needs More Engineers; Best Qualified to Handle Labor

Though Lawyer and Engineer Stand Together, It Is the Latter Who Looks Forward, Says Dr. Smith—Discusses Four Phases of Waste and Their Cure

Discussions of coal problems, Dr. George Otis Smith, the Director of the U. S. Geological Survey, pointed out in the course of remarks before the Washington section of the American Institute of Mining and Metallurgical Engineers, reveal the positions of the lawyer and the engineer. "They are standing together," said Dr. Smith, "but they are back to back—the engineer looking forward and the lawyer looking backward."

Dr. Smith presented four phases of the coal question, which formed the basis of a general discussion among those in attendance. These points were:

(1) Waste of resource—better mining; better utilization; effect of price.

(2) Waste of labor—short year and overmanning; larger use of machinery; mine management; union limitation of output; co-operative spirit.

(3) Waste of capital—overdevelopment; idle plants; limits on new development; waste through competition; combinations.

(4) Waste of transportation—the industry's bad load factor; seasonal peaks; long haul; unneeded fields.

Dr. Smith made a plea for the use of more engineers in the coal-mining industry and their utilization in connection with labor relationships. The engineer, he pointed out, has come up in a part of the work which has placed him in close personal contact with the mine worker. As a result, he knows him in a personal way and frequently is better qualified to deal with labor problems than is the mine manager, who often rises to his position through the accounting department. He believes that labor can be brought to a much higher plane of efficiency and expressed the hope that the matter of individual productivity would find a part in the program of labor leaders. He mentioned that he had heard long discourses by labor leaders but had been impressed by their failure to mention the need of increased efficiency. He expressed decided disapproval of any plan which has as its object the limitation of individual output.

Dr. Smith declared that waste is an outstanding ill in coal. There is waste from the face to the stack, he said. There is waste in man power and each time the industrial cycle goes round, these wastes seem to increase, he asserted. If there were better mining and better utilization, the equivalent of 100,000,000 tons of coal might be saved every year. He characterized as deplorable a rate situation which in one year resulted in the transportation of 5,000,000 tons of coal to the lakes from

Southern fields which displaced nearby coal equally suitable for the movement. During a six months' period that useless haul represented a loss of 1,500,000 ton-miles.

Major Starr, of the Chamber of Commerce of the United States, deplored the attitude of the United Mine Workers toward the use of machinery in mines. Where machinery is used, he declared, it is necessary to pay the men the full amount of the saving made. He cited the great economies and improvements which had been made possible in the non-union mines through maximum use of labor-saving machinery. He mentioned one mine in which there are no mules and no picks. Coal is produced there just like shredded wheat, he said—"not touched by human hands."

O. P. Hood, chief mechanical engineer of the Bureau of Mines, declared that there are many inheritances of

the days of dollar coal which must be overcome. Management must pay more attention to the boiler room, he pointed out, under the changed conditions of higher fuel costs. He expressed the opinion that there is too much imitation in engineering. One engineer will get a desirable result and others will follow like sheep. Mechanical equipment for the handling of coal must be suited to the individual problem, rather than that met with in another plant. He urged more study of the combustion problem.

Walter Trent called attention to the fact that at least 90 per cent of the values in ore are recovered at metal mines. Each ton of coal, he said, contains \$14.50 of value, but the recovery is less than 20 per cent.

H. Foster Bain, director of the Bureau of Mines, made the point that control over development would do more than any other single thing to solve the difficulties of the coal industry, but that such a policy would be entirely contrary to the principles which the American people always have supported. Public opinion would not submit to any drastic step looking to limitation of the opening of new mines. He pointed out the tendency for acquaintanceships now to run in business lines. People formerly knew each other because of their geographical proximity. Now like activities seem to control personal relationships, he said. He prescribed constant flow of facts as one of the needs of the industry.

Praise for Oddie's Bill

Introduction of Senator Oddie's Department of Mines bill is bringing much commendation of the measure. H. Foster Bain, director of the Bureau of Mines, in a letter to the Nevada Senator, says:

"I have no hesitation, as a mining man, in expressing my personal conviction that if such a department can be created it will be of the greatest possible service to the country, as a whole, as it will to the particular industries in which you and I are especially interested. It will be of great benefit to the mining industry, and accordingly to the public interest if, so far as is possible, the various functions of the federal government that relate to mines and mining can be brought together."

Dr. George Otis Smith, director of the U. S. Geological Survey, says: "All who are interested in federal legislation which recognizes and promotes the mineral industry are gratified by the consideration of such a measure as the one you have introduced."

F. F. Sharpless, secretary of the American Institute of Mining and Metallurgical Engineers, wrote: "Our directors are deeply appreciative of your many efforts in behalf of the mining industry. They feel that in you they have a staunch and loyal advocate for every matter of merit in which the mining industry is concerned."

I. C. C. Denies Higher Rate From Tennessee Mines

Proposed increases in the rate on coal from points on the Tennessee R.R. to Louisville, Cincinnati and other points are not justified, in the opinion of the Interstate Commerce Commission. The case was brought by the Cincinnati, New Orleans & Texas Pacific and the Tennessee R.R. in an effort to increase rates to Louisville and Cincinnati by 9c. and 10c. more than the rates from all other points of origin in the group embracing the mines on the Tennessee. A 15c. increase was proposed to points in other states in the Middle West. The proposed increases were opposed successfully by the Southern Appalachian Coal Operators Association.

In its opinion, the commission holds that the proposed rates would disrupt the general rate situation from certain of the groups involved and would give undue preference to mines on and shippers from the Oneida & Western and other short lines in the same general territory. "If the Tennessee is unable to exist under reasonable rates and just, reasonable and equitable divisions of joint rates," says the opinion, "its connections cannot be called upon to bear any additional part of its expenses. The producers of coal and lumber along its line are interested more than anyone else in its maintenance and continued operation."

Illinois Sees Coal Strike April 1, but It May Be a Short One

Long Fight Likely Only If Miners Insist Upon Wage Increase—Operators' Association Favors Four-State Parley and Wage Cuts—
"Wages O. K.," Some Say

Illinois is looking toward April 1. Now that the Illinois Operators Association has gone on record as favoring participation in four-state negotiation by Illinois, Indiana, Ohio and—faint hope—western Pennsylvania, and a reduction in miners' wages, the question, will there be a strike? is much at the fore. The general sentiment throughout the state is that there certainly will be a strike. It may be short if the miners will be willing to renew the present wage contract, or it may be long if they will not. But it will be difficult to avoid a shutdown.

The action of the association, taken in Chicago Dec. 20, gives form to one body of opinion in Illinois. But not every important operator favors a drive to reduce wages, necessary though that may be to many companies. Some declare there is no use trying it and that they will not fight for such a thing. Therein lies the chance for a strike of only short duration. It is calculated that the mental attitude of mine labor will make it difficult if not impossible for President John Lewis, to sign a continuance of the present scale before April 1. Hence the necessity of a shutdown—unless government pressure upsets negotiations between operators and miners.

However, the Illinois operators who will not fight for wage cuts will fight against wage increases. They say so flatly. Therein lies the chance for a long strike. They recognize that one of the worst things for the industry would be a long strike. It would revive a lot of wildcat operating that is now either dead or dying and which, they think, ought to be permanently trimmed off the body of the industry. But even that constant menace is not enough to feaze them. The suggestion for wage increases makes them see red and battle light appears in their eyes.

Of course it is generally believed that the 10-per cent increase which is noised abroad in labor circles as one of the probable demands of the union is merely "swap talk." It is to be traded by the miners for operator proposals, such as the well-worn ones about discontinuance of the check-off, division of the country into small districts for wage-making and the like.

There will be some new proposals by the operators this time, however. One of them concerns a wage scale for underground loading-machine operation. At present there is no scale although a good many machines are now working in such unionized regions as western Kentucky, Indiana and Illinois. Western Kentucky's general wage contract runs another year, but that field looks on with interest while the Middle West maneuvers for a recognized

loader scale. Quiet negotiations between operators and miners in Indiana thus far have gained little ground. Operators insist upon a day scale and miners upon tonnage rates, and there they split. However, there have been some faint indications that the parties to the case are really closer together than they seem, for many miners are seeing the light.

This and other questions will be taken into the coming conference by Midwest operators, and earnest efforts will be made to get something done about them. But the sentiment generally is that the whole problem is too complicated to be wound up by April 1.

Strike Called Off in Maryland Cost Union \$734,000

In the *United Mine Workers Journal* of Dec. 1 is a formal statement, informative in a general way, of the decisions of the Policy Committee that John L. Lewis foregathered in Indianapolis for several weeks in November. The miners' organization spent nearly three quarters of a million dollars in supporting the 20 months Maryland strike beginning April 1, 1922. Nothing was said about West Virginia. The statement follows in full:

"After being in session more than a week, the International Executive Board of the United Mine Workers of America transacted an enormous amount of business, adjourning Nov. 20. A greater part of the session was devoted to reviewing the work accomplished and now under way by the organization in the various districts within the confines of the jurisdiction.

"The board, after going over the matter of the revocation of the charter of District 26, Nova Scotia, in July this year, approved the action of the International officials and authorized a continuance of the provisional district under the direction of the International union.

"The matter of the strike in Maryland, District 16, which has been on since April 1, 1922, was discussed and the board made arrangements for the termination of the strike. During the period of the strike financial relief to the members of the district was advanced in the total of \$734,000, it was announced.

"The International board together with the officers of the International union were authorized to continue their efforts to obtain action from the Interstate Commerce Commission relative to the matter of "assigned-car" practice as indulged in by railroads, public utilities and large consumers of coal.

"The board gave considerable atten-

tion to the program of litigation in which the organization is now involved, due to various damage suits, injunctions and other legal processes brought against the organization in the various districts. The matter of litigation in Alabama was especially gone into.

"The organization is facing a number of damage suits. The board was particularly interested in the victory won by the union in the second trial of the Coronado case. It is believed that the winning of this case by the miners will have set a strong precedent as to the final outcome of several similar suits now pending against the union.

"The board had a large number of appeals and grievances from the various districts, and these were taken up for decision. The finances of the organization were reviewed and found to be satisfactory. There will be no further meeting of the board until after the convention in January."

"And Satan Also Came"

When Governors Pinchot, of Pennsylvania, and Silzer, of New Jersey, occupied places at opposite sides of the toastmaster at the annual dinner of the New Jersey Society of Pennsylvania, Dec. 18, in Philadelphia, 300 members of the society were prepared to see the fur fly—and they were not disappointed.

"I thought I would say something about coal tonight," said Mr. Pinchot, "but you will realize the position a fellow is in who has not yet been able to determine whether he was successful in getting coal in the homes of the people or was merely responsible for raising the price.

"I called a coal conference of Governors some time ago with the idea of doing something to decrease the price. Not many Governors responded, but Silzer did. I wonder if it would be unfair in this connection to recall an old quotation which runs, 'And Satan also came.' At any rate, Governor Silzer was there. I tried to convince him that New Jersey might also be persuaded to take her share in the responsibility of reducing the price of coal. But he couldn't see it. He wanted Pennsylvania to do it all. But I beat him to it by calling another conference, and he didn't come. But the Governors who did decided that the other states should help, including New Jersey, and so, you see, he's in the game anyway."

"I do not object to the Governor's quotation, 'Satan also came,'" said Governor Silzer in reply to Mr. Pinchot, "because I have a distinct impression that on the occasion he refers to the Governor of New Jersey gave the Governor of Pennsylvania a little bit of hell."

Oddie Studies Coal Commission Report; To Base Legislation on Findings

Constructive Bill to Promote Better Service by the Industry Expected—
Co-operation with Hoover Likely on Commercial Phases—
Pinchot Conferees Soon to Press for Federal Action

BY PAUL WOOTON

Washington Correspondent, *Coal Age*.

An intensive study of the report of the Harding Coal Commission is being made by Senator Oddie, of Nevada, chairman of the Committee on Mines and Mining, with the idea of translating into legislation such of the recommendations as may meet his approval. He has not proceeded far enough with the study to determine just the form this legislation will take. It is entirely probable that it will incorporate certain suggestions which have been made since the report of the Coal Commission was issued.

It is a relief to many who are deeply interested in the best interests of the coal industry to know that the legislation to grow out of the Coal Commission's report is to be handled by a legislator who is entirely constructive in his tendencies. For that reason it is safe to assume that the administration measure will not come out as full of teeth as a corn shredder, vesting the Federal Trade Commission with powers to conduct a new program of regulation of the punitive type. Senator Oddie is confidently expected to bring out legislation which will seek to foster and promote the coal industry along the lines that will enable it to furnish better service to the public.

Bills that have been introduced at this session have been designed to lambaste profiteers or deal with first-aid matters such as penalizing shipments of dirty coal or embargoing exports.

PRODUCTION CRUX OF COAL PROBLEM

Senator Oddie feels that since the whole coal question revolves around its production, it really constitutes a matter clearly within the jurisdiction of the Committee on Mines and Mining. The parliamentary officials of the Senate have taken the same viewpoint and Senator Oddie believes his committee is in a better position than any other to handle such fundamental coal legislation as the country may need. On the commercial phases of the problem, it may be accured that Senator Oddie will work in close co-operation with Herbert Hoover, Secretary of Commerce. In fact he already is co-operating in a major way with Secretary Hoover on various problems having a bearing on metal mining.

Legislation now is imminent from another quarter. It is expected that the Governors who participated in the Pinchot conferences soon will have agreed on the draft of a bill which they will put forward. There is some surprise in Washington that the diverse interests represented by the consuming states should have come to an agree-

ment so readily. While the effort is going forward to obtain the interstate pact, it is clear that the principal hope of the Pinchot conference is in federal action. If the Governors of these states represent the trend of public sentiment, it will mean strong pressure for federal action. Enough is known of the Pinchot draft to indicate that it is another suggested code of penal rules. For that reason there is a feeling that it is particularly timely that Senator Oddie should be considering the bringing out of legislation of a more constructive type.

Bureau of Mines Reports on Work of Past Year

Practically 100,000 miners have been trained by the Bureau of Mines in mine-rescue and first-aid methods since the establishment of the bureau in 1910, states Director H. Foster Bain, in his annual report to the Secretary of the Interior for the fiscal year 1922-23. Whereas in 1910 the bureau trained 734 men, during the past year 14,941 men received the training, which was conducted in 35 states and Alaska.

Two effective methods for preventing the spread through a coal mine of a minor initial explosion have been demonstrated by the bureau at its experimental mine near Pittsburgh, where more than 500 experimental explosions have been produced and in which the explosibility of coal dusts from all parts of the country has been studied. The first method is to wet the dust so thoroughly that no dry dust remains in the mine. The second is to dilute the coal dust with shale dust, limestone dust, or other non-inflammable dust so that flame will not pass from point to point.

The widespread attention given to the fatalities from explosions has resulted in the common supposition that gas and coal-dust explosions form the main hazards of mining, but the bureau finds that if the deaths from falls of roof and coal could be eliminated, the number of miners killed would be cut approximately in half. The deaths from roof falls aggregated 900 during 1922. The fact that this number is less than the total during several preceding years is due to thousands of men having been idle for several months during the bituminous-coal strike.

The larger part of the responsibility for decreasing this class of accidents may fairly be placed on the miners themselves, states Director Bain. Most of the falls occur at the working places and the miners there are better able

to observe the conditions under which they work and to tell when the roof should be taken down or additional props put up than is anyone else.

For the 11-year period that ended with 1922, 47.84 per cent of all fatalities were due to falls of roof and coal, 16.85 per cent were caused by mine cars and locomotives, 11.25 per cent by gas and coal-dust explosions, 6.04 per cent by explosives, and 3.47 per cent by electricity. During this period 25,975 men were killed in coal mines. Approximately 90 per cent of all the deaths occurred underground, 2.29 per cent were from shaft accidents, and the remainder, 7.59 per cent, occurred on the surface.

Director Bain cites the need for an intensified safety campaign among miners, operators and inspectors to maintain diligence in observing the precautions which will lead to the prevention of accidents. This includes a wider dissemination of the knowledge already acquired by the Bureau of Mines and the agencies which have been co-operating with it.

An intensive study of the electrical hazards in coal mining and of those following the more extensive use of machinery underground should be made.

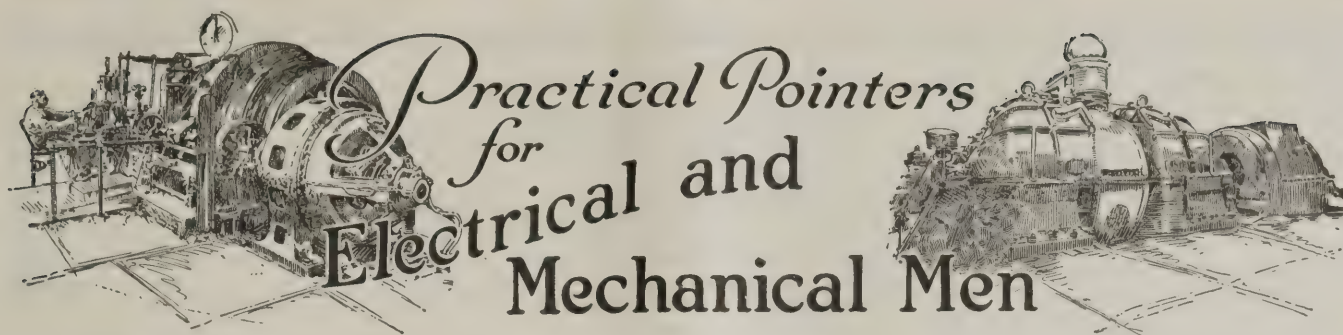
Concentrated effort should be made to reduce the number of deaths from falls of roof and coal and from mine transportation, both of which call for further investigative work and renewed alertness by miners and operators.

Coal is now being mined on public lands under lease in Colorado, Montana, New Mexico, North Dakota, Utah, Washington and Wyoming. Prospecting permits have been issued covering areas in these states and in Alabama, Arkansas, Arizona, California, Idaho, Nevada, Oregon, and South Dakota.

A vertical oven, designed to produce a lignite char as a stable fuel for domestic and power purposes, was built and operated in co-operation with the University of North Dakota. Some of the char was shipped to the Pittsburgh station of the Bureau of Mines, where grates suitable for burning it in an ordinary cookstove were designed which proved successful in laboratory tests. The lignite char proved an admirable fuel.

Improved methods and a portable instrument were devised for determining quickly the severity of cases of carbon monoxide poisoning and the carbon monoxide content of mine atmospheres. Important economies were effected in fuel consumption and in operating practice at various plants making refractory wares and at brick kilns.

HENRY WALKER, a mining engineer who is serving as deputy chief inspector of Mines for Great Britain, will visit this country in February. Arrangements are being made by George S. Rice, chief mining engineer of the Bureau of Mines, which will make possible first-hand observations as to safety methods employed in American mines.



Method of Suspending Feeder Cables to Many Levels

Up until about ten years ago power was supplied to electrical equipment in the anthracite mines by means of cables suspended in the airshaft, which usually is just alongside of the regular hoisting way. This served the purpose rather well for a time, but as the equipment increased and an entire operation

depended upon the feed lines hanging in the shaft, frequent stops due to the burning of the wires in wet shafts compelled officials to look around for some other method.

The old oak-pin side bracket, nailed to the shaft bunting, and fitted with a deep-grooved glass insulator to which the 4/0 weatherproof wire was fastened by a copper tie wire, soon gave way to the armored cable, supported only at the top of the shaft and allowed to hang free alongside of pipes and other obstructions in the shaft. Following this came the boreholes, generally about 12 in. in diameter and protected from water by pipe cemented in on all sides. The usual procedure was to start this hole from the surface and drill down through probably a half dozen different veins. In this way the hole was in the solid at all points. After its completion it was tapped at all veins and sufficient of the pipe cut away to allow connections to inside feeders.

A sufficient length of cable to reach from the surface to the first vein and into a set of switches at that vein, is now dropped and anchored to supporting spools at the top of the hole. A set of copper busbars is then installed a foot or so away from the bottom of the hole at the first vein. One of these busbars takes the positive and the other the negative cable. A tap is taken from the negative busbar and run directly to the rail in the first vein or level. A second tap is taken from the positive busbar, thence to a switch of sufficient capacity to withstand the maximum current which will be demanded by the equipment in that vein, and out of this switch to the trolley wire.

A second cable of sufficient length to allow for anchorage at the first vein and running to the second vein is placed in a manner similar to the way it was handled in the first vein. This method is carried on at all levels, making it possible to disconnect any individual vein from the main cable in case of trouble with feed lines or trolley wires due to falling roof in the workings.

For a time after the adoption of the cemented-in pipe between the veins, the cables were installed without cutting at the various veins and were allowed to hang their entire length from the surface to the lowest vein to which power was being furnished. Taps were taken from the cables as they passed each vein, the positive cable leading to a

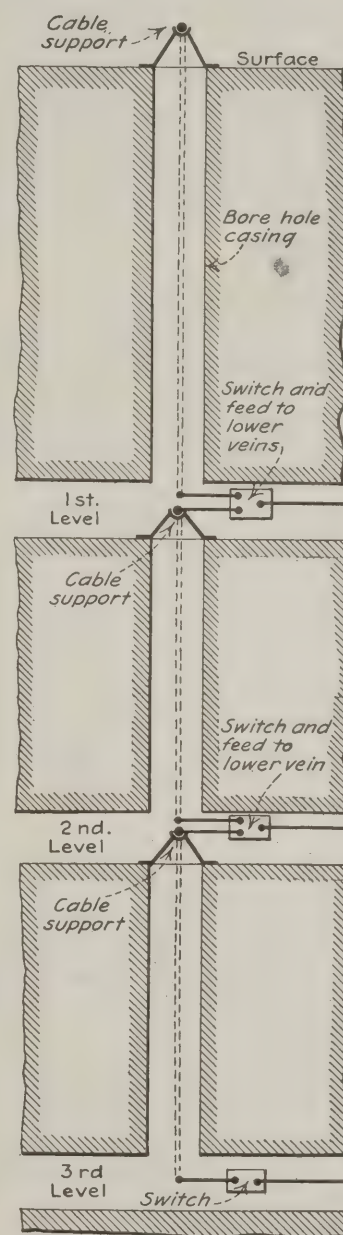


FIG. 2—SEPARATE CABLE TO EACH LEVEL

This arrangement requires a separate cable support for each section of cable, but repairs may be more readily made with a short piece of cable. Latest practice is along these lines.

section switch and the negative cable to the rail.

This was found to be an expensive way to install cables inasmuch as a grounded wire between the surface and the first vein generally resulted in the

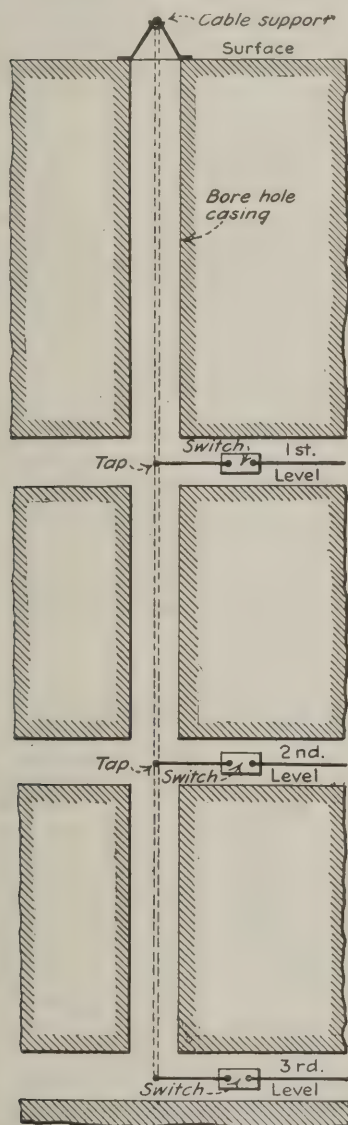


FIG. 1—CONTINUOUS CABLE FROM SURFACE TO BOTTOM LEVEL

At each vein the cable is tapped. A disadvantage of this plan is that a break anywhere in the cable is likely to carry all the switching equipment of each lower vein with it as it drops.

cable burning off and causing it to drop to the foot of the hole, taking with it much of the switching equipment connected to it at the various veins. With the present scheme, however, it is possible for any one of the separate cable lengths between the veins to burn off and drop in the hole without destroying the rest of the system other than cutting off the supply to any vein below the affected cable. The repairs therefore consist only in dropping a short piece of cable, of the length required, between the two veins. In the first case, where the cable was in one piece from the top to the bottom, it was always necessary to drop new cables the entire length of the hole as well as to make new taps at all of the veins. Short lengths of cable, well anchored and installed in a perfectly dry hole, provided they are of sufficient cross-section to carry the maximum current, will last for years without giving trouble of any kind.

Scranton, Pa. M. S. BEDDOW.

Important Mechanical Details Of Locomotive Motor

Dust, sand, etc., when mixed with oil, have a grinding action on the bearings of locomotive motors, wearing away the bearing linings as well as the shaft or axle. As a result, various means have been taken to make these bearings dustproof and thus extend their life in service.

It is necessary to keep dirt, water, etc., out of the oil so that it will not be drawn into the bearing surface with the oil. This is done by having a tight cover over the oil and waste pockets, held in place by a spring. This cover should be lined with felt and should have a deep lip to prevent wheel wash, etc., from splashing in.

KEEP DUST CAP TIGHTLY FASTENED

The outer end of the commutator end armature bearing is ordinarily protected by a dust cap over the end of the shaft. This cap is made of sheet steel or malleable iron and is fastened to the housing or the bearing by bolts or screws, completely enclosing this end of the bearing. This dust cap should always be kept in place, as the position of the bearing with respect to the wheel flange is such as to permit the dirt, sand and wheel wash from the wheel flange to be thrown directly on this part of the motor.

The outer end of the pinion end bearing usually extends into the gear case and needs no further protection. The gear case fits over the armature bearing or an extension of the housing with a sufficiently close fit to keep the lubricant in the gear case and tends to keep dirt out of the bearing at this point. There is little possibility of dirt, etc., getting into the armature bearings from the inside of the motor, as the oil throwers on the shaft and oil catchers on the housings act as guards and give ample protection against the entrance of dirt.

Stress Importance of Bonding And Get Better Voltage

Until such time as those most concerned in keeping the electrical equipment in mines up to the minute realize that building of haulage tracks is just as important as the trolley wire, and is the return for whatever power is sent out by the trolley wire bonding will not be taken seriously. It is surprising what little attention is given to this important link in the chain power feeders.

Electrical men who give scrupulous attention to the installation and maintenance of trolley wire leave the other side of the circuit to a bonder who frequently is too young to know that he must do his work well if the locomotive which is to operate on a certain road after he is through bonding is to perform in a satisfactory manner. Channel pin bonds are sometimes installed in too hasty a manner, and quite frequently the channel pin, instead of being driven straight with the hole, in which case it will press in on all sides of the bond securely, will be allowed to cut into the wire and sever it almost in two. Hence a high-resistance joint is the result, and if two or three of these occur on a long, steep hill, power troubles can be looked for. It seems a foolish thing to insist on a well-kept trolley if the bonding is not also installed properly and kept in good condition.

IMPORTANCE OF THE BONDER

A bonder should be given to understand that his job is not merely a stepping stone to the higher position of electrician. He must first be a good bonder, else his chances for being a good electrician will not amount to much. Make him understand this, at the same time impressing on his mind just why he holds an important position. Explain to him just what the bonds he installs are doing and the damage they can do if not put in properly. Make him clean all holes in which the bond and channel pin are inserted, and insist that the pin shall be driven in straight and true, so that there will be no cutting away of part of the cross-section of the wire itself. Make him understand, also, why the pin should be driven all the way home, why this will result in preventing moisture from entering and destroying the fit of the hole, and finally, take him into your confidence and explain just why he must be a good bonder if he ever hopes for anything better.

It is remarkable how the efficiency of a mine will pick up once the bonding is put in proper shape. When a sudden complaint comes to the electrician that the power in a certain part of the mines has fallen off it usually will be found to be due to neglected bonding. An efficient bonder is worth his weight in gold to an electrical organization, and it is a surprising thing how much his work will improve when he is given to understand that what he does is of value and is appreciated as such by the whole organization.

ELECTRICAL INSPECTOR.

How the Maximum-Demand Indicator Operates

When the maximum demand register is part of the watt-hour meter mechanism, the meter, in addition to recording the amount of energy used, gives the maximum demand at which this energy has been used. The operation of the maximum demand indicator usually is by means of a pusher which at the beginning of a predetermined period of time advances the maximum-demand indicator hand over the scale. The speed at which this maximum-demand indicator can operate is a function of the speed of the meter disk.

At some predetermined time interval the forward motion of the pusher ceases and it is instantly withdrawn or reset to a point where it starts to travel again for the next time interval. The indicator hand is, however, left at the point on the demand scale to which it has been advanced by any previous operation of the pusher and it is not advanced until a higher maximum demand comes upon the line. Most meters are arranged to be manually reset by the meter reader or meter inspector.

The position of the maximum-demand indicator records the maximum demand which has occurred since the last time the meter was reset, providing the time intervals during which the pusher is moving are constant. This brings out an important point in connection with maximum-demand meters, and that is that the timing device be very accurate. In a newly designed meter this timing is accomplished by means of a synchronous motor which inherently operates at a definite speed; in fact its speed can change only with the frequency of the alternating-current supply, and since the frequency of the system is constant, the synchronous motor drive must be constant. This feature represents one of the latest developments in maximum-demand meters.

Banking Power-Plant Fires

The fire under the boiler should never be banked until it is quite certain that there is not going to be a demand for the use of this boiler for a few hours, as much of the coal burned during the banking is a loss and if the fire is prepared for banking just before a load comes on, much time is lost in getting the furnace back into favorable operation. While the fires are banked the stokers should be periodically moved to prevent the fire bed from becoming too porous or honeycombed.

The usual procedure in preparing and banking the fire during periods of low demand is this: (1) The forced draft is shut off; (2) the induced and forced draft fans are stopped; (3) the stokers are stopped; (4) the damper on the stack is closed to a degree just sufficient to clear the furnace of gases; (5) the feed water valve is closed.

Problems In Underground Management

Shaft Designed to Make Replacement of Buntons Easy and Avoid Wreckage

When a Cage Runs Wild the Buntons Catch It and Much Damage Is Done If They Are Torn Out—A Way to Minimize the Destruction

The main shaft of an important American mine has been lined with reinforced concrete from 1 ft. to 2 ft. thick on all sides, the concreting extending from the sump bottom to the surface, a total height of 150 ft. The sump is 12 ft. deep and the net opening of the shaft 11x15 ft., the concrete bottom resting on hard rock. The shaft lining continues upward, and where it passes through the coal strata, the walls are extended to a width of 24 ft. and are made 2 ft. thick with a suitable design to support the roof of the shaft bottom and to make it possible to load and unload rails or pipe on the bottom without lack of headroom or other similar difficulties.

In casting the concrete, a channel, or long, narrow recess 12 in. wide and 2 in. deep and extending the entire distance from the sump to the ground landing, was provided in the side walls for the reception of the buntons, which were placed after the concrete had set and the forms had been removed. The buntons are 10-in. iron beams the ends of which are provided with angles. On one end these angles are riveted and on the opposite end they are bolted. The bolted angles are designed so that they can be removed if necessary should an accident or other cause make replacements obligatory. By drifting the angles, the original tension always can be expected on buntons so installed.

CAN READILY INSERT NEW BOLT

For the reception of the guides a cast-iron chair provided with a T-slot was bolted to the web of the buntons. These castings are so arranged that a new bolt can be inserted readily, should it become necessary to do so. These castings or chairs not only support the guides but form for them a permanent base or line. The guide replacements go against the face of the chairs previously set to line and secured, and thus automatically they come truly to a plumb line with their faces in correct position.

The buntons were inserted in the slot and securely keyed with iron wedges to the proper tension. Then the entire channel was filled with a lean mixture of cement mortar, troweled

flush with the side walls of the shaft. Should it become necessary to remove any of the buntons, a pick will cut the lean mortar and expose the bolted angles, which can then be removed, allowing the buntun to drop out of the slot for removal. Should an accident occur in the shaft severe enough to dislodge the buntons, the lean mortar will yield to the strain and break away without serious damage to the buntun itself.

The concrete end walls are provided with T-slot castings set into the mixture at the time of casting and permit of bolt removal, and in general these castings resemble the chairs fastened to the buntun for the purpose of supporting the guide. In both cases these castings are set at 6-ft. intervals, providing anchorage for guides accordingly. The guides measure $5\frac{1}{2} \times 7\frac{1}{2}$ in. and are of pine throughout.

Close Propping and Small Falls Save Timber

BY R. W. LIGHTBURN
Gans, Pa.

Posting in the mines should be done according to system. For instance, if 4 ft. is the desirable distance between props in somewhat bad roof, props should be set 4 ft. apart and in line across the rib, that is, being drawn regardless of the roof being good or bad.

The miner may object to setting these posts, arguing that he can mine all the coal under the coming area of fall with less posts than he is asked to set. Perhaps he can, but there is another party at interest, the man who has to draw the posts. His safety depends on as few posts as possible being bent or broken under the pressure of the roof.

The purpose of the posts is to steady as far as possible that part of the roof over the area extracted and not yet caved. They must be sufficiently numerous to prevent the roof from becoming broken or cracked. They must retain in the roof its inherent strength. If too few are used the roof will be fractured and the posts will be under too heavy a burden. Should they break

down, not only will the posts be lost but also several tons of coal.

Falls should be kept within proper dimensions. The area allowed for a single fall should be about 16x24 ft. It will have about four rows of props and extend for a width equal to the combined width of room and pillar. Where the falls are kept to such a dimension the posts do not have to stand in place long and are not subjected to inordinate pressure and so can be used over and over again.

Only persons of experience should remove timber. Such a man will have an established method of removing difficult props. Some of the posts may have sunk into the cap-piece and to recover them extra posts must be set so that the man who is doing the work can be in the line of greatest safety and in the most favorable position for the recovery of posts.

If the bottom is hard and much slate has been thrown back among the posts so that it is difficult to get at the post bottom to loosen it, a slanting cut should be made in the post near the cap-piece with a sharp axe and on the outbye side of the post. A post puller should then be attached, and then with the exercise of a little force the post will come out.

I would advocate that the man who must recover timber be the man to place it. If a rib boss were given a section of suitable size he could do both satisfactorily.

To draw posts the timberman should have an axe with a hammer on one face. It should have a handle 4 ft. long. He also should have a punching post with a 6-ft. iron handle and fitted with a light pick-shaped head which can be stuck into a post that has been knocked down so that the post can be drawn to a point where it can be removed by hand. This punch post is useful in recovering crossbars. To get the best results specially designed tools for all purposes should be used.

Urge Early Coal Loading

Shippers of coal in northern West Virginia have been asked by railroad companies operating in that part of the state to load as much of their coal as possible during the first three days of the week, if it can be done without prejudicing the business of shippers. This request is made in order that the roads may be in a position to clean up business on Friday and Saturday of each week and is part of a program of increased economy in connection with the handling of traffic.

Discussion

How to Prevent Gas from Causing Explosions

BY GEORGE EDWARDS
Pikeville, Ky.

Recent mine explosions have awakened a new interest in the means of preventing such catastrophes. To handle a mine generating explosive gas is a job for a man who has been trained in the work as it were from the cradle up and should not be placed in the hands of any other. When considering a foreman's experience everything depends on where that experience was obtained, under what management he has worked and how long he was able to stay. Some companies are proud of the fact that they train their own men, and that is without question the best plan to adopt, but if they have been operating nongaseous mines and then encounter explosive gas, they should break that rule and go out of the organization for an experienced man to take charge of the job.

When gas is found, no matter how little, thorough plans should be made to provide for every eventuality and every opportunity should be taken to discourage disregard and indifference to small accumulations of gas. The tendency of the average boss who is not familiar with gas is to pretend to be wise and abundantly able to take care of the situation. Such men may be found lighting the gas for the fun of seeing it burn, until at last some man lights a trace, as he has often done before, and finds more gas than he expected and becomes to his surprise a badly burned man or something worse.

WISE FOREMAN PLAYS SAFE

The foreman who is familiar with gas will not allow the bosses or the workmen to do anything foolish, for he has learned that an ounce of prevention is worth a pound of cure and you will find him getting ample ventilation up to the working faces, which means that all stoppings and overcasts are well built and that no crosscuts are allowed to remain open but are promptly stopped with masonry stoppings.

Doors usually are necessary in the advanced workings, but the strictest kind of regulation should be enforced in having them built so that they will close automatically and everyone in the mine should be made understand that leaving a door open is a serious offense. The night shift usually is the hardest to control, and among the worst to leave doors open and damage other equipment are the undercutters and their helpers. The night foreman in a mine generating explosive gas should be thoroughly capable.

It is a good rule to have the firebosses register in, to insure that they are taking all the time necessary to

cover their section carefully. If this is done you will have no late starters, and if a fireboss should fail to report for duty, whoever is in charge will be able to make provision for his replacement. The firebosses should examine all doors and see that the ventilation is traveling in its proper courses both on Sundays and holidays.

Looking back over my experience with firebosses, I cannot forget that they often are young men who are just starting on their first responsible job, and for this reason they should be rigidly disciplined. I have found them in most cases familiar with the work they are supposed to do, but they fail in most instances because they are not willing to do the work as it should be done. A fireboss examining a mine with extensive pillar work has a hard job before him, especially in thin coal.

The foreman in charge should devote his entire time to the inside workings and he should be in constant command of all operations from beginning to end. The "sunshine foreman" should be eliminated from the gaseous mine.

Denies Undue Delay in Rescue Work at Hunt Mine Fire

In *Coal Age* of Nov. 15 there is a note with regard to the fire at the Hunt Mine, near Staunton, Ind., in the course of which there is an implied criticism of the delay of men from the Vincennes station of the Bureau of Mines reaching the fire. The facts are as below:

The notice of the fire reached the Vincennes station at 10 a.m. The foreman left at once for Staunton in a small truck belonging to the station and arrived at the mine, 80 miles distant, in two hours and thirty minutes. At the time the call came in some minor repairs were being made on the big truck, so that it was nearly 11 o'clock before it was ready to start. The first-aid miner driving it covered the 80 miles in 4 hours and 30 minutes, arriving at 3:30 p.m. This is good time for a large truck heavily loaded with equipment, and one designed to travel 20 miles an hour.

When the foreman arrived at 12:30 p.m., flames were pouring out from the mine and it would have been impossible to enter it even if apparatus had been at hand, but he helped the fire companies from Brazil and Terre Haute, who by that time had a fire engine pumping water from a pond a quarter of a mile distant and were throwing a good stream of water on the fire.

At 3:30 p.m., when the apparatus arrived, the fire was about extinguished. Word was sent down the slope to the foreman, who in company with Mike Scollard, former chief mine

inspector, and William Morwood, inspector for the Associated Companies, immediately came out and commenced to assemble the apparatus. This required about twenty-five minutes. Just as they completed this and started for the mine opening, word came out that the firemen had gone on into the mine without equipment and were bringing out a body. The foreman and the two men above mentioned then went into the mine and brought out the fourth and last body. The firemen who rushed into the mine without apparatus were, of course, running a great and probably unwarranted danger of being overcome by carbon monoxide, and in fact they were nearly overcome.

It can hardly be expected that the federal government will be able to maintain rescue and fire-fighting crews in such numbers as to permit their reaching each mine in less time than was taken in this case. In fact, the time might well have been longer, since it is the duty of the men of the mine safety service to devote the greater part of their time to training at the mines, and it is only by chance that they are actually at their headquarters at any given moment. When the Mine Safety Service was established it was more with a thought of demonstrating methods and training men than to relieving the industry of all of the work of first aid, rescue and fire fighting.

Whenever and wherever the men of the service are available they are instructed to proceed promptly to the scene of the disaster and to render any aid possible, but the major responsibility of meeting any emergencies must always rest on the industry itself and the state officials. Since the federal government has no police power in the states the federal men could never proceed except by consent, and they must always be the assistants of the state inspectors under such circumstances rather than an independent and all comprehensive force.

In a number of mining districts the operators, realizing the necessity of having a twenty-four hour local service, have combined to support local mine safety stations and crews. That at Globe, Ariz., is well known. The Coeur d'Alene operators this year established such a station and have found it very useful in fighting mine fires. The Bureau of Mines will always give all of the service that it can, but it must not be expected to give complete and continuous protection to each individual district. To do so would require an appropriation of funds far beyond any that might properly be suggested to Congress.

H. FOSTER BAIN,
Director, U. S. Bureau of Mines.

Know Any Queer Ones?

A correspondent writes: "Why not have a letter competition to see who can report the oddest named coal mine? For instance, 'Struggling Monkey,' mine near Terre Haute, Ind."

The lists are open.



Production and the Market



Weekly Review

Present indications are that the year 1923 will close with the fourth largest production of bituminous coal on record. With two weeks to go, the output to Dec. 15 was 526,489,000 tons and the year's figure will be over 540,000,000 net tons. Three years—1917, 1918 and 1920—have exceeded this figure. Anthracite production, on the other hand, promises to set a new high record for fresh-mined coal. The total output for the year will be around 95,000,000 net tons, exceeded only by the war years, 1917 and 1918. The washery production in those years was very large, however, and has been correspondingly small this year. Therefore the final figures may show a new record for fresh-mined anthracite. This has been the most prosperous year ever enjoyed by the hard-coal industry, despite the strike of September.

The end of the calendar year has no especial significance to the coal trade save that as the miners will take several days for the holiday there will be a cleaning up of "no bills" at the mines, to be followed by brisker trading after the new year begins. The only feature of the past week has been the pick-up in screenings, not due to any increase in demand but to scarcity of fine coal. The operators, rebelling at the absurdly low quotations on screenings in the Middle West, shifted to mine-run, the demand for lump being at low ebb. A period of severe weather will call forth lump in quantity and screenings will again be plentiful, and cheaper than ever.

Stocks Allay Uneasiness About April 1

There is no change in the steam-coal market in the Eastern section of the country. New England is flat as far as all-rail Pennsylvania soft coal is concerned; the smokeless coals coming in by water have driven them off the spot market. Stocks of soft coal are so generally satisfactory that no strong currents in the price are looked for, even should there be definite indications of a strike next April.

Coal Age index of spot prices of bituminous coal at the mines declined three points last week to 178. The corresponding average price was \$2.16. Increases in price were recorded by central Illinois, Indiana, and Smokeless. Southern and Eastern coals all recorded slight declines in price.

Production of beehive coke for the year will fall short of 17,000,000 net tons. Although more than twice the output in either 1921 or 1922, this figure is below previous years; less even than in 1919, when the steel industry was at low ebb.

Quotations on independent anthracite are slowly receding. The market stands at \$11 for stove and nut. The steam sizes are weak, except No. 3 buckwheat, which has largely been tied up on contracts. Nothing but a spell of real cold weather can save the premium prices from a new year slump.

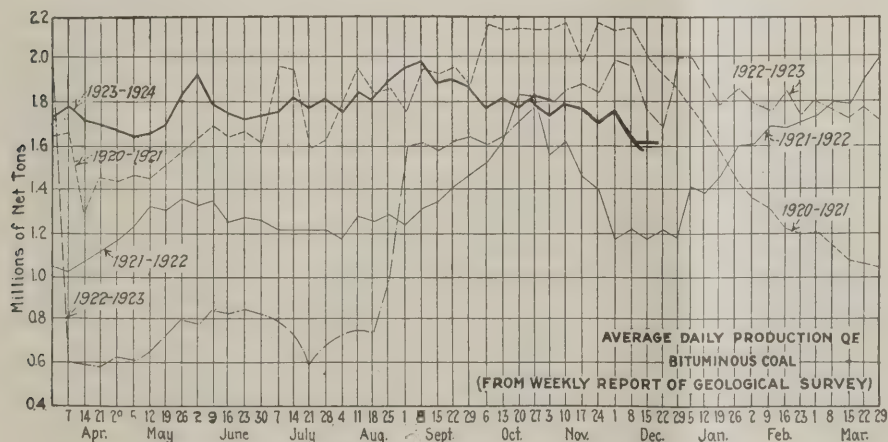
Lake movement of soft coal during the week ended Dec. 16 amounted to 48,567 net tons, of which 46,204 tons was cargo coal. In the corresponding week of last year 53,086 tons was dumped. Cumulative shipments of cargo coal during this season to Dec. 16 were 29,724,320 net tons, an increase of more than 41 per cent over the average of the three preceding years.

Dumpings at Hampton Roads for all accounts during the week ended Dec. 20 were 355,927 net tons, as compared with 283,168 tons the previous week.

Midwest Markets Are Slow

Nothing has happened during the past week to stiffen up the weak and sagging markets in the Middle West. Domestic demand is just as soft as the weather. Lump, produced in small volume because of the proportion of shutdowns in the Western fields, is filling the light demand and there is no immediate indication of any improvement in price because of the potential production all ready to burst loose with the first cold wave.

The domestic market is pretty well saturated with Pocahontas lump and egg at \$3.50@3.75 and with mine-run at \$2, so that the flow of that and other high-grade Eastern



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Dec. 1	10,387,000	8,943,000
Dec. 8 (a)	11,495,000	9,829,000
Dec. 15 (b)	10,667,000	9,828,000
Daily average	1,778,000	1,638,000
Calendar year	387,599,000	526,489,000
Daily av. cal. year	1,311,000	1,786,000

ANTHRACITE

Dec. 1	1,852,000	1,748,000
Dec. 8	2,075,000	1,899,000
Dec. 15	2,237,000	2,013,000
Calendar year	51,030,000	91,971,000

COKE

Dec. 8 (b)	291,000	265,000
Dec. 15 (a)	299,000	242,000
Calendar year	7,489,000	17,443,000

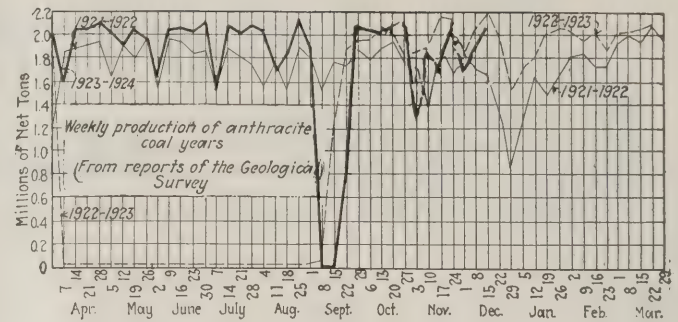
(a) Subject to revision. (b) Revised from last report.

coals into the Middle West runs along lightly. Anthracite is in no keen demand by householders. The large sizes are stocked in volume by retailers and even chestnut is now on hand in sufficient quantity to meet all needs.

Steam coals show the only signs of life and these are selling readily only because of the slim output.

It is a rather "blue" Christmas in the Cartersville field of Williamson and Franklin County for most miners. Many mines have been idle for many weeks. Others are working one and two days a week and very few of them are getting more than half time at best. Railroad tonnage has eased up and the only thing for which there is any great demand seems to be screenings and small nut. All mines have domestic sizes unbilled. Movement is good and plenty of empties are in sight. There is a general feeling of dissatisfaction among the miners throughout the entire field.

The Franklin County operators are trying to maintain their circular, but this is being cut and the independents are selling lump and egg as low as \$3, with nut at \$2.75, in an effort to keep things going. Railroad tonnage in the DuQuoin field is practically stopped. In the Mt. Olive district steam seems to be in good demand, but it is diffi-



cult to move domestic sizes. This field continues to take \$3@3.25 for domestic sizes, which dealers seem to think too high. Mines in this field are getting from one to two days a week. Railroad tonnage is good. In the Standard field screenings are in good demand and 2-in. lump fairly active, with a ready call for steam nut, while egg and 6-in. lump are slow.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Dec. 26 1922	Dec. 10 1923	Dec. 17 1923	Dec. 24 1923†
Smokeless lump.....	Columbus.....		\$6.30	\$3.75	\$3.35	\$3.25@ \$3.50
Smokeless mine run.....	Columbus.....		6.00	2.10	2.10	1.75@ 2.00
Smokeless screenings.....	Columbus.....		5.50	1.25	1.25	1.20@ 1.35
Smokeless lump.....	Chicago.....		7.75	3.35	3.35	3.25@ 3.75
Smokeless mine run.....	Chicago.....		6.60	1.75	1.80	2.00@ 2.25
Smokeless lump.....	Cincinnati.....		6.75	3.50	3.10	2.75@ 3.50
Smokeless mine run.....	Cincinnati.....		6.25	2.00	2.00	1.75@ 2.25
Smokeless screenings.....	Cincinnati.....		6.10	1.50	1.50	1.50@ 2.00
*Smokeless mine run.....	Boston.....		8.60	4.50	4.40	4.60@ 4.75
Clearfield mine run.....	Boston.....		4.25	1.85	1.90	1.40@ 2.25
Cambria mine run.....	Boston.....		4.80	2.35	2.35	2.00@ 2.75
Somerset mine run.....	Boston.....		4.40	2.10	2.15	1.75@ 2.60
Pool 1 (Navy Standard).....	New York.....		6.25	3.00	3.00	2.75@ 3.25
Pool 1 (Navy Standard).....	Philadelphia.....		5.50	3.00	2.95	2.75@ 3.20
Pool 1 (Navy Standard).....	Baltimore.....		6.00			
Pool 9 (Super. Low Vol.).....	New York.....		5.35	2.25	2.25	2.00@ 2.50
Pool 9 (Super. Low Vol.).....	Philadelphia.....		5.30	2.35	2.35	2.25@ 2.50
Pool 9 (Super. Low Vol.).....	Baltimore.....		5.10	2.25	2.25	2.00
Pool 10 (H.Gr.Low Vol.).....	New York.....		5.10	1.95	2.00	1.75@ 2.15
Pool 10 (H.Gr.Low Vol.).....	Philadelphia.....		4.85	1.85	1.85	1.75@ 2.00
Pool 10 (H.Gr.Low Vol.).....	Baltimore.....		4.60	2.20	2.20	1.90
Pool 11 (Low Vol.).....	New York.....		4.15	1.80	1.60	1.50@ 1.75
Pool 11 (Low Vol.).....	Philadelphia.....		4.45	1.65	1.65	1.60@ 1.75
Pool 11 (Low Vol.).....	Baltimore.....		4.10	1.90	1.90	1.75
High-Volatile, Eastern		Market Quoted	Dec. 26 1922	Dec. 10 1923	Dec. 17 1923	Dec. 24 1923†
Pool 54-64 (Gas and St.).....	New York.....		3.55	1.60	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.).....	Philadelphia.....			1.60	1.65	1.65@ 1.80
Pool 54-64 (Gas and St.).....	Baltimore.....		3.85	1.85	1.85	1.50
Pittsburgh sc'd gas.....	Pittsburgh.....		5.25	2.55	2.55	2.30@ 2.50
Pittsburgh gas mine run.....	Pittsburgh.....			2.25	2.25	2.20@ 2.30
Pittsburgh mine run (St.).....	Pittsburgh.....		3.10	2.05	2.05	1.90@ 2.10
Pittsburgh slack (Gas).....	Pittsburgh.....		3.00	1.50	1.50	1.60@ 1.75
Kanawha lump.....	Columbus.....		5.25	3.00	2.85	2.50@ 2.75
Kanawha mine run.....	Columbus.....		3.10	1.85	1.60	1.50@ 1.75
Kanawha screenings.....	Columbus.....		2.85	80	95	1.00@ 1.10
W. Va. lump.....	Cincinnati.....		6.25	2.85	2.85	2.95@ 3.00
W. Va. Gas mine run.....	Cincinnati.....		3.75	1.60	1.60	1.30@ 1.60
W. Va. Steam mine run.....	Cincinnati.....		3.35	1.60	1.60	1.30@ 1.60
W. Va. screenings.....	Cincinnati.....		3.10	85	80	1.00@ 1.40
Hocking lump.....	Columbus.....		5.25	2.95	2.90	2.50@ 2.75
Hocking mine run.....	Columbus.....		2.85	1.85	1.85	1.65@ 2.00
Hocking screenings.....	Columbus.....		2.60	1.05	1.15	1.25@ 1.40
Pitts. No. 8 lump.....	Cleveland.....		4.75	2.45	2.45	2.00@ 2.90
Pitts. No. 8 mine run.....	Cleveland.....		3.25	1.95	1.95	1.85@ 1.90
Pitts. No. 8 screenings.....	Cleveland.....		3.10	1.35	1.60	1.40@ 1.60
Midwest		Market Quoted	Dec. 26 1922	Dec. 10 1923	Dec. 17 1923	Dec. 24 1923†
Franklin, Ill. lump.....	Chicago.....		\$5.35	\$3.60	\$3.60	\$3.25@ 3.75
Franklin, Ill. mine run.....	Chicago.....		4.10	2.35	2.35	2.25@ 2.50
Franklin, Ill. screenings.....	Chicago.....		3.10	1.70	1.80	1.90@ 2.00
Central, Ill. lump.....	Chicago.....		4.35	3.00	3.00	2.75@ 3.25
Central, Ill. mine run.....	Chicago.....		3.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings.....	Chicago.....		2.20	1.45	1.50	1.50@ 1.65
Ind. 4th Vein lump.....	Chicago.....		5.10	3.25	3.25	3.00@ 3.50
Ind. 4th Vein mine run.....	Chicago.....		3.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings.....	Chicago.....		2.35	1.65	1.70	1.65@ 1.80
Ind. 5th Vein lump.....	Chicago.....		4.75	2.50	2.50	2.25@ 2.75
Ind. 5th Vein mine run.....	Chicago.....		3.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings.....	Chicago.....		2.35	1.45	1.50	1.50@ 1.60
Mt. Olive lump.....	St. Louis.....			3.00	3.10	3.00@ 3.25
Mt. Olive mine run.....	St. Louis.....			2.25	2.50	2.50
Mt. Olive screenings.....	St. Louis.....			1.55	1.75	1.75
Standard lump.....	St. Louis.....		4.25	2.85	2.85	2.75@ 3.00
Standard mine run.....	St. Louis.....		2.10	2.05	1.95	1.90@ 2.00
Standard screenings.....	St. Louis.....		1.50	1.15	1.35	1.25@ 1.50
West Ky. lump.....	Louisville.....		4.35	3.00	3.00	2.75@ 3.25
West Ky. mine run.....	Louisville.....		3.35	1.70	1.75	1.85@ 1.90
West Ky. screenings.....	Louisville.....		2.50	1.00	1.15	1.25@ 1.40
West Ky. lump.....	Chicago.....		4.25	2.85	2.85	2.75@ 3.00
West Ky. mine run.....	Chicago.....		2.75	1.75	1.75	1.50@ 2.00
South and Southwest		Market Quoted	Dec. 26 1922	Dec. 10 1923	Dec. 17 1923	Dec. 24 1923†
Big Seam lump.....	Birmingham.....		3.95	3.85	3.85	3.75@ 4.00
Big Seam mine run.....	Birmingham.....		2.60	1.95	1.95	1.75@ 2.15
Big Seam (washed).....	Birmingham.....		2.60	2.35	2.35	2.25@ 2.50
S. E. Ky. lump.....	Chicago.....		6.25	3.10	3.10	3.00@ 3.25
S. E. Ky. mine run.....	Chicago.....		3.85	1.85	1.85	1.75@ 2.00
S. E. Ky. lump.....	Louisville.....		6.75	3.35	3.10	2.75@ 3.25
S. E. Ky. mine run.....	Louisville.....		3.50	1.75	1.75	1.50@ 1.75
S. E. Ky. screenings.....	Louisville.....		3.10	75	1.15	1.00@ 1.40
S. E. Ky. lump.....	Cincinnati.....		6.50	3.10	2.85	2.50@ 3.25
S. E. Ky. mine run.....	Cincinnati.....		3.35	1.55	1.55	1.35@ 1.75
S. E. Ky. screenings.....	Cincinnati.....		3.25	95	1.00	1.00@ 1.25
Kansas lump.....	Kansas City.....		5.50	4.75	4.75	4.50@ 5.00
Kansas mine run.....	Kansas City.....		3.75	3.25	3.25	3.00@ 3.50
Kansas screenings.....	Kansas City.....		2.50	2.00	2.00	2.00

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in *italics*

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Dec. 17, 1923		Dec. 24, 1923†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....		\$2.34	\$9.00	\$7.75@ \$8.25	\$8.50@ \$10.00	\$8.00@ \$9.25	\$8.50@ \$10.00	\$8.00@ \$9.25
Broken.....	Philadelphia.....		2.39		7.90@ 8.10				
Egg.....	New York.....		2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 10.50	8.75@ 9.25	9.85@ 10.50	8.75@ 9.25
Egg.....	Philadelphia.....		2.39	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 12.20	8.75@ 9.25
Egg.....	Chicago.....		5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 11.50	8.00@ 8.35
Stove.....	New York.....		2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 11.00	8.75@ 9.25
Stove.....	Philadelphia.....		2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Stove.....	Chicago.....		5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York.....		2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 11.00	8.75@ 9.25
Chestnut.....	Philadelphia.....		2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 12.20	8.90@ 9.25
Chestnut.....	Chicago.....		5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range.....	New York.....		2.34		8.25		9.00		9.00
Pea.....	New York.....		2.22	7.00@ 11.00	6.15@ 6.30	6.00@ 7.25	6.15@ 6.65	6.00@ 6.50	6.15@ 6.65
Pea.....	Philadelphia.....		2.14	7.00@ 8.00	6.15@ 6.20	6.35@ 7.50	6.35@ 6.60	6.35@ 7.50	6.35@ 6.60
Pea.....	Chicago.....		4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York.....		2.22	4.00@ 5.00	4.00@ 4.10	2.00@ 3.00	3.50	2.00@ 3.00	3.50
Buckwheat No. 1.....	Philadelphia.....		2.14	5.00	4.00	2.25@ 3.50	3.50	2.25@ 3.50	3.50
Rice.....	New York.....		2.22	3.00@ 3.25	2.75@ 3.00	1.35@ 2.25	2.50	1.35@ 2.25	2.50
Rice.....	Philadelphia.....		2.14	2.50@ 2.75	2.75@ 3.00	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley.....	New York.....		2.22	1.75@ 2.00	1.50@ 2.00	1.25@ 1.50	1.50	1.00@ 1.50	1.50
Barley.....	Philadelphia.....		2.14	1.00@ 1.75	2.00	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Birdseye.....	New York.....		2.22		2.10	1.25@ 1.45	1.60	1.25@ 1.45	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in *italics*.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

St. Louis Market Easy

Mild weather has brought about an easy market in St. Louis with very little domestic tonnage moving and that only of the cheaper grades. Country demand has practically ceased. Wagonload steam locally is fairly active and carload for nut and screenings good, with some nut moving to Chicago and the Northwest. Although trade is low all over Kentucky, even in the Eastern non-union fields where wages have been reduced in some instances to get business, there is hope springing eternal in the Kentucky breast. The fact of low production, however, strengthened screenings in both ends of the state. There is very little business other than steam just now, but almost everyone sees something ahead.

Northwest Awaits Winter

Mild weather is still holding the market at low ebb at Duluth, Minneapolis and Milwaukee. The selling competition between rails, lakes and lignite from Dakota continues to be keen and to hide any sign of interest on the part of buyers. Demand at Duluth for soft coal is off. In fact dock men report that this year is the dullest in several years. It is expected, however, that many of the mines on the iron range will be in the market immediately after Jan. 1, as water power is short, and they will need coal to operate. The only demand at present is from public utilities and power plants

which have been supplying water power. The market is generally firmer. Dock men feel that the buying streak must come and are sitting tight.

West Also Somnolent

Nothing disturbed the painful peace of Western coal markets during the week. Steam coal is generally in good demand with small supply but domestic supply more than meets all the needs. In Utah operators are getting from \$1 to \$2 less at the mines for all sizes of coal than they did a year ago.

Ohio Markets Demand Slack

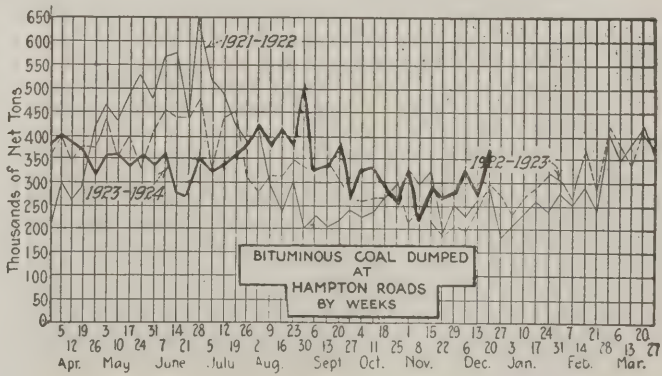
Slack, screenings and small sizes hold the attention of the Cincinnati market. Low-volatile screenings are beginning to be demanded by the by-product trade. The extreme weakness of the market is shown in lump, particularly smokeless lump. Retail business was in a trifle better shape due to a snow flurry but soon fell back into the old rut. Outside of the small sizes, which are showing strength, the trade at Columbus is dull. Buying of steam and domestic sizes is limited, owing to heavy reserves in the bins and yards of dealers. The Cleveland market, like all others, was affected by the holiday season. The steam trade is quiet, inquiries are few and but little activity is expected before Jan. 1. The Pittsburgh coal market grew poorer last week both as to prices and as to the difficulty in making sales. Demand for spot coal is light, and but few consumers with contracts appear to be able to take extra tonnage. It is quite impossible to interest anyone in stocking coal against a possible suspension on April 1.

New England Buyers Show No Interest

On steam coal in New England there are few developments. Buyers show no interest in the current market, and now that there is less coal being forced on the market there is a pronounced lull throughout the trade. At Hampton Roads the amount of coal standing has been steadily cut down and as fast as the tonnage is moved there is less and less being sent from the mines to replace it. A few agencies are even buying spot coal to make good on commitments, and, as might be expected in a situation of this character prices are up slightly although the upgrade movement is extremely slow.

Tidewater Demand Slow

Weather conditions reduced consumption and affected the soft-coal market along the Atlantic seaboard. Demand was slow at all tidewater markets, due to both weather and the efforts of nearly all consumers to avoid adding to their supplies until after New Year's. At New York there has been some inquiry regarding contracts for next year, some of which expire early in January, but the matter of price is difficult to arrive at. The Philadelphia market continues dull and lifeless. There is no buying of any consequence and consumers do not appear to be anxious as to increasing their reserves. Baltimore reports that except for the demand for slack from the cement industry there is no sign of encouragement in that market. The Birmingham market continues slow and draggy. Steam coal is difficult to move and domestic grades move slowly. The trade, it is asserted is at about the dullest point of the year.



Anthracite Market Not Active

There is no great activity in the anthracite market. Demand for the various domestic coals is sectional, stove being in demand in some, while in others chestnut appears to be the most difficult to obtain. At New York cancellations of high-priced coals are being received by some shippers, while the general run of quotations for stove and chestnut appears to be around \$11. Egg coal was quoted as high as \$10.50. Retail dealers are not inclined to buy premium coal unless it is absolutely necessary. Philadelphia retail dealers are not rushed for deliveries, most of them having some supplies on hand to meet all requirements. Egg and pea is hard to move by producers and in some instances they find it necessary to insist upon buyers taking some of these sizes

with the preferred coals. There is no activity in the Baltimore anthracite market. The steam-coal market is dull and these coals are accumulating, although barley is in better shape than either buckwheat or rice.

Car Loadings, Surplusages and Shortages

	Cars Loaded—	
	All Cars	Coal Cars
Week ended Dec. 8, 1923.....	913,774	173,156
Previous week.....	835,296	156,608
Same week in 1922.....	909,174	197,818

	Surplus Cars		Car Shortage	
Dec. 7, 1923.....	197,128	104,245		
Same date in 1922.....	6,657	2,352		
Nov. 30, 1923.....	153,057	80,756	1,336	605

Foreign Market And Export News

British Coal Output Gains

Production of British coal increased 10,000 tons during the week ended Dec. 8, output amounting to 5,729,000 tons, according to a cable to *Coal Age*. The output for the previous week was 5,719,000 tons, while for the corresponding week of last year it was 5,592,000 tons.

A sustained demand for almost all classes of coal maintains the activity of the Welsh coal market. There is a steady pressure for supplies for the balance of this year and over the first half of January. Most of the big mines are sold ahead, and new business probably will be done at higher prices. European business is increasing, especially with France, Belgium, Italy and Holland. The demand from Germany is slow. Business with other countries, including South America, is steady.

The only disturbing factor in the Welsh market is caused by the refusal of the trimmers to work the third shift at the ports. This refusal was a handicap, especially at Cardiff, it having come at a most inopportune time on account of the full order books of most of the mines.

The Newcastle market remains steady except that the return of stormy weather has delayed shipping. As a result there has been some prompt coal on the market and lower prices have been accepted. There is inquiry from Scandinavia and Germany, and France and Italy are also showing a disposition to do business. Operators are quoting current prices up to the end of March.

French Coal Market Dull

Demand for the French industrial coals is quiet, but movement of house coals is more active. Immediate needs are being covered, but with the cheapest grades. Anthracite and semi-bituminous are dull.

Imports of British coals are lower, buyers refusing to pay the high prices quoted as a consequence of the rise in sterling. Orders, close to 100,000 tons, have been placed in Cardiff by some of the French railways at prices of 26s. 6d. for large Admiralty second and 18s. 6d. for steam smalls, according to grades, for delivery during 1924.

Export Clearances, Week Ended Dec. 22, 1923

FROM HAMPTON ROADS	
For Dominican Republic:	Tons
Du. SS. Ary, for Puerto Plata.....	6,227
For New Zealand:	
Br. SS. City of Dunedin, for Auckland.....	1,417
For West Indies:	
Nor. SS. Tela, for Fort de France....	4,395
For Cuba:	
Amer. Schr. Snetind, for Cienfuegos..	2,260
Nor. SS. Krosfond, for Havana.....	2,678
For Halifax:	
Br. Schr. David C. Ritcey.....	443
For Italy:	
Ital. SS. Emanuele Accame, for Genoa.....	11,100

FROM BALTIMORE	
For Cuba:	
Am. SS. Elizabeth.....	4,698

FROM PHILADELPHIA	
For Cuba:	
Am. SS. Lillian.....	—

Hampton Roads Market Weak

Business, generally, was duller at Hampton Roads last week because of the holiday season. The market was weak, but movement of coal held its own. Foreign movement showed a slight increase, while inquiries for export coals were somewhat brisk.

Coastwise trade was slow, but bunkers was good, and supplies of coal at tidewater increased. Ill effects of the Virginian Ry. strike, which threatened to tie up coal movement on that road, were being eliminated, and the Sewalls Point piers received almost normal coal supplies.

Domestic business showed little improvement, and prices at retail were weakening. Ten dollars a ton was the maximum for best grades of soft coal at retail, while prepared coal were selling one dollar higher.

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Dec. 13	Dec. 20
Cars on hand.....	2,200	2,142
Tons on hand.....	125,575	124,317
Tons dumped for week.....	108,643	132,439
Tonnage waiting.....	12,000	10,000

Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,244	1,092
Tons on hand.....	73,950	66,450
Tons dumped for week.....	65,493	79,742
Tonnage waiting.....	1,040	4,500

C. & O. piers, Newport News:		
Cars on hand.....	1,560	1,417
Tons on hand.....	78,515	71,740
Tons dumped for week.....	78,693	105,611
Tonnage waiting.....	690	6,315

Pier and Bunker Prices, Gross Tons

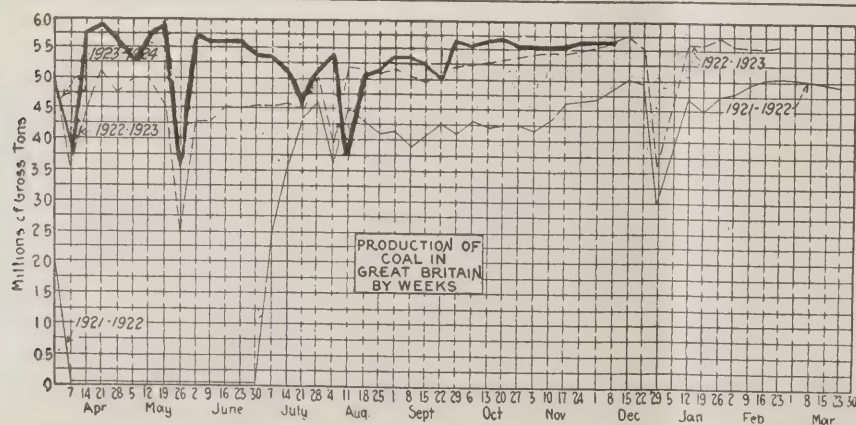
PIERS			
	Dec. 15	Dec. 22†	
Pool 9, New York.....	\$5.00@ \$5.25	\$5.00@ \$5.25	
Pool 10, New York.....	4.75@ 5.00	4.75@ 5.00	
Pool 11, New York.....	4.50@ 4.80	4.50@ 4.75	
Pool 9, Philadelphia.....	4.90@ 5.20	4.90@ 5.20	
Pool 10, Philadelphia.....	4.50@ 4.90	4.50@ 4.90	
Pool 11, Philadelphia.....	4.25@ 4.60	4.25@ 4.60	
Pool 1, Hamp. Roads.....	4.50	4.50@ 4.60	
Pools 5-6-7 Hamp. Rds....	4.15@ 4.30	4.10@ 4.25	
Pool 2, Hamp. Roads.....	4.25	4.25@ 4.35	

BUNKERS			
Pool 9, New York.....	5.30@ 5.55	5.30@ 5.55	
Pool 10, New York.....	5.05@ 5.30	5.05@ 5.30	
Pool 11, New York.....	4.80@ 5.15	4.80@ 5.05	
Pool 9, Philadelphia.....	5.15@ 5.55	5.15@ 5.55	
Pool 10, Philadelphia.....	4.90@ 5.20	4.90@ 5.20	
Pool 11, Philadelphia.....	4.65@ 4.90	4.65@ 4.90	
Pool 1, Hamp. Roads.....	4.50	4.50@ 4.60	
Pool 2, Hamp. Roads.....	4.25	4.25@ 4.35	

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to <i>Coal Age</i>			
	Dec. 15	Dec. 22†	
Admiralty, large	29s. 6d. @ 30s.	29s. @ 30s.	
Steam smalls	22s. 6d. @ 25s.	21s. @ 22s.	
Newcastle:			
Best steams	26s. 6d.	24s. 3d. @ 25s. 6d.	
Best gas	24s. @ 24s. 6d.	24s. @ 25s.	
Best bunkers	23s. @ 24s.	25s. @ 26s.	

† Advances over previous week shown in heavy type, declines in italics.



Traffic News

Postponed Again

Another postponement of the effective date of the assigned car order has been made by the Interstate Commerce Commission until April 1, 1924. This is the sixth postponement, the commission's decision originally having been scheduled to go into effect Sept. 1, 1923.

Lehigh Would Control D. S. & S.

The Lehigh Valley R.R. Co. on Dec. 17 made application to the Interstate Commerce Commission for authority to acquire control of the Delaware, Susquehanna and Schuylkill R.R. by lease or ownership of its capital stock. The D. S. & S. has been used in the past for coal carrying only. It is a short line established by Coxe Brothers & Co. and is situated in the Hazleton district.

Install 9,179 Coal Cars

Of a total of 21,973 new freight cars installed in service during November, 9,179 were coal cars, according to the Car Service Division of the American Railway Association. From Jan. 1 to Dec. 1 177,845 new freight cars and 3,704 new locomotives have been installed by the railroads.

Balk at Higher Hard-Coal Rate

C. A. Bruce, secretary of the Twin City Coal Exchange, announced on Dec. 11 that the exchange will file a formal protest against the proposed increase in through rail rates on anthracite from the principal Pennsylvania mines to Minneapolis and other Northwestern points. The freight rate on anthracite, if changed, will mean an increased transportation cost of \$1.66 on a net ton of hard coal, Mr. Bruce said. Several other Northwestern organizations are planning to protest the proposed rail rate, according to Mr. Bruce.

Obituary

Benjamin F. Tarr, aged 78, a Civil War veteran, who is said to have erected the first coal tippie in Pennsylvania and also to have sunk the first double coal shaft in the state, died Nov. 30 in his home in Verona, Pa. He had been connected with various gas and coal operations until his retirement, eleven years ago.

Angus A. Ferguson, 56 years old, a well-known mining man in Nova Scotia, former manager of Florence colliery, later coal inspector for Scotia, and mining instructor died at Sydney Mines on Dec. 10.

Henry S. Hastings, of St. Marys, Pa., receiver of the Pittsburgh, Shawmut & Northern R.R. and the mortgaged properties of the Shawmut Mining Co. and the Kersey Mining Co., died at New Haven, Conn., Dec. 13, while visiting his son, who is a student at Yale University. At the time of his death Mr. Hastings was President of the Shawmut Mining Co., the Kersey Mining Co., the Shawmut Coal & Coke Co., the Shawmut Commercial Co., Clarion River Ry., Kersey R.R. Co., the Shawmut Holding Corporation of New York State, Shawmut Realty Corporation of Pennsylvania, and treasurer of the Byrnedale Coal Co. He was 58 years old.

Ralph E. Gilman, special engineer in charge of turbo-generator engineering of the Westinghouse Electric & Manufacturing Co., died in the Methodist Hospital, Los Angeles, Calif., Dec. 5. He was on leave of absence in an effort to improve his health. Mr. Gilman was a graduate of the Leland Stanford University, receiving his E. E. degree in 1898. He entered the employ of the Westinghouse company immediately after his graduation and beginning in January, 1901, he was located for two years in the engineering department. In 1903 he was transferred to the British Westinghouse Company and spent the next five years in London. In 1908 Mr. Gilman was recalled to East Pittsburgh and assigned to special duties in the power-engineering department. He was in this department continuously until the time of his death. He leaves a widow.

Association Activities

Opposition to government interference in private business was voiced at a largely attended meeting of directors of the **National Retail Coal Merchants' Association** in Washington Dec. 14 and 15. It was unanimously agreed to work for association aims, such as standards of coal, through co-operation with governmental agencies rather than by seeking more laws. The Washington headquarters of the association was charged with the duty of collecting all available data relative to the use of fuel oil and other substitutes for coal, for the benefit of dealers needing this information. In discussing "snowbirds," it was agreed that the proper course to pursue is to educate the consumer to recognize that it is better to deal with a permanent coal merchant who has an investment, is responsible and who will stand back of his sales in weight and quality. Secretary Mellon's tax reduction program was indorsed and a resolution to this effect was adopted to be sent members of Congress. President Coolidge's message to Congress was approved. There was informal discussion of the coal bills already introduced in Congress, and of other measures which it is understood will make their appearance. F. W. Schremes, of the Schremes Fuel Service, Kansas City, was elected a vice-president of the Association to succeed the late E. R. Sweeney, of the Sweeney-Bryan-Mitchell Co., Kansas City, who died recently. Bluefield, W. Va., was selected as the meeting place of the next annual convention, to be held in May.

Recent Patents

Scraper, R. G. Le Tourneau, Stockton, Calif.; 1,470,853. Oct. 16, 1923. Filed Sept. 27, 1922; serial No. 590,755.

Scraper, J. R. Maginness, Sandy City, Utah; 1,471,178. Oct. 16, 1923. Filed May 7, 1920; serial No. 379,562. Renewed March 27, 1923.

Scraper, G. W. Packer, Chicago, Ill., assignor to Goodman Mfg. Co., Chicago, Ill.; 1,471,627. Oct. 23, 1923. Filed Nov. 2, 1922; serial No. 598,480.

Coal Cutter, M. S. Moore, London, England, assignor to Cowlishaw, Walker & Co., Ltd., London, England; 1,471,975. Oct. 23, 1923. Filed May 16, 1922; serial No. 563,969.

Shallow-Pit Coaling Station, R. S. Jacobson, Chicago, Ill., assignor to Roberts & Schaefer Co., Chicago, Ill.; 1,472,597. Oct. 30, 1923. Filed Oct. 19, 1918; serial No. 258,855.

Coal-Cutting Machine and Tool, I. E. Grundwald, near Munchen, Germany, and Rudolf Wannenmacher, Trautenau, Czechoslovakia; 1,472,641. Oct. 30, 1923. Filed March 28, 1923; serial No. 628,366.

Publications Received

Smoke Abatement, by Osborn Monnett, Bureau of Mines, Washington, D. C. Technical paper 273. Pp. 31; 6x9; illustrated. Discourses upon the pollution of the air, domestic smoke problem and gives results of tests of different coals. Plates showing starting of fires and the adding of coal are included.

La Destruction et La Reconstitution des Mines de Lens, Address before National Conservatory of Arts and Trades, March 12, 1922, by E. C. Cuvelette; 9 x 11 1/2 in., pp. 92, 47 full-page illustrations and 2 plates. Illustrations show mines before and after reconstruction. Publisher, L. Danel, Lille, France.

A pamphlet entitled "**Trade Standards Adopted by the Compressed Air Society**" has just been published embodying the result of extended study and research on the part of the executives and engineers associated with the members of that organization. It embraces the nomenclature and terminology relating to air compressors and their operations; a history of the development of speeds of air compressors; an explanation of capacities and pressures; instructions for the installation and care of air compressors with illustrations of devices suggested for cleaning the intake air; recommendation for the lubrication of air-compressing machines and the cleaning of air-receiver piping; a description of the low-pressure nozzle test recommended by the society, and a partial list of applications of compressed air. The Compressed Air Society has published this pamphlet with the belief that there is a need for such an authoritative work of reference, and that compressed air engineers and users as well as manufacturers of air compressors will appreciate this step toward the establishment of definite trade standards in the industry. Copies may be had from the members, or by addressing the Secretary of the Society, C. H. Rohrbach, 50 Church St., New York.

Coal Legislation Hopper

Representative Newton, of Minnesota, introduced in the House, Dec. 20, a bill authorizing government agencies to gather information about the coal industry. The bill gives the Federal Trade Commission authority to obtain information and make reports about ownership, production, distribution, stocks, investments, costs, sales, margins and profits in the coal industry. The Interstate Commerce Commission is authorized to obtain reports from the railroads relative to car distribution, mine ratings and similar questions. The Geological Survey is authorized to obtain information and make reports relative to coal production. The Secretary of Labor is authorized to obtain information relative to wages and labor conditions. The President is authorized to declare an emergency when in the judgment of the Federal Trade Commission such action is warranted. During such emergency the President would have power to deal in coal and to control production, movement and distribution of coal.

Trade Literature

Flanged Obround Condulets, Four-page folder published by the Crouse-Hinds Co., of Syracuse, N. Y., describing covers and wiring devices for Flanged Obround Condulets.

Reliance Electric & Engineering Co., Cleveland, Ohio, has issued a neat little book entitled "Electric Motors—How to Choose and Use Them." It has 32 pp., is 3 x 6 in.; illustrated.

Coming Meetings

Tug River Coal Operators' Association, Annual meeting Jan. 4, 1924, Bluefield, W. Va. Secretary, C. C. Morfit, Welch, W. Va.

New England Wholesale Coal Association, Annual meeting Jan. 8, 1924, Boston, Mass. Secretary, R. S. Townsend, Boston, Mass.

Engineers' Society of Western Pennsylvania, Annual meeting Jan. 15, 1924, Blue Room, William Penn Hotel, Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

American Wood Preservers' Association, Annual meeting Jan. 15-17, 1924, Hotel Buehlebach, Kansas City, Mo. Secretary, P. R. Hicks, Chicago, Ill.

Northeast Kentucky Coal Association, Annual meeting Jan. 24, 1924, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

News Items From Field and Trade

ILLINOIS

The United Electric Coal Mining Co. during the past year has purchased 2,500 acres of strip coal lands within three miles of Cuba, Ill., at a cost of \$300,000. The company is now building a steel tippie and grading plant of 4,000 tons capacity in eight hours. Three steam shovels, each costing \$110,000, and railroad tracks and switches costing \$250,000 have been erected. The total investment is expected to exceed \$1,000,000.

After two years and a half of development work, initial production has been reached by the new Shuler Coal Mining Co. mine at Alpha. The mine is now producing 100 tons daily, but in a few weeks the output will be raised to 300 tons. By next year the company expects to be producing 1,000 tons daily. As the Shuler company will attempt to market the bulk of its product in Davenport and Bettendorf, Iowa, and Moline, East Moline and Rock Island, Ill., it is believed that the competition will be keen in the steam coal line when this big mine has once been put on a capacity production basis. The company has 2,000 acres in the tract where development is now taking place. Charles Shuler, of Davenport, president of the Iowa National Bank and owner of extensive coal lands in Colorado and Iowa, is the head of the concern, and Charles Shuler, Jr., is the manager at the new mine in Alpha.

The Tiger Coal Co., Cuba, Ill., has opened a shovel mine, at a cost of \$100,000.

INDIANA

On application of the Consumers Coal Co., of Indianapolis, John F. Heinze, a coal operator of Boonville, has been appointed receiver of the Key Coal Co., which has operated a mine near Boonville. The coal mine has not been in operation since March 15.

"There appear to be too many mines and miners," said William Mitch, secretary of District 11, United Mine Workers, recently in commenting on reasons why Indiana mines are shut down 40 per cent and why the other 60 per cent is working only half time. John Hessler, district president, said freight-rate adjustments to give Indiana coal a better competing chance would help.

The Primrose Coal Producing Co. of Indianapolis, has been dissolved. William Schroluche was president.

KENTUCKY

Early in the coming year the Northwest Kentucky Coal Association will move its offices to the recently completed Ashland National Bank Building. A number of operating companies in the Big Sandy field will establish offices in the new bank building. John E. Buckingham, a pioneer in the development of the Big Sandy field, is president of the Ashland National.

MASSACHUSETTS

Eugene C. Hultman, State Fuel Administrator, estimates that the total cost to the people of Massachusetts for heating their homes with anthracite during the current year will be \$90,000,000, double the cost of eight years ago. He says that this coal bill consists of \$50,000,000 for the anthracite at the mines in Pennsylvania, \$20,000,000 for transportation to Massachusetts, and another \$20,000,000 for delivery and other charges to the consumers' cellars.

MISSOURI

At a meeting Dec. 15 the board of directors of the Central Coal & Coke Co. declared the regular dividend of 5 per cent on preferred and 6 per cent on common stock. John H. Kirby, who recently acquired a controlling interest in the company, was elected to the board to succeed C. F. Fox, and Thomas Mackie, general purchasing agent and a stockholder, was chosen to succeed J. R. McAllister.

NEW JERSEY

Joseph Malloy, formerly of the Clearfield office of Halden-Kelley Coal Co., has been transferred to the Newark office of the company. He will be in charge of the office management under Ira M. Van Vliet.

NEBRASKA

The East mine of the Brewerton Coal Co., which has been closed for two months, as the result of labor trouble, resumed operation on Nov. 27 and the work of cleaning up the mine preparatory to hoisting coal was started. The closing was the climax of a series of short shutdowns due to labor trouble.

NEW YORK

The Westmoreland Coal Co. on Dec. 18 declared an extra dividend of 1 per cent and the regular quarterly dividend of 2 per cent, payable Jan. 2 to stock of record Dec. 27.

A. T. Ward of the Acme Coal Mining Sales Corporation has transferred his office to 1 Broadway, New York.

Colonel Oscar H. Fogg has resigned as secretary-manager of the American Gas Association. Colonel Fogg, who has headed the gas association since 1919, leaves to assume the position of president and general manager of the Baltimore Gas Appliance & Manufacturing Co., Baltimore, Md. Alexander Forward, of Richmond, a member of the State Corporation Commission of Virginia, has resigned that post to accept the position with the American Gas Association made vacant by the resignation of Colonel Fogg. The American Gas Association has a membership of more than 500 manufactured gas utilities in the United States and Canada.

OHIO

The Stark Mineral Co. has been chartered with a capital of \$10,000 to operate coal mines in the Tuscarawas field as well as to produce clay and other minerals. Incorporators are: Thomas C. Eayrs, Frank F. Bamberger, M. H. McCormick, W. L. DeHoff and Joseph A. Miller.

The Co-Operative Coal Co., Cleveland, has been chartered with a capital of \$10,000 to operate coal mines and sell coal at wholesale and retail. Incorporators are John K. Frye, Ray J. Curry, Della I. Curry, Georgeanne A. Frye and H. H. Henry.

The Ohio-Cities Coal-Supply Co., Akron, has been incorporated with a capital of \$500,000 to buy, sell and mine coal. Incorporators are S. R. Enderton, M. D. Hubbard, W. D. Stuhldreher, L. W. Rinear and H. E. Kepler.

A charter has been granted in Delaware to the Antiquity Coal Corporation, with a capital of \$800,000. The incorporators' names are: Elmer H. Holmes, Syracuse, Ohio; Charles Ebersbich, Pomeroy, and L. D. Davis, Middleport, Ohio.

OKLAHOMA

The Wise Mine of the Henryetta Coal & Mining Co., at Okmulgee, was badly damaged by a cave-in on Dec. 9. The loss is estimated at \$100,000. The Wise is one of the oldest coal shafts in the Henryetta field.

PENNSYLVANIA

A. B. Sheets, of Pittsburgh, Pa., vice-president of the Hillman Coal & Coke Co., has been elected to the board of directors of the Oakland Savings & Trust Co., Pittsburgh.

The four and a half mile belt conveyor system and two 35-car rotary dumps to feed the belt, being installed by the H. C.

Frick Coke Co. to convey the coal underground from their three Colonial mines at Grindstone and Smock, Fayette County, to the River near Fayette City is expected to be ready for operation by Jan. 1.

W. A. Chandler, consulting engineer for the Hudson Coal Co., has appointed C. J. Adams as electrical engineer to succeed James James, resigned, who has accepted a position with the Lehigh Coal & Navigation Co. Mr. Adams was formerly assistant consulting engineer for the Hudson company. R. J. McClure has resigned from the engineering department of the Hudson company, and J. F. Lewett has been named in his place.

The Philadelphia & Reading Coal & Iron Co., through J. F. Whalen, chief counsel, at Pottsville, on Dec. 18, resolutely opposed any settlement of the suit for taxes brought by the Schuylkill County Commissioners at a hearing before Judges Bechtel, Koch and Berger. Mr. Whalen, said that it was the purpose of the corporation to get a definite judicial decision on the heavy increase in taxes on its lands irrespective of any settlement made by other companies with the County Commissioners, and a decision solely upon the evidence presented.

The general grievance committee representing the 17,000 miners of the Lehigh Valley Coal Co. between Wilkes-Barre and Old Forge, at a meeting in Exeter, Dec. 14, decided to call off the strike, and have their grievances adjusted under the direction of District President Cappellini. The district president told the men that Mr. Thomas had agreed to reinstate the five miners discharged at the Maltby colliery for refusing to place a 9-in. topping on their cars, and that Mr. Inglis had assured him that no time would be lost by the conciliation board in taking up the grievances of the Valley miners.

Branson, Long & McFadden, Inc., with offices in Philadelphia, Johnstown and Pittsburgh, have sold their business to the Triangle Coal & Coke Co., of Pittsburgh, as of Jan. 1, 1924. The latter company was recently incorporated in Pennsylvania with a capital stock of \$25,000 by W. B. Atwood, president of the Bunker Coal Co., and his associates. Branson, Long & McFadden, Inc., have acted as sales agents for Bunker coal together with other high-grade steam and gas coals and the business will be carried forward by the new company in the same manner as before. J. L. Sease, E. C. Dodson and N. L. Parkins, formerly of Branson, Long & McFadden, Inc., will be in charge of the Philadelphia, Johnstown and Pittsburgh offices, respectively. The main office of the company will be consolidated with the offices of Bunker Coal Co. in the First National Bank Building, Pittsburgh, Pa.

Fire destroyed the Tip Top breaker of the Beaver Valley Coal Co., west of Hazleton on Dec. 10. The breaker has not been in operation this month, owing to a strike called on Nov. 30 by 150 of the workmen. The strike was due to the discharge of a foreman and the claim that a spy system had been in vogue. The company lacked fire-fighting facilities there and once the fire was started it could not be checked.

The first semi-annual meeting of the Coal Mining Institute of the Ninth Bituminous District was held on Dec. 1 at Connelville. S. S. Hall, mine inspector of the Ninth District, presided and addresses were made by John L. Gans of *The Weekly Courier*; Captain Steidle, of the Mining Department of Carnegie Institute of Technology, Pittsburgh; J. E. Struble, of H. C. Frick Coke Co., and Richard Maize, of Uniontown, president of the Coal Mining Institute of America, and others.

The Clearfield Bituminous Coal Corporation has been granted a permit for the enlargement of the existing impounding reservoir on Hinty's Run, the source of the water supply for the company's village of Commodore, Green township, Indiana County.

A state permit has been issued to the Jefferson & Clearfield Coal & Iron Co. for the construction of a waetr-works system in its mining village of Aultman, Centre township, Indiana County.

The Central Pennsylvania Coal Producers' Association has resumed publication of its "Bulletin" which was suspended some time ago. The co-operation of all members of the association is sought in order to make the publication a success.

L. N. Williams, it has been announced has become traveling coal freight agent for the Baltimore & Ohio, with headquarters at Pittsburgh.

The Lehigh Valley R.R. has started to store soft coal for use on engines on the Hazleton & Mahanoy division of the road, it was announced on Dec. 17. There is a pile of the fuel totaling between 10,000 and 12,000 tons at Delano, which was gathered last spring and summer, and to this has been added between 2,000 and 3,000 tons during the last few weeks.

Miners employed by the Pennsylvania and Hillside Coal companies in northeastern Pennsylvania had a record output of coal on Dec. 15, according to company officials, who say that 33,870 tons was prepared and shipped to the market in eight hours. The upper district of the Pennsylvania Coal Co. led with 21,870 tons to its credit. The lower, or Pittston district, turned out 12,000 tons, which was a light increase in production for this district, which prior to 1920 turned out as high as 15,000 tons of coal in a day. In the record made the No. 1 colliery, at Dunmore, had the largest output, 7,500 tons. For the past few months the mines of the Pennsylvania and Hillside companies, in the Pittston district, have not been hampered in production by petty strikes.

S. J. Phillips, state mine inspector, at Scranton, in a letter mailed to the Carnegie Hero Fund Commission called the commission's attention to the heroism displayed by Eben Jones, mine foreman at the Mount Jessup mine, who on Dec. 8 in an attempt to warn four fellow-workers of impending danger, was himself imprisoned with them under a fall of hundreds of tons of rock and coal. His body has since been recovered. Mr. Phillips describes the act of the hero-foreman as "one of the most heroic ever recorded in the anthracite field," and urges that the commission do its utmost in rewarding the hero.

Joseph J. Walsh, Secretary of Mines, told the Governors' Conference, at Harrisburg, on Dec. 14, in opposing the repeal of the certification law, that there are enough miners in Pennsylvania now. He added, however, that there was room for 22,000 additional laborers, on whom there are no restrictions in the way of required qualifications.

Although Mrs. Eckley B. Cox, wife of the late Senator Cox, pioneer anthracite operator, is seriously ill at her home in Hazleton, the forty-eighth annual visit of the "Coxe Santa Claus" was made to 3,000 school children of Beaver Meadow, Buck Mountain, Eckley, Stockton No. 7, Oneida, Tombick, Derringer, and Garven. Each boy and girl received a new \$1 bill and a half pound box of chocolate candy.

UTAH

Entry on 900 acres of coal lands in the Fish Lake National Forest is being protested by the field department of the U. S. Land Office. It is claimed that Olive Beebe, Rank Foote, Oscar Beebe, John F. Beebe and May B. Browning, claimants of the land, had not improved a mile of coal up to July 26, 1906, the date the government took over the preserves. The land in dispute is about eight miles from Emery.

The Utah Fuel Co. has announced its intention to test the constitutionality of that section of the Utah Workmen's Compensation law which provides that in addition to the burial expenses the employer of a person who dies leaving no dependents shall pay to the State Treasurer 20 per cent of the amount that would have been due such dependents. The question is now being considered by the Industrial Commission and is expected to go before the Supreme Court at an early date. If the law is not upheld a second problem will be the disposal of the \$30,000 which has been collected under the law so far.

WEST VIRGINIA

George R. C. Wiles, former chairman of the West Virginia Public Service Commission, speaking at the Lions Club Luncheon, Dec. 14, at Charleston, said that the trouble with the coal business in West Virginia is over development and the remedy for the situation is less government regulation through commissions and investigations and the establishment of fair competitive conditions. "Investigations and the creation of commissions can only result in the producers losing and the consumers paying," he concluded. "Give us fair competitive conditions and the law of the survival of the fittest will make West Virginia the greatest coal-producing section in the world."

Less than 1 per cent of the coal in West Virginia has been mined and at the present

rate of production the supply in West Virginia will last for 1400 years, Stephen Hays, general engineer of the Westinghouse Electric & Mfg. Co., said in an address before the Business Club of the West Virginia University. He also asserted that the available coal area in West Virginia is about 9,500 square miles, sheltering something like 60,000,000,000 tons of good coal and about 100,000,000,000 tons of low-grade coal.

A jury in the U. S. District Court at Charleston on Dec. 12 returned a verdict recommending judgment of \$899,054.60 for the White Oak Coal Co. from the United States Government. The company sued to recover that amount by representing the difference between the price paid by the Navy Department for coal requisitioned between July 1, 1919, and April 1, 1921, and the prevailing market price. Approximately 210,000 tons of coal was requisitioned at that time, the coal company asserted. Motion was made for a new trial by U. S. Attorney Elliott Northcott, who requested 60 days in which to prepare and file his reasons for a new trial.

The Valley Fuel Co. has increased its capital stock from \$100,000 to \$500,000 and the Kenawha Valley Coal Co., of Charleston, has increased its capital stock from \$100,000 to \$2,000,000. The Jake Henry Coal Co. has changed its general plan of stock issue from 3,000 shares of common stock to 2,500 shares of common stock and 500 shares of preferred stock, and the Indian Run Collieries Co. has changed its general plan of capitalization from 3,000 shares of preferred and 7,000 shares of common stock to 10,000 shares of common stock. The Behler Coal Co. and the Flat Run Gas Coal Co. have filed notices of dissolution with the Secretary of State of West Virginia.

There has been more activity among some of the larger mines in the New River field since Dec. 1. All sixteen of the mines of the New River Company, which had been working on a part-time basis, started working full time soon after the first of the month.

WISCONSIN

The late Edward A. Uhrig, president of the Milwaukee-Western Fuel Co., left an estate valued at \$4,361,489.42, according to the inventory and appraisal filed with the Probate Court, Milwaukee, Dec. 12, 1923. The inventory includes 10,700 shares of stock in the fuel company, held to be worth \$3,152,220. The deceased gave 911 shares of stock in the company, valued at \$268,380, to his son, Alex. B. Uhrig, some years prior to his death. His salary as president of the Milwaukee-Western Fuel Co. was \$18,000 per year. The entire interest of the Uhrig family was acquired by Pittsburg interests some months ago. Joseph W. Simpson is now president of the company.

The Milwaukee Western Steamship Co., subsidiary of the Milwaukee Western Fuel Co., has sold the two coal steamers, the Joseph W. Simpson and the Alex. B. Uhrig, to the Reiss Steamship Co., of Manitowoc, which is controlled by the Reiss Coal Co. The Reiss company now has eleven vessels in the lake coal traffic.

WASHINGTON, D. C.

The annual budget for the fiscal year ending June 30, 1925, submitted to Congress by President Coolidge, shows that the U. S. Coal Commission expended \$452,195.56 of its \$600,000 appropriation, that the expenditure for 1924 will be about \$138,000, leaving approximately \$10,000 to be returned to the Treasury. Among the other items of interest to the coal industry contained in the budget are: \$14,500,000 for coal and other fuel, including transportation, for the navy; \$4,250,000 for fuel for the army; \$1,805,272 for the Geological Survey; \$1,909,573 for the Bureau of Mines; \$78,000 for continuation of the investigation of mineral resources of Alaska, and \$136,734 for the preparation of reports of the mineral reserves of the United States, including special statistical inquiries as to production, distribution, and consumption of the essential minerals.

Dr. R. R. Sayers, chief surgeon of the Bureau of Mines, is in England on the last lap of a trip which has included a study of health conditions in mining communities in Australia, New Zealand, South Africa, and Europe. Dr. Sayers expects to arrive in Washington the latter part of December or the first of January.

Agreement between a labor union and employers which results in a limitation upon production is not a violation of the Sherman anti-trust law, at least in a specific case where the public interest was not affected, according to the decision of the U. S. Supreme Court, Dec. 10, reversing a decision of the lower courts in granting the government an injunction against the National Association of Window Glass Manufacturers, the National Window Glass Workers and others. The union and the association last year negotiated a contract in two parts, one to run from Sept. 25, 1922, to Jan. 27, 1923, and the other from Jan. 29 to June 11, 1923. It was provided that no employer could have both contracts. This resulted in closing those plants which did not have a contract. The object was to provide practically continuous employment for the 2,500 members of the union, which makes hand-blown glass, as business was insufficient to operate all plants continuously because of the competition of machine-made glass. One end to be accomplished was to prevent skilled workers from leaving the industry because of part-time employment. Although the lower courts declared this to be a violation of the Sherman act, the Supreme Court, through Justice Holmes, held that there was no conflict between this contract and the law.

Charles L. Dering, president of the American Wholesale Coal Association, has appointed the following committee to serve on Advisory Committee to the Coal Division of the Department of Commerce: Charles L. Dering, Chicago, Ill.; Borden Covell, vice-president (president Northern Coal Co.), Boston, Mass.; Seth W. Morton, Member of Senior Council (sales manager of W. G. Morton), Albany, N. Y. Alternate members: Benjamin H. Read, Director (Lynah & Read), Baltimore, Md., and G. H. Snowdon, director (president of the G. H. Snowdon Co.), Pittsburgh, Pa.

Washington retail coal dealers, represented by J. Maury Dove, Jr., president of the Coal Merchants' Board of Trade, and by officials of the National Retail Coal Association, presented to Secretary of the Interior Work on Dec. 14 a proposal to take over the entire government coal business in Washington. Secretary Work took the proposal under advisement, and prior to familiarizing himself with the details of the proposition, asked the dealers to withhold the provisions of their proposal.

CANADA

Lack of employment at some of the mines of the British Empire Steel Corporation at Sydney has become so serious that the provisional officers of the United Mine Workers at Glace Bay have appealed to Prime Minister W. L. MacKenzie King and other Canadian officials for relief. After stating that the mines are working only one or two days a week and some weeks not at all, and that some of the families are in destitute circumstances, the union leaders in their telegrams to the authorities say that it is their opinion that the government of Canada should make arrangements to take coal from these mines, so as to relieve the unemployment situation, instead of buying coal from the non-union coal operators in the United States.

Alberta Ontario Coal Imports, Ltd., of Toronto, has been incorporated with a capitalization of \$50,000. The provisional directors are Norman S. Robertson, George McC. Willoughby and Harold L. Steele.

The Western Coal Co., Ltd., has been organized at Toronto and has been granted an Ontario charter to carry on business as a coal operator. The authorized capital is \$40,000 and the provisional directors are H. A. Newman, M. R. Newman and F. M. Waizman, all of Toronto.

The last shipments of coal for the season have been made from the Nova Scotia coal mines to the St. Lawrence ports. The total shipments for the year to the St. Lawrence market are approximately 1,100,000 tons, which is an increase of 84,000 tons over last year, but less than was expected early in the decision. Many buyers during the strike transferred their orders from Nova Scotia to the United States.

As a result of the 1922 coal strike official government figures on exports of coal to the United States from Nova Scotia—the great bulk of which comes from the collieries of the British Empire Steel Corporation—show a striking gain for the coal year, ended March 31, 1923. Figures for the last three years, ended March 31, are as follows: 1921, 42,479 tons, valued at \$417,233; 1922, 16,057 tons, valued at \$129,322; 1923, 58,073 tons, valued at \$3,557,101.

New Equipment

Disk Mine Fan Fitted with Aeroplane Blades

Ship and aeroplane propellers always have had curved faces. It is natural that the blades of mine fans should be similarly constructed. A new mine ventilator with curved blades known as the Robinson Coniflo Disk fan is now being manufactured by the Robinson Ventilating Co., of 6027 Jenkins Ave., Pittsburgh, Pa. In eight comparative tests conducted by some of the largest coal companies these fans of equal size to those they have replaced are said to have produced larger volumes and higher pressures, operating at the same speeds and using the same motor.

Every fan operating at high speed and against high pressure has a marked short-circuit in the center of the wheel. This is called the back flow. It is caused by the peripheral speed reaching a maximum at the tips of the wheel and being practically zero at the roots of the blades. It is claimed by the manufacturer that this fault cannot be corrected by overlapping the blades be-

capacity and a greater mechanical efficiency than would otherwise be attained. The curved blades and the large center disk also give the air a much higher speed per revolution and permit the fan to be fairly efficient against pressure up to 2½ in. gage.

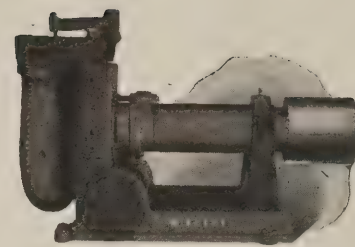
Compactness saves erection difficulties and makes the fan more portable. The fact that the blades are stamped from heavy sheets, riveted and braced by heavy plates to the center disk makes the wheel so strong that it can be operated to 1,000 r.p.m. Rods, bolts and nuts are eliminated in the bracing, consequently the braces cannot work loose. The balance also is maintained at all speeds. Either ring oiling or ball bearings can be used.

Centrifugal Pump to Handle Water with Dirt Solids

The Wilfley centrifugal sand pump, recently developed by the A. R. Wilfley & Sons Co., Denver, Colo., has as an important feature the elimination of the stuffing box, which in most centrifugal pumps gives considerable trouble when pumping gritty material.

The seal on this pump consists of a revolving member having radiating wings, called an "expeller," which prevents the material from leaking out by centrifugal action. An automatic check-valve seal is around the shaft while the pump is not in operation. Another important feature of this pump is the slippage seal adjustment. When this slippage occurs, as it does to some extent in all centrifugal pumps, it causes a reduction of capacity and efficiency. This leakage depends upon the clearance between the runner and the side plate. Gritty water in time increases this clearance and therefore cuts down the efficiency.

It will be interesting to note that this pump is fitted with ball bearings. The bearing assembly is of unit con-



PUMP FOR COAL WASHING

The wet process of coal washing and separation requires pumping of water containing much grit. A pump capable of meeting this condition must be simple, efficient and able to resist wear.

struction, independent of the frame.

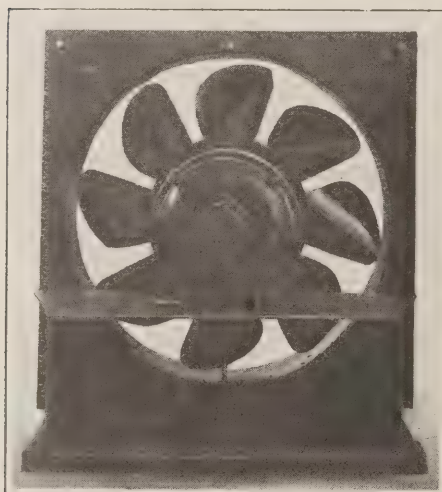
The wearing parts are all easily replaced in a few minutes, and this quick change feature is particularly valuable where a spare pump is not available or when the nature of the material handled is gritty, such as is the case where coal washing and a wet preparation process is used.

Mine-Car Retarder

In many cases the grade approaching the cage or dump is so steep that it is impossible to put in a cager or stops of any kind, as the load of the trip will bend the axles of the cars. Then again it is often desirable to control a trip of cars on steep grades. A device known as the Nolan mine-car retarder rubs the surface of the wheels of two or more cars and brings such pressure upon them that the cars can be brought to a complete standstill, if desired, and released so that the cars will move forward one, two or more at a time.

On one side of the track is a fixed guide which consists of a heavy channel, securely bolted to the ties. On the other side is a similar channel which is movable, and is moved in and out against the wheels of the cars by means of a hand lever situated wherever desired. This second channel moves upon slide plates and a spring will move it into its inoperative position, whenever the pressure from the lever is released. It is asserted that one man, by means of this simple machine, can control a long and heavy trip and feed the cars as desired.

The complete equipment is now being placed on the market by the Mining Safety Device Co., of Bowerston, Ohio.

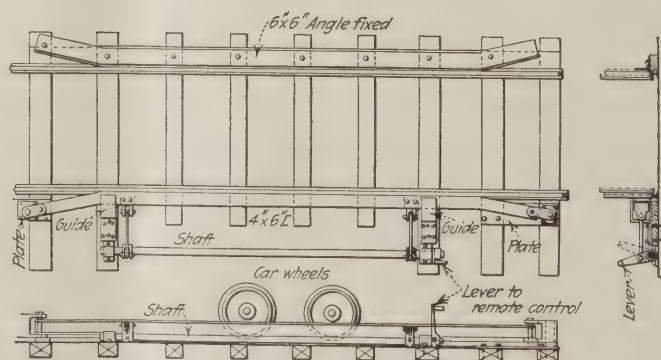


FAN BUILT TO PREVENT BACK FLOW

The fan revolves in the direction of the hands of a clock. Air leaves the blades not only near the casing but also near the disk. In consequence the pressure is more nearly equal over the whole airway ventilated.

cause this restricts the space through which the air must travel and slows the speed of the air through the wheel.

To a large extent the back flow is avoided with this fan because it is provided with such liberal space that the air can travel through the wheel at speeds that will create the pressure desired. The curvature of the blades assists the air to take a direction parallel to the axis of rotation of the fan and the large disk in the center of the wheel retards the back flow. The air is not discharged violently against the casing but along the edges of the blades. This gives the fan a higher volumetric



MINE-CAR RETARDER

The movable sidepiece puts pressure on the side of the car wheels and in this manner stops or retards the cars.

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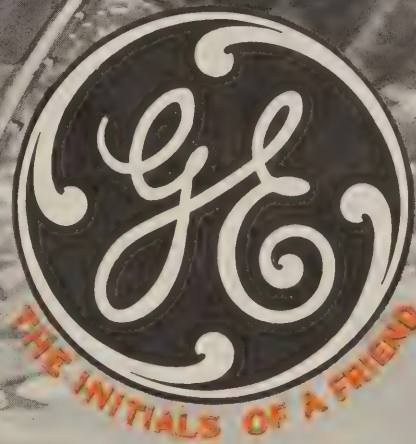
COAL AGE

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December 27, 1923



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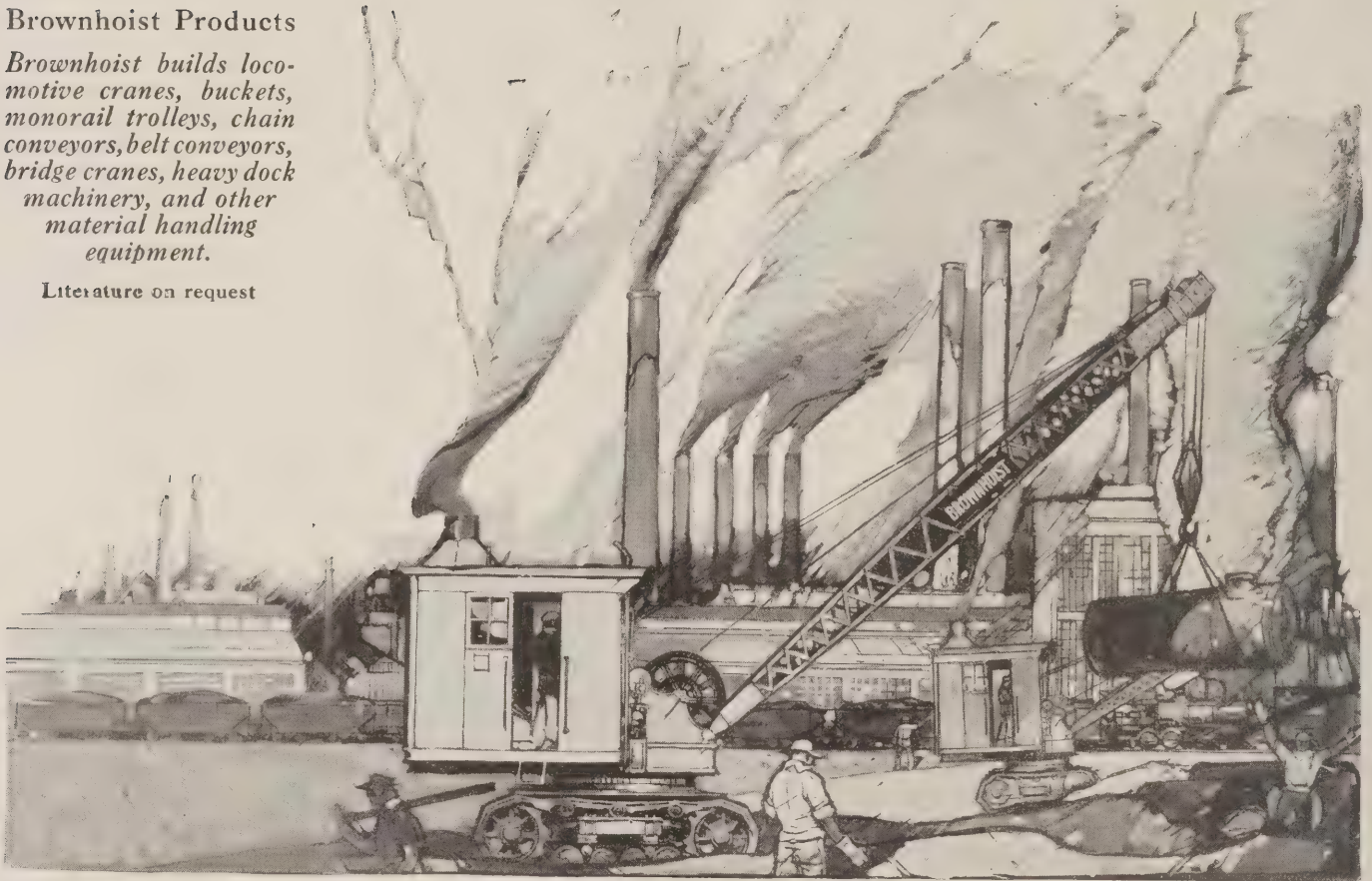
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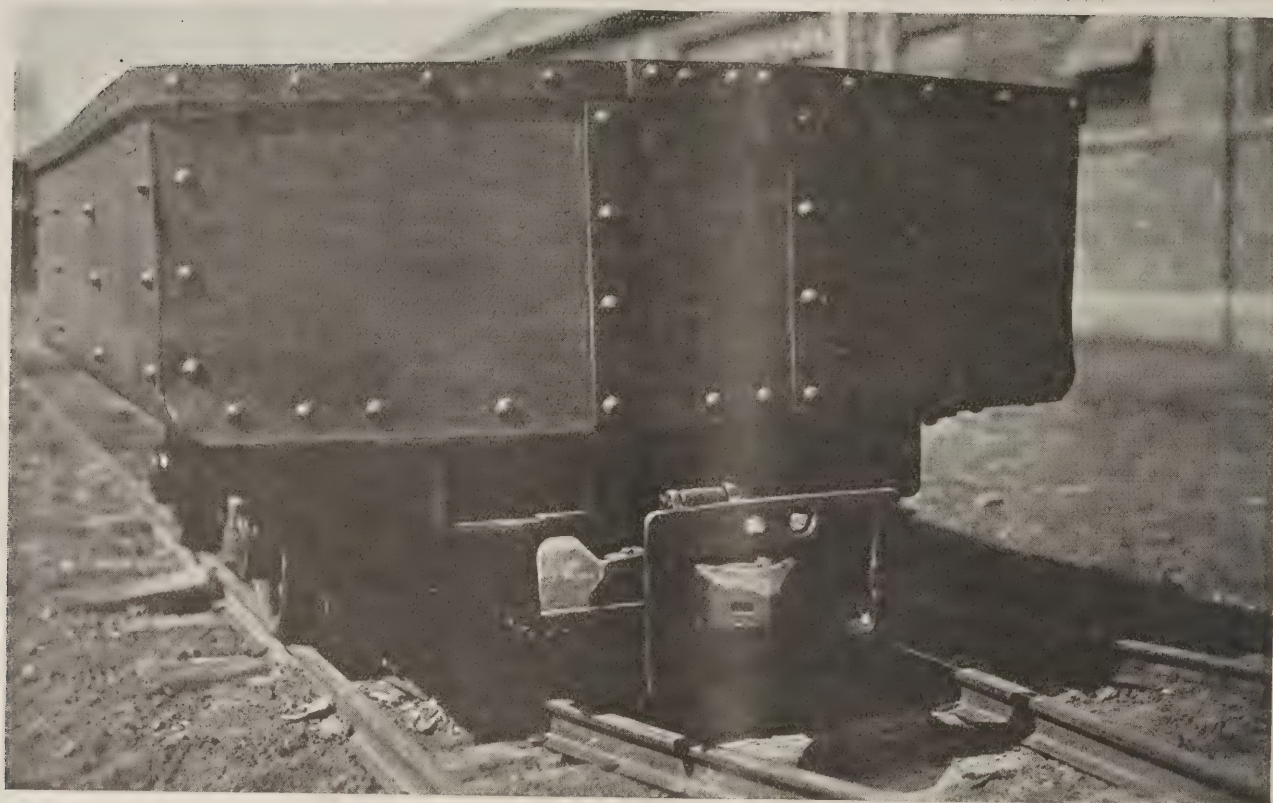
Copyright 1923
By McGraw-Hill Company, Inc.
Published weekly
Entered as second-class matter
Oct. 14, 1911, at the Post
Office at New York, N. Y.,
under the Act of March 3,
1879.
Printed in U. S. A.
Member Audit Bureau of
Circulations
Member Associated Business
Papers, Inc.
Number of copies printed
this issue, 12,724

Greetings

*This is the in-between issue of
Coal Age. Christmas is past;
the new year is just ahead.*

*Coal Age extends to all that
old but ever new and always
welcome greeting*

Happy New Year



Tomlinson Automatic Car Coupler and Spring Bumper for Mine Cars

The advantages and necessity of automatic couplers and spring bumpers for mine and industrial cars have long been apparent to those who have operated the heavier types of cars where they are operated in trains and hauled by locomotives.

To fulfill these requirements O-B is now offering to the mining and industrial field a modification of the well known Tomlinson Automatic Car Coupler. This type of coupler is standard on most of the electric railway properties in the United States, Canada and many of the foreign countries, where automatic couplers are used. Its merits have been proven, as it is in use on probably 50,000 cars scattered over the world—on several hundred different railways.

The operation is strictly automatic—requires no preliminary adjustments or alignment.

It couples by impact either on straight track, curves or vertical breaks in grade. Uncoupling is accomplished from either side of the trip with no danger to the operator—fully complying with all the safety appliance requirements now in force on steam railroads of this country.

The face of the Tomlinson coupler is a large flat surface and it has adequate spring draft gear to compensate for the bumping shocks—thus saving the car frame and body.

The Tomlinson Mine Car Coupler is designed so that it can be used on cars of the end dumping or rotary type. The rotary type may be dumped without uncoupling.

In fact, the Tomlinson Automatic Mine Car Coupler meets every requirement for operation of mine cars in trains.

Demonstration on your property can be arranged through consultation with any of our representatives.

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Jeffrey Labor-saving Mining Equipment as used by the Cleveland & Morgantown Coal Co.



Where Jeffrey Equipment
is used—

FAN



Where Jeffrey Equipment
is made—



NOTE how the complete steel casing extending to the ground, eliminated masonry and simplified the installation of this Jeffrey Fan at the Pursglove, West Virginia, mine of the Cleveland & Morgantown Coal Company.

A 7 ft. x 3 ft. 6 in. Double Inlet Blowing Fan, it has a maximum capacity of 150,000 cu.ft. per minute, with a normal capacity of 125,000 cu.ft. per minute arranged for belt drive from motor.

The Jeffrey type of casing here shown is of drift-mine application. A Jeffrey Blowing Casing may be built with steel hood extending over on air shaft or arranged for blowing into a drift or slope mine. Other Jeffrey casings include the Exhausting, Primarily Blowing Reversible, and Primarily Exhaust Reversible. The service of Jeffrey engineers is at all times available in helping determine the most practicable type of fan and casing.

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TRADE MARK

stopped air-leakage in the
old fan drift, and moreover
increased the air-current
from 160,000 to 200,000 cu. ft.
per minute!!

*This is only one of many instances of the
value of "Gunitite" in and about the mine.
Let us tell you about all the others!*

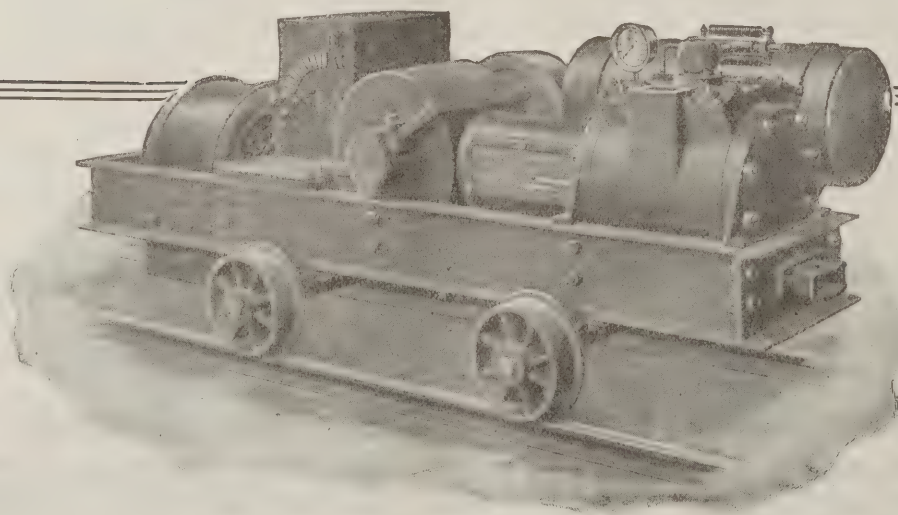
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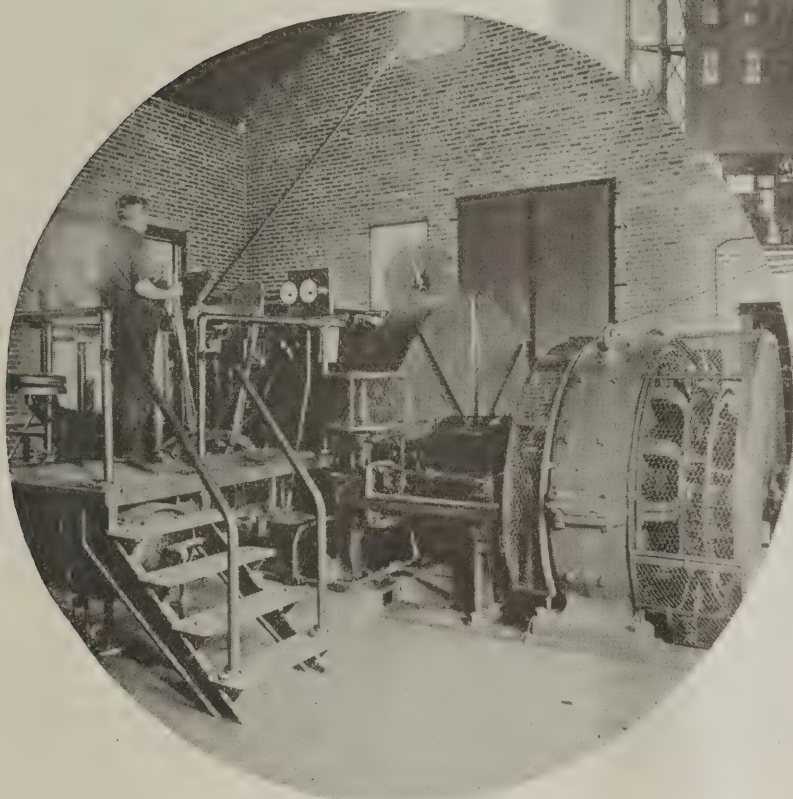
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The use of the Traylor Compressor means the elimination of leaky air-pipes—for you can run this compressor direct to the job, saving labor and money in shipping and inspecting and repairing air-lines. Write for Bulletins.

500 tons per hour
from a depth
of 405 feet!



HERE'S an 850 horsepower Vulcan, hoisting "in balance" 500 tons per hour from a depth of 405 feet. The installation is at the Coverdale Colliery of the Pittsburgh Terminal R. R. and Coal Company.

The cage weighs 20,000 lbs.; cars, 5,600 lbs.; coal 10,000 lbs.; rope 2,000 lbs.

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The Vulcan used here is single reduction geared with a cylindro-conical drum 9 to 11 feet in diameter. An air released, weighted engine operates two post type drum brakes. An auxiliary motor shaft brake, a Vulcan Travel and Speed Limit Device as well as other special Vulcan safety devices, complete the equipment.

The maximum rope speed is 1,560 feet per minute.

There's a Vulcan Hoist
for every purpose

Vulcan Iron Works

Established 1849

1730 Main Street, Wilkes-Barre, Pa.

VULCAN OF WILKES-BARRE

HOISTS



Three Wise Men and the East

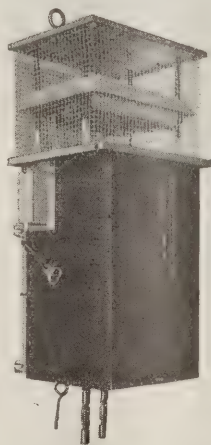
The brains of the Ample Steam Coal Co., comprising the superintendent, "Jack" Bream; the foreman, "Doug" Walls; and electrician "Peep" Cassidy, rubbed shoulders in a dog-hole off one of the East Haulage-way entries, while a trip of loads on the down grade thundered by to the tune of an incessant and discordant clanging of the locomotive gong.

With the passing of the tippie bound cars, the three huddled figures disjointed themselves from what appeared to be a compact unit of humanity, and with arched backs took up their journey to the outside.

The conversation began at the point where it had been interrupted in the scramble for safety. "Well, you fellows", Walls opened up, "got a good sample this morning of what we have to put up with down here in this section in the way of rotten voltage. I might call conditions on that East feeder line 'shocking', if it wouldn't be for stretching the truth. Guess you'll believe me after this when I report a mining machine stopped dead in its tracks with a smouldering armature, or another trailing cable going up on high in a blaze of glory."

Not to be denied, he continued: "We've got too much load on that section feeder and none on the

South. We could scamper a lot more coal out of that section if we had better power down there. Why can't we tie those two feeders together, I wants to know? Wouldn't that set us right, 'Peep'."



The Circuit Breaker with Brains

"Yes and No", 'Peep' replied. "No question but what it would largely solve our voltage troubles, but you'll never win me over to tying those section feeds together solid. With all of that bad roof in the South, you would be knocked out

of more time on 'shorts' than what you would gain in better voltage."

"Nope, what we ought to do—", 'Peep' glanced out of the corner of his eye toward Bream, "is—"

"Out with it" grunted the 'Super'. "Your monthly envelope is supposed to take care of an occasional stray new thought. If you feel one coming on get it out of your system."

"Tie those feeders together with an automatic reclosing sectionalizing breaker", 'Peep' responded with zest. "That would let the East section enjoy all of the advantages of being tied in with the South without any of the disadvantages. A 'fall' then wouldn't tie up operations in both sections tighter than a wet knotted sock."

"But, of course, that means spending a few dollars", 'Peep' added, "and, as you know 'Doug', our Boss is strictly 'agin' that sort of thing."

"Looks to me like a plain case of conspiracy with intent to mutiny", Bream laughed. "You're a wiser bird than I give you credit for being, 'Peep'."

"Don't hand me any bouquets", 'Peep' chuckled. "Slip your flowers to 'Doug'."

"You know 'Peep'", Walls came right back, "the Chief is no dumb-bell himself."

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO.

COLUMBUS, OHIO, U. S. A.

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PITTSBURGH: 223 Oliver Bldg.

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"SIMPLATE" Indestructible Flat Disc Valves: Exceptionally large bearing surfaces: Totally enclosed frame construction: Automatic lubrication throughout: Automatic regulation: These are the outstanding features which enable Chicago Pneumatic Air Compressors to develop high volumetric efficiency with low power consumption per unit of air actually delivered.

Men who know appreciate the refined development of the Chicago Pneumatic Air Compressors. Records of their achievements prove their efficiency and economy. All the 500 types and sizes are essentially the same machines, modern in every detail, each embodying all of the distinctive features.

There is a type and size for your requirement, with a satisfactory performance record. Write for Bulletin.

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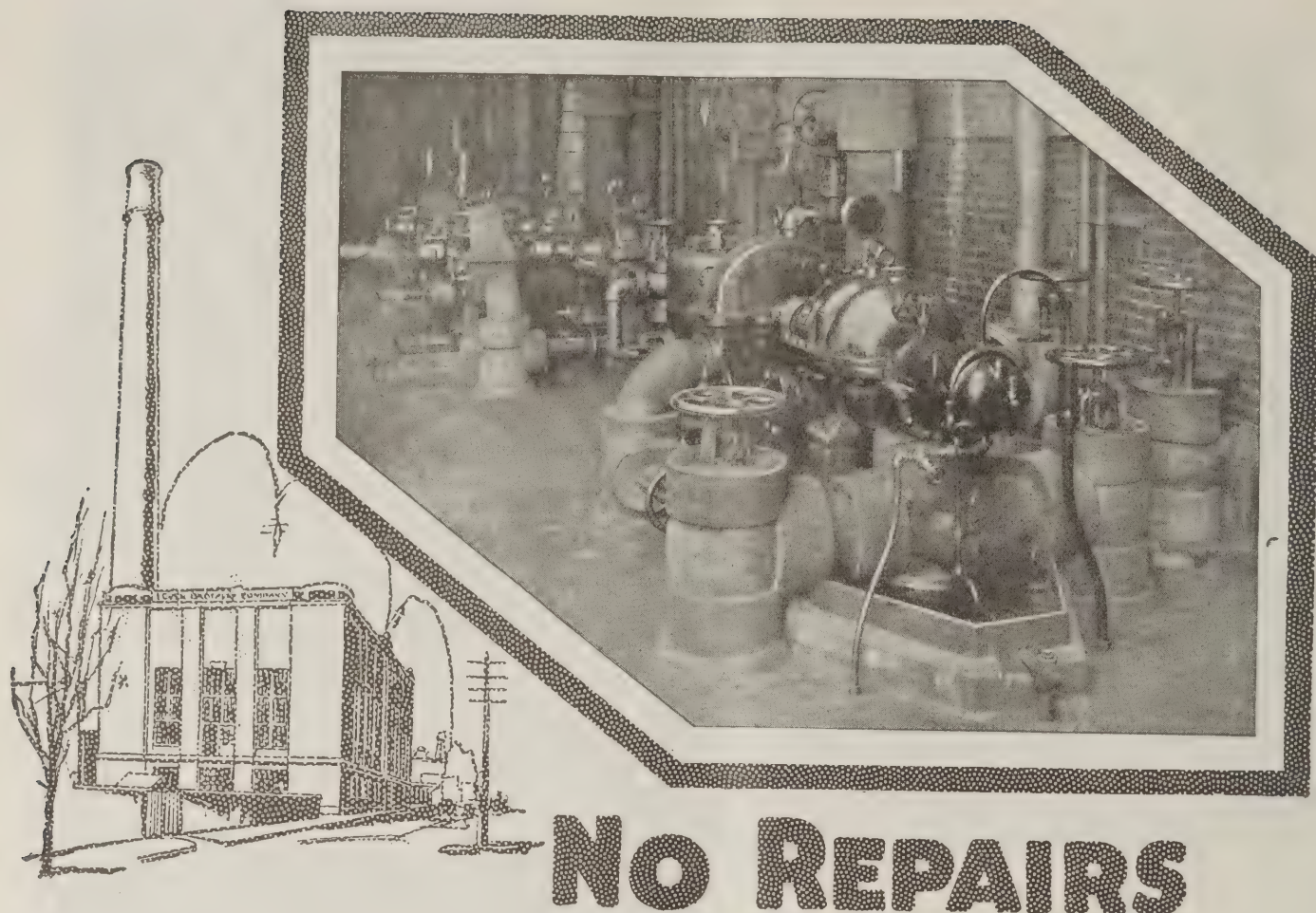
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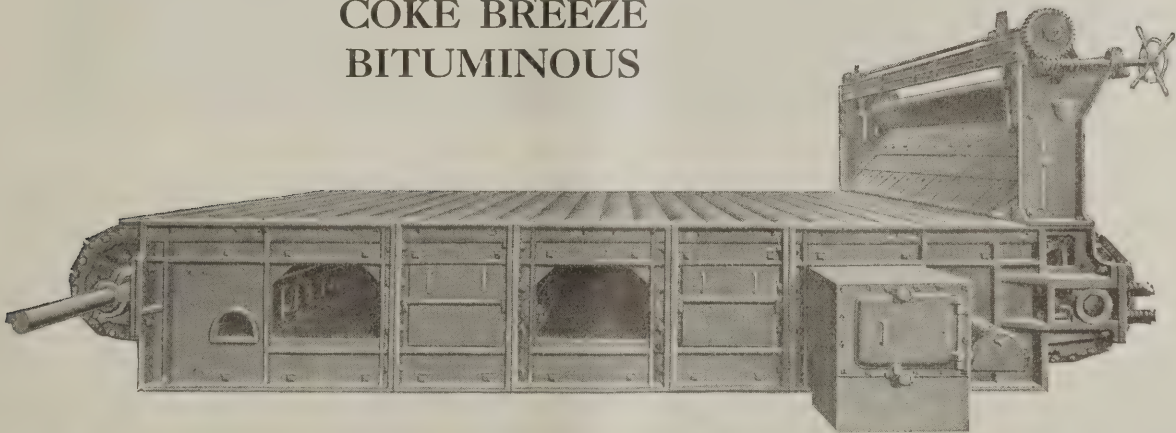
“This practice is inexcusable, wasteful and expensive.”

COAL AGE, Nov. 22, '23.

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How Can You Expect to Compete When You Are Spending All That Extra Money on Labor, Repairs, Haulage, Etc.?

USE—THE CAR FOR HARD TIMES

- (1) No tippie labor in dumping coal or slate, all automatic.
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The mine equipped with "S. & D. Griffith" Automatic Drop Bottom Cars

Prosper in Hard Times As the Woodward Coal Company wrote us:

Kent, Ohio, Nov. 26th 1923.

"We have just received your letter and the new Catalogue of the automatic cars. You certainly have placed this car into the Catalogue in a very plain and comprehensive manner. I enjoyed the "layouts" in the last five pages very much and think this is a good idea to carry them there and believe they could be even further elaborated.

"So far as the car itself is concerned we have used them now about a year and *could not be induced to go back to the old style end dump cars under any consideration.*"

Old Mines are discarding old-fashioned cars and for new mines the "S. & D. Griffith" Automatics are rapidly becoming standard equipment.

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- can a miner live in air in which the oxygen content is reduced to 17 per cent?
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PRACTICALLY every question that has ever been asked by a mine examining board in recent years is in these three books. The answers and illustrations are wholly original and taken as a whole cover every important phase of coal mining practice.

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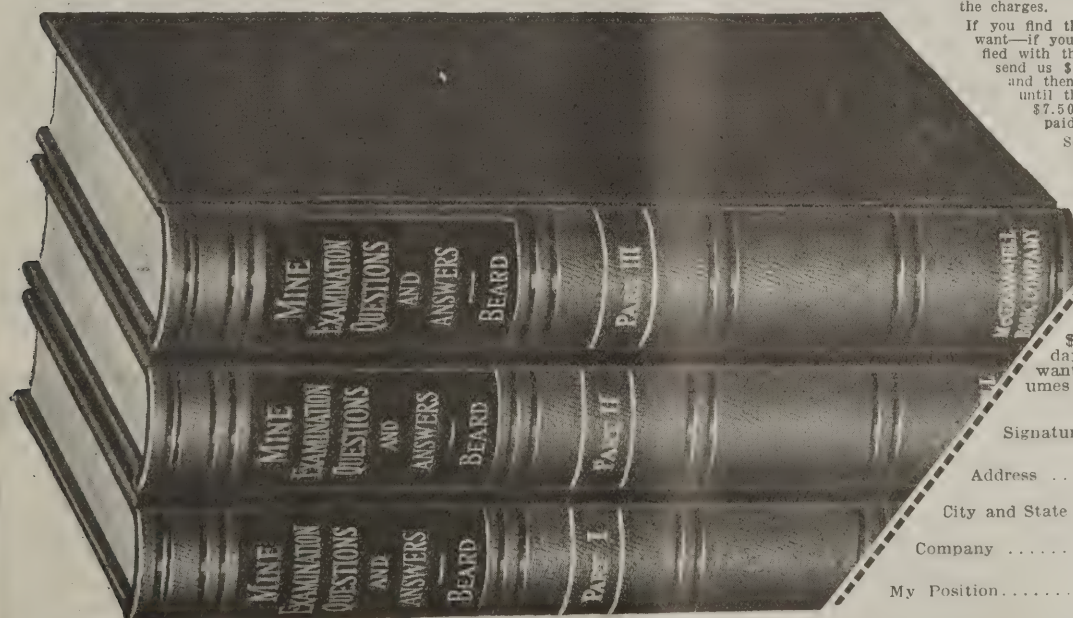
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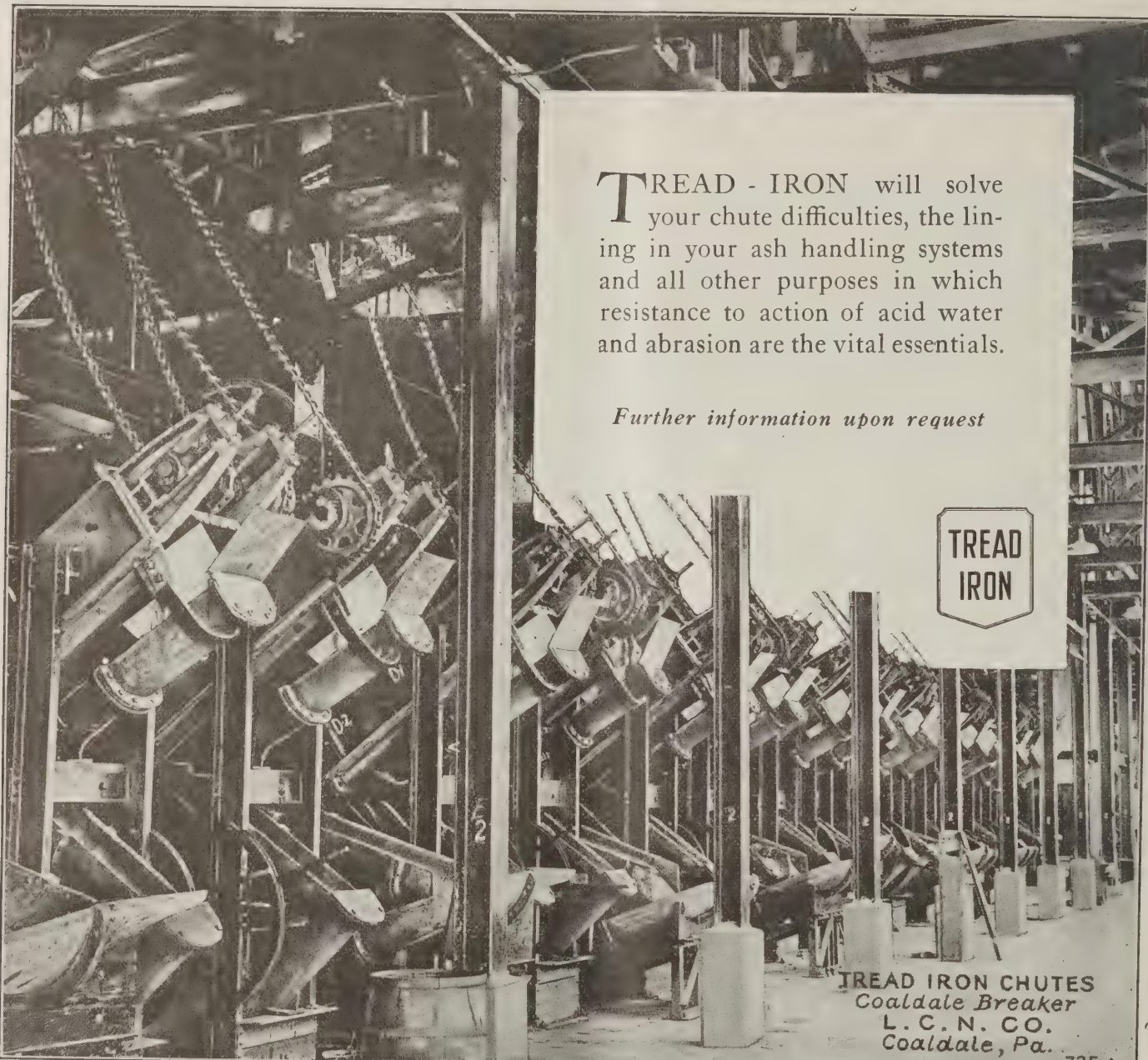
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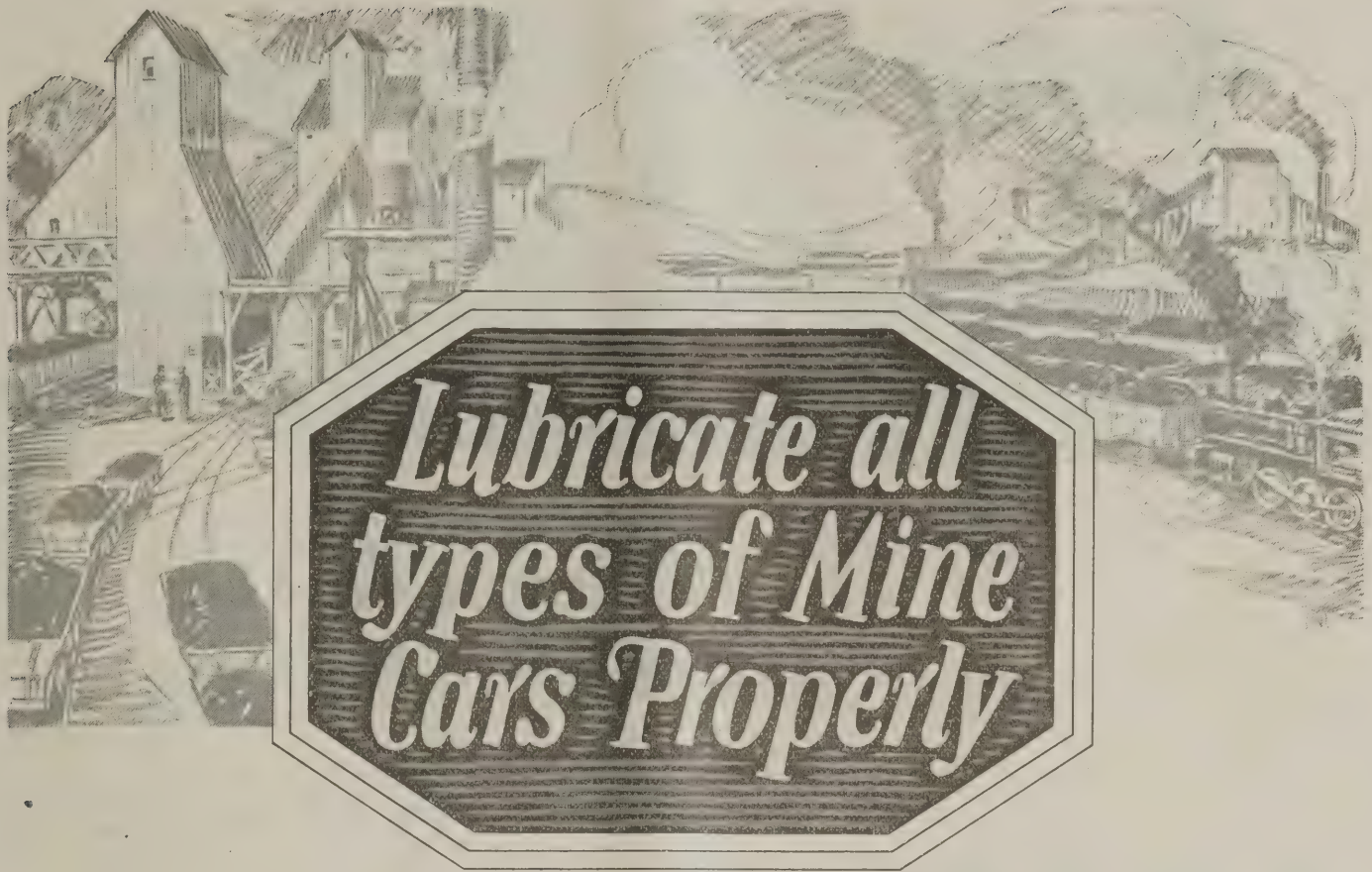
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The bearings on mine cars may be divided into four general types, each of which has characteristics which dictate the grade of grease which lubricates it properly.

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SECOND: The floating axle type in which the entire axle runs in an axle housing. Felt or wool packing is placed at various points on the axle to retain the lubricant which is carried in a reservoir in the center of the housing. The proper lubricant for this type of bearing is a grease which will feed easily by capillary attraction and not glaze or harden on the packing.

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will lubricate your mine cars properly, regardless of the type of bearings with which they are equipped. These greases are insoluble in water

and are not affected by acid, water or gases usually found in mines. They possess unusual lasting qualities and do not harden or gum.

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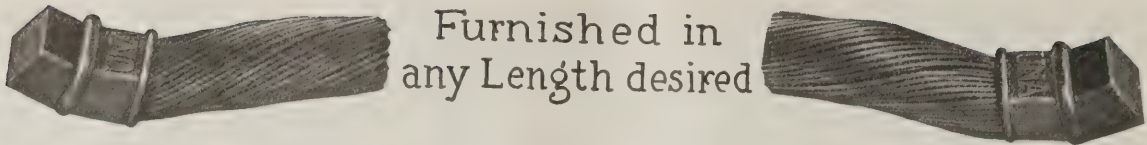
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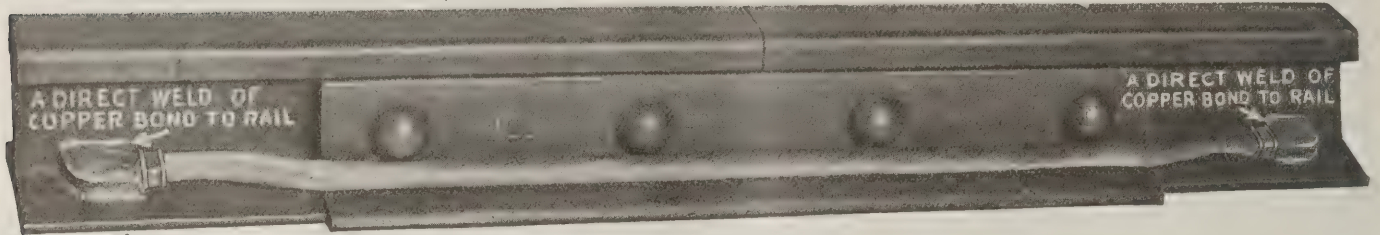
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A terminal of an all copper UNA Bond is placed in a small mold against the rail. An electric arc is drawn. Then UNA Metal (copper flux alloy) is melted into the mold with the bond strands. When the mold is full the bond head is solidly welded to the rail as shown by the above photograph.

It takes just about 35 seconds to weld each terminal.

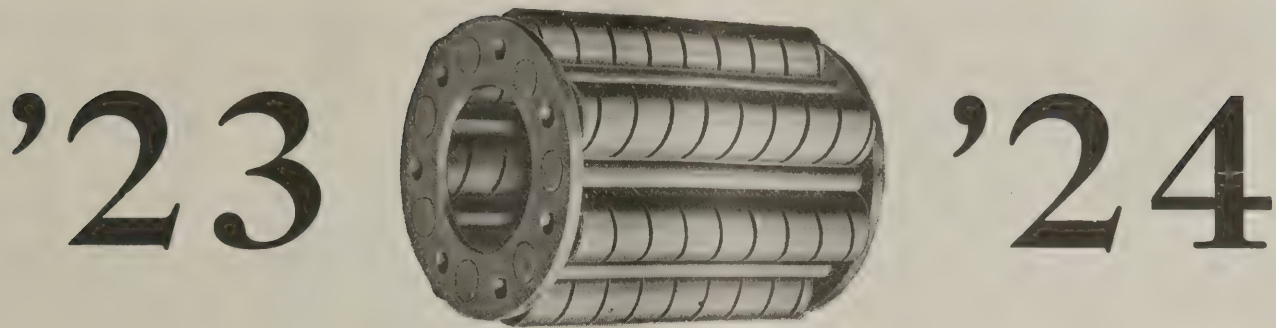
The complete job is simple and readily learned. Besides, the operator has easy control of the welding and can judge each weld as it is being made.

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The Past, the Future and Hyatt Bearing Mine Cars

This season of the year puts us all into a retrospective frame of mind, we pause before our entry into the new year.

With the coming of 1924 the mine operator is greeted by greatly increased responsibilities and problems. The past is gone but its lessons and experience remain, and the wise operator is going to cash in to the greatest possible extent on them.

The important thing is to make the coming year a successful one by applying the knowledge that 1923 and the years gone by have left.

One of the lessons learned in the mining industry is that mine cars whose wheels turn easily on Hyatt roller bearings are the best cars obtainable. Time has proved that these easy moving cars are time, labor and power saving, that they cut lubricating costs, and that they last many years longer than ordinary cars.

The operator whose cars are now Hyatt equipped has solved his car problem for good and all. His mind is free to pass on to unsolved problems, and you know there are enough of those.

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ROY EDWARDS

Steam Shovel Engineer

BLOCKER, OKLAHOMA

September 29th, 1923.

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Dear Sir:

Knowing that you are at all times glad to know of some good performance of the Thew shovels I am sending you three kodak views showing the Thew 3-A, 1½ yard steam shovel, shop #2148, equipped with a 32 ft. boom and 24 ft. dipper stick, digging slate, shale, clay and soil overburden that was 24 ft. deep when these views were taken. We have been in deep digging for some time but I am overcasting all material on one side and carrying a bottom that is 22 ft. wide. If anyone don't believe that I have dug material 24 ft. deep and 22 ft. wide just have them bring down their steel tape measure and I will show them. The Thew is a good reliable, rugged shovel to have on any job and this 3-A is the best stripping shovel built.

Yours very truly,

Roy Edwards

STATE OF OKLAHOMA,

Pittsburg County

SS.

Before me, *Thomas R. Jones*, a Notary Public, in and for said County and State, on this *14* day of *October*, 192*3*, personally appeared *Roy Edwards*

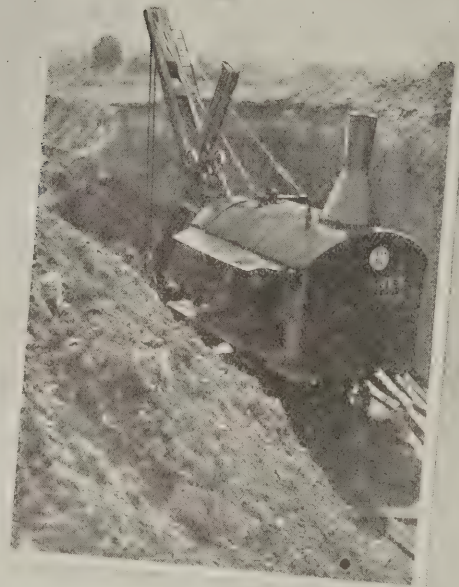
to me known to be the identical person who executed the within and foregoing instrument, and acknowledged to me that he executed the same as his free and voluntary act and deed for the uses and purposes therein set forth.

Witness my hand and official seal the day and year above written

My Commission on Expires

March 26-1927

Thomas R. Jones Notary Public



Just a few of the 150 mines abroad using

The Rheo Washer

- 1—The Charbonnages de Bois-du-Luc (Belgium), one of the largest mines in Belgium, have just put to work recently a Rheo-Washer.
- 2—The Mines de Lens (France) had a Rheo-Washer before the war which was destroyed by "faits de guerre," have ordered another to replace it.
- 3—The Nixons Navigation Steam Coal Co., one of the most important mining concerns in Great Britain, have ordered a Rheo-Washer after comparative practical trials had been carried out on their coals.
- 4—The States-Mines of Holland have ordered a Rheo-Washer after practical trials had been carried out on their coal.
- 5—The Establishments Schneider & Co., the leading industrial concern in France, have ordered a Rheo-Washer for their mines in Decize.
- 6—The Administration of the French Mines in the Sarre Country have ordered six large Rheo-Washers, three of which are now in practical operation.
- 7—The Gewerkschaft Carolus Magnus, Palenberg, Germany, have ordered a large Rheo-Washer to replace a jig washery.
- 8—Hulleras de Riosa, one very big mining concern in Spain, have built at their expense an experimental Rheo-Washer, which has been put to work a few months ago, and have ordered a large Rheo-Washer.
- 9—The Usines Skoda, Prague (Tcheco-Slovakia), the biggest industrial concern in the country (20,000 men), have ordered a Rheo-Washer.

And now the Rheo-Washer is coming to help American coal operators obtain clean coal at lower cost.

For complete particulars on the advantages and operation of the Rheo-Washer clip and mail coupon.

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- 1—A coal cleaning system that takes advantage of
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 - (c) Shape of the various pieces of coal.
- 2—The coal is washed down a long trough of variable grade with openings or traps at intervals in which the slate falls, being opposed in some cases by a rising stream of water, which prevents the coal being carried along with the slate.
- 3—A system of rewashing the middlings with the feed so that they aid in separating the clean coal from the slate, thus avoiding waste.
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- 6—Design permits of handling overloads and variations of feed.
- 7—Will wash all coal up to 4 inches—both anthracite and bituminous—with but one screening.
- 8—Not an experiment—a tried and proved system. Arrangements can be made to build it for your requirements entirely in the United States.

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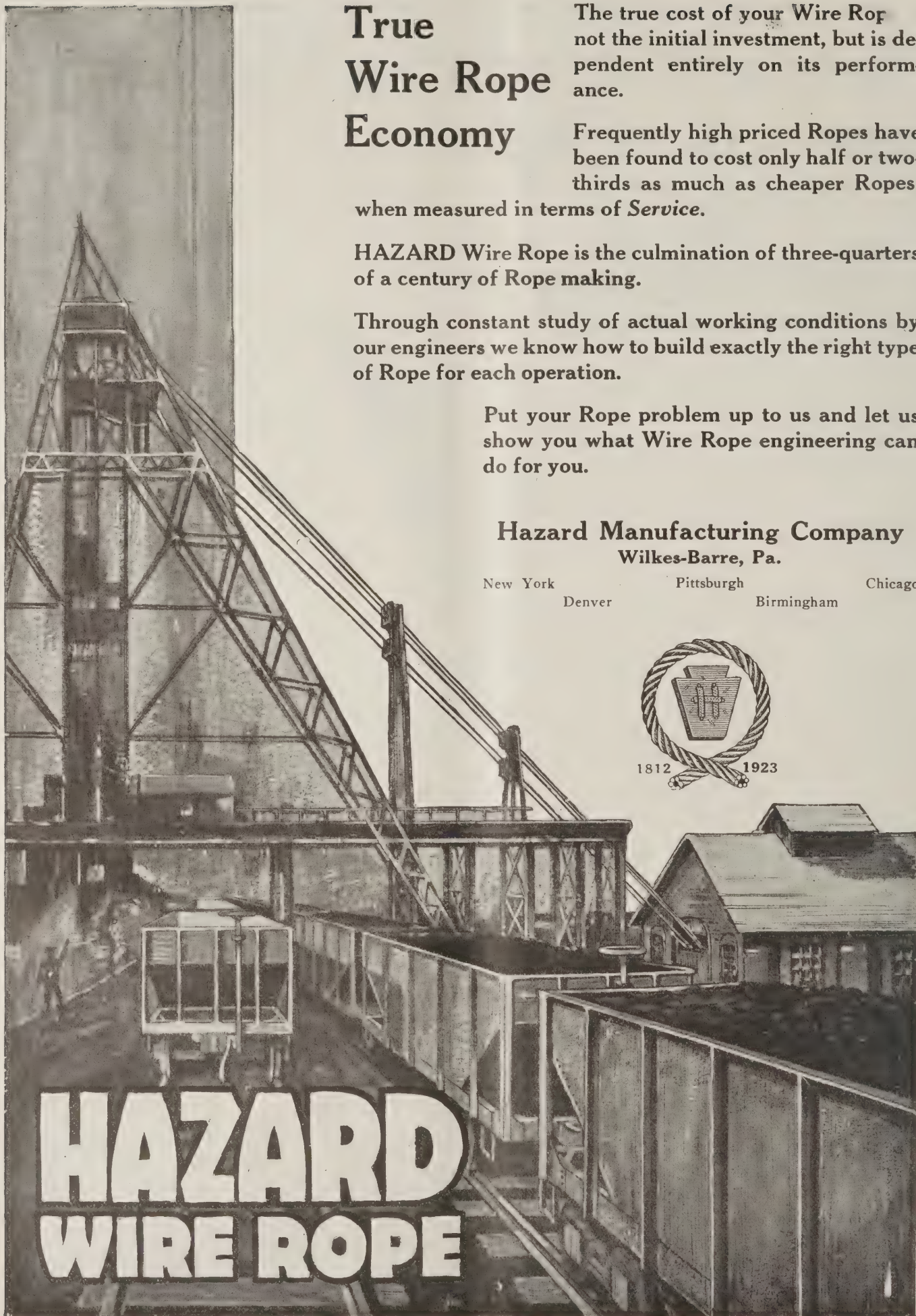
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Write for Complete Mine Pump Catalog.

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These Deming Distributors specialize in mine pumping service. The nearest one will give your needs personal attention. In nearly all cases they can make immediate deliveries from stock on their floor.

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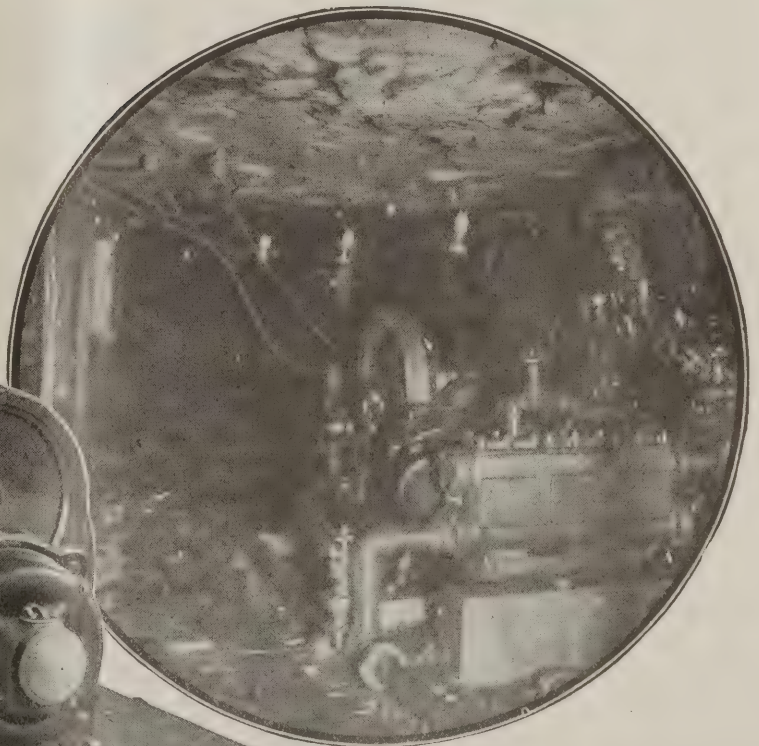
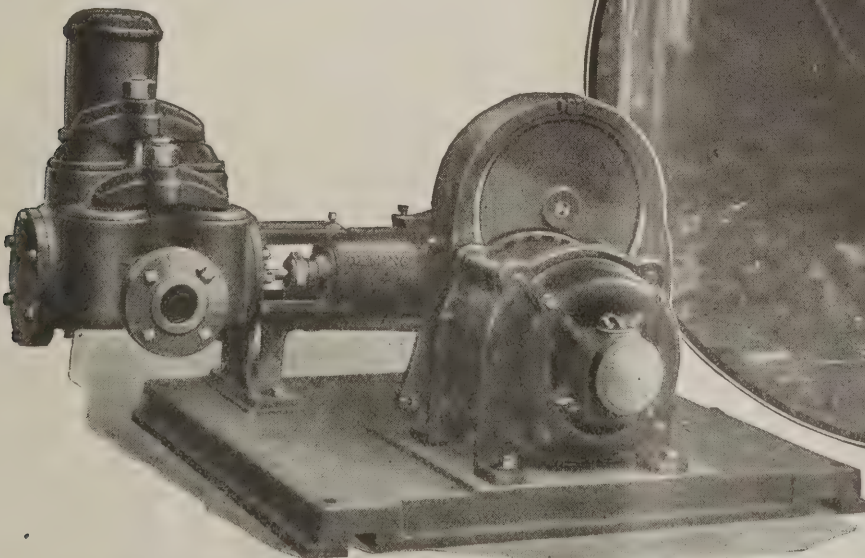
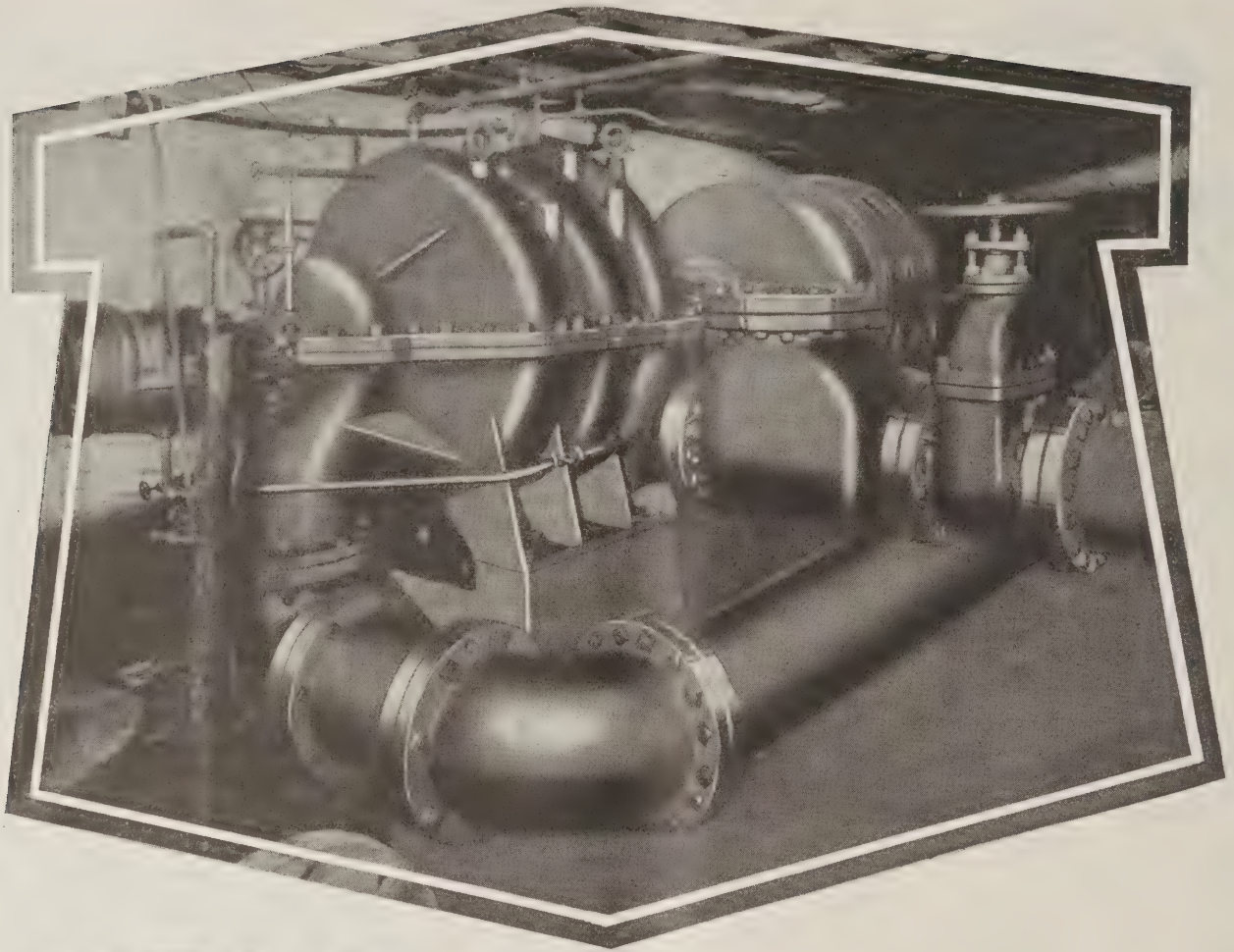


Fig. 896—Self-oiling, double-acting piston pump for medium service. Built in capacities of 50 and 80 gallons per minute.



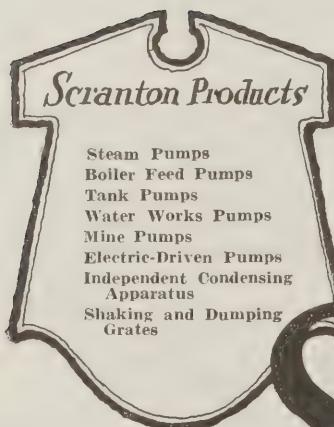
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Six Scranton Centrifugal Pumps similar to the one shown here are installed in the Jermyn Colliery of the Hudson Coal Company.

They are All-Bronze Units, 10-inch, 3-stage—driven by 300 hp. motors; 715-720-r.p.m.

Installed in 1918, they have shown an extraordinary capacity to withstand the dangers of acid water in the sump, and the toughest kind of service underground.

A full description of all our Scranton Pumps—for every service conceivable below and above the surface—will be sent you by return mail. We will also be glad to tell you about our other equipment for the mine.



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Use it with any
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**Weights 20 Cars a Minute—
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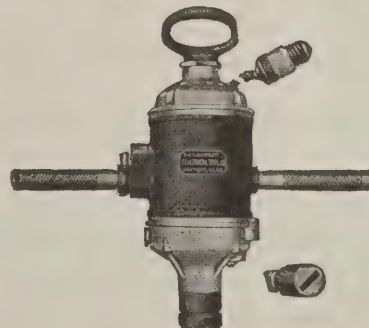
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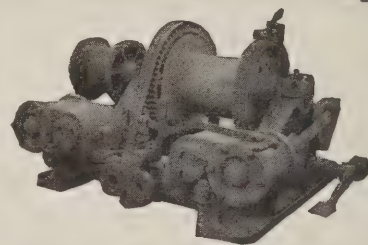
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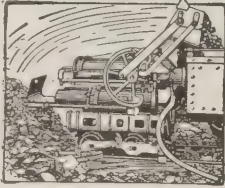
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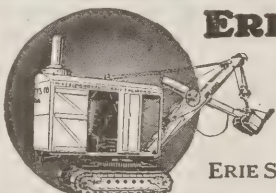
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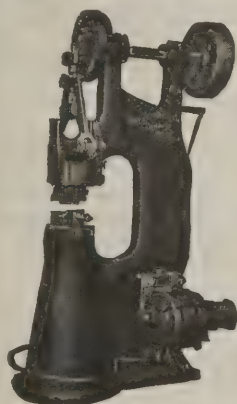
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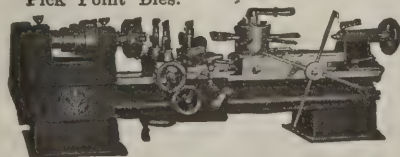
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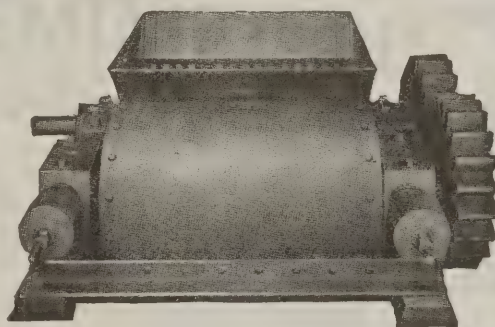
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Whether your crushing requirements be for stoker, plant or yard purposes, there is a Scottdale Crusher especially made to meet your requirements. A crusher of wide ability and capacity, sturdy construction, simplicity and economy of operation—dependable. Capacities range from 20 to 240 tons per hour.

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Box 950, Scottdale, Penn.



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MACHINERY



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There are Hauser-Stander Wood Tanks which have been in service for 30 years, without one penny of repair expense! That is what Hauser-Stander means by long service.

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Coal Preparation Specialties

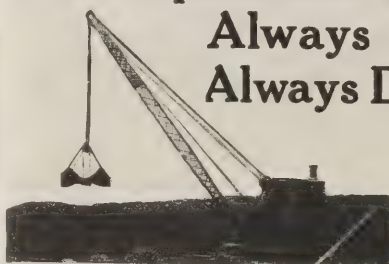
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All Types
All Sizes

Designed and built to give the user the best of everything

Let us show you one in operation.

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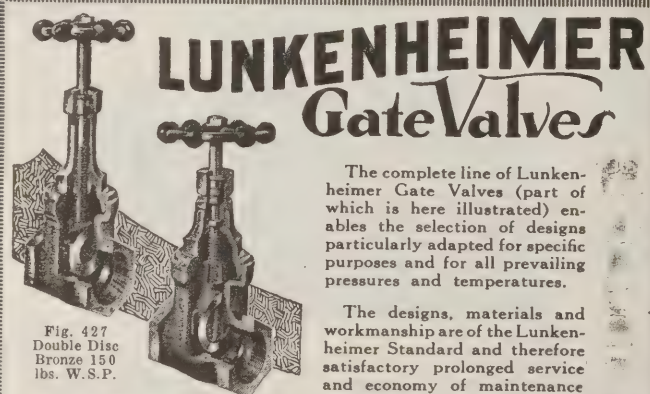


Fig. 427
Double Disc
Bronze 150
lbs. W.S.P.

Fig. 768
Wedge
Disc.
Bronze.
200 lbs.
W.S.P.

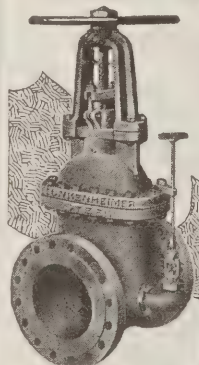


Fig. 1354
Wedge Disc
Steel 350 lbs.
W.S.P.



Fig. 892
Wedge Disc
Iron. 250 lbs.
W.S.P.

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"QUALITY"
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HIGH GRADE ENGINEERING SPECIALTIES
IN THE WORLD
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Fig. 647
Wedge Disc
Iron. 125 lbs.
W.S.P.



Fig. 600
"Clip." Iron
100 lbs.
W.S.P.

"America's Best since 1862"

600-31-9

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Machines**

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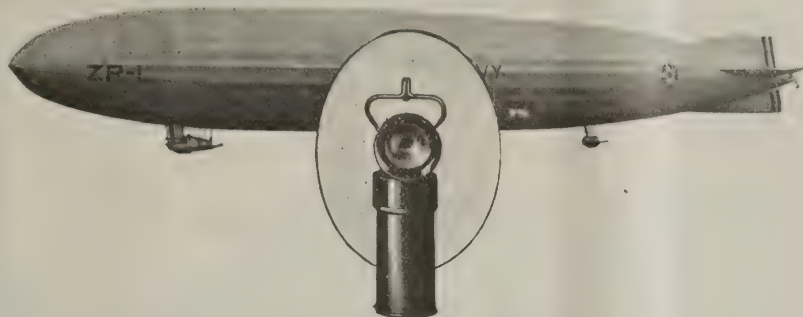
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"CEAG" Inspector's Lamp

Chosen by U. S. Navy for Use on Shenandoah (ZR-1)

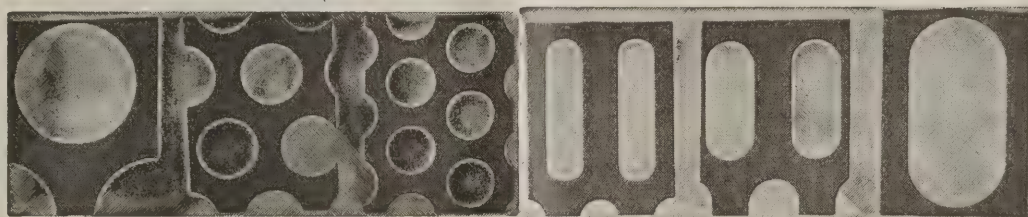
The "CEAG" Inspector's Lamp, Type G.M.S. is up to U. S. Navy standards of *safety* and *efficiency*.

This lamp was chosen for use on the Shenandoah (ZR-1) and is now standard equipment, "CEAG" Inspector's Lamps, Types G.M.S. and G.M. are used extensively by coal mine officials. Described in Bulletin No. 105.

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of Holes



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Tower Simplicity


The Caldwell Tubular Tower is the simplest, most easily erected and most graceful tower on the market. Its construction—of steel tubing, rugged socket castings and steel sway-brace rods with drop-forged turnbuckles—results in a tower of practically no wind resistance that will serve you long and faithfully. This tower is built for tanks from 1,000 to 40,000 gallon capacity. A prospective tower purchaser will do well to investigate the Caldwell Tubular.

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leaking, weak and impaired mine
shafts, tunnels and workings, and
eliminate water trouble.*

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Particularly for those conditions
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for every purpose



ELEVATOR BUCKETS (plain and perforated) **STACKS AND TANKS**
GENERAL SHEET AND LIGHT STRUCTURAL WORK
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Acid-Proof Wood Pipe for mine water




The
**Michigan
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DEISTER-OVERSTROM
Diagonal Deck Coal Washing Tables
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Been in use over 68 years. Used
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Investigate.

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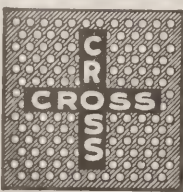
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LIDGERWOOD MINE HOISTS

Steam—Electric
For very mine Service

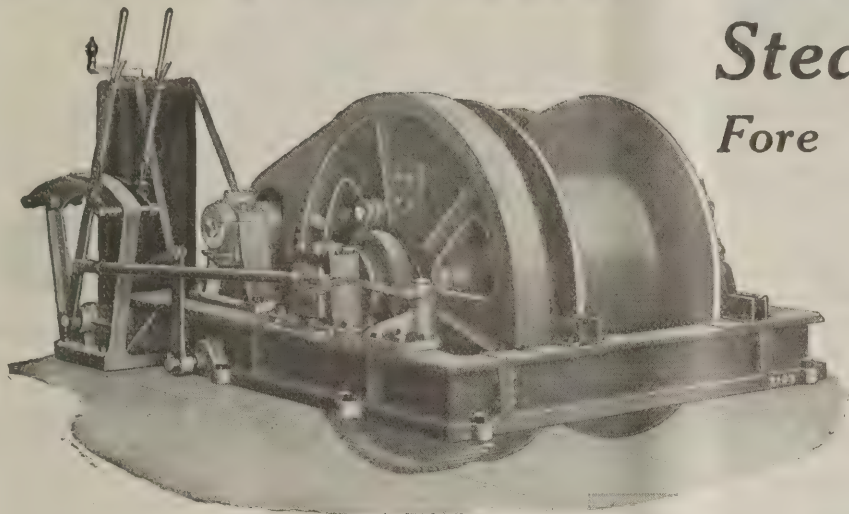


Illustration shows a newly designed band friction hoist, of medium size.

This hoist is proving very successful in operation.

It is built to the usual Lidgerwood standard quality of design, workmanship and material, insuring a smooth running, well balanced hoist.

SPEED

STRENGTH

SAFETY

WITH ECONOMY IN OPERATION

Requests for Catalogs invited

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A large mining property equipped two test locomotives at the same time, one with “Tool Steel” pinions, one with a highly recommended “special” of another make, claimed to be “as good as Tool Steel.” The two locomotives operated in the same service for the same time and the pinions were examined and impressions taken to show wear.



← This is the impression of the
“Tool Steel” Pinion

This is the impression of the →
**High Grade Special
Pinion**

After Identical Service

They Standardized on
“Tool Steel”

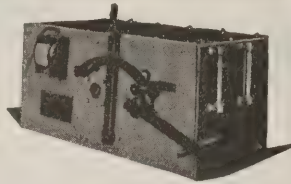
Do you wonder?



“Tool Steel” gears last from 5 to 8 times as long as untreated and two to three times as long as special quenched.

The Tool Steel Gear & Pinion Co., Cincinnati, Ohio

The Safety-First Friction Clutch Room Hoist



Entirely enclosed with a steel frame. Easily operated by unskilled labor. No danger. No jerk. Any speed desired.

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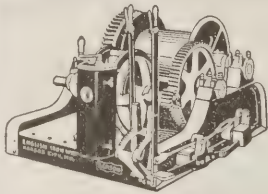
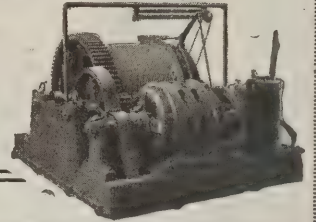
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Ottumwa Hoists comprise a line which completely covers the requirements of coal mines. Ottumwa Engineers are always available for consultation regarding hoisting problems.

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Ottumwa, Iowa

Ottumwa Electric and Steam
Hoists, Mine Cars, Sheave
Wheels and Rollers and
Roller Bearing Trucks.



Electric Hoist

Hoists for every class
of mine service

Iron Works Dept.

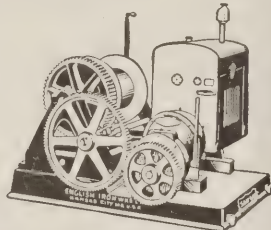
English Tool
& Supply Co.

Kansas City, Mo., U. S. A.

"SAMSON"

Electric Hoists

Gasoline Engine Hoists



4-Cylinder Engine Hoist

KEYSTONE

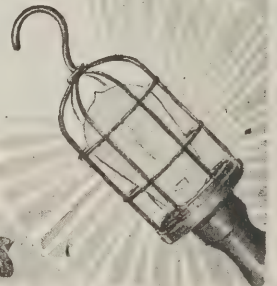
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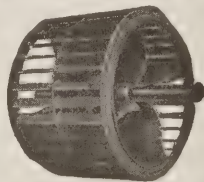
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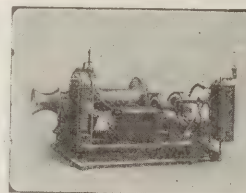
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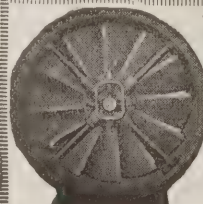
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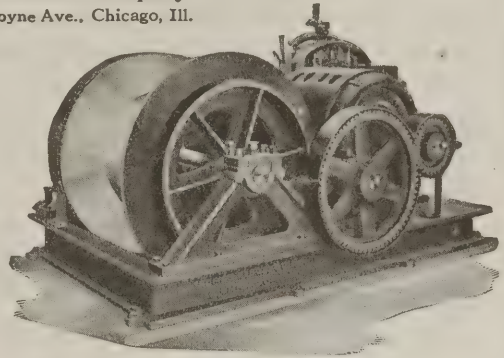
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Thomas Hoists are built to meet every requirement of the mine operator and are designed and constructed with the sole idea of rendering efficient day-in-and-day-out service in shaft, slope or tippie hoisting, thus speeding mine production, and helping to keep the production costs low.

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Builders of Hoists for over 30 years

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*Type "D"
for Low Coal*



THE LORAIN STEEL COMPANY

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Manufacturers of Steel and Composite mine cars, and all kinds of mine track work.

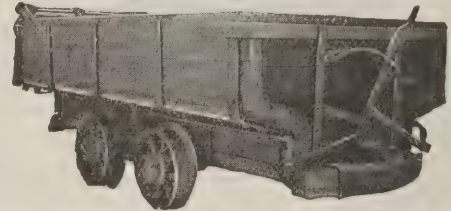
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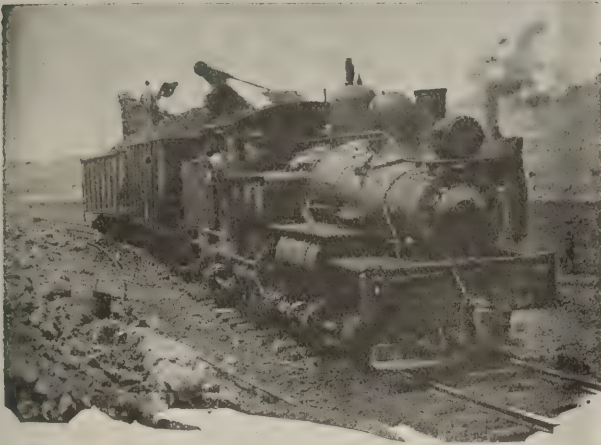
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SPOT QUICKLY AND ACCURATELY WITH SHAYS



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Shay Geared

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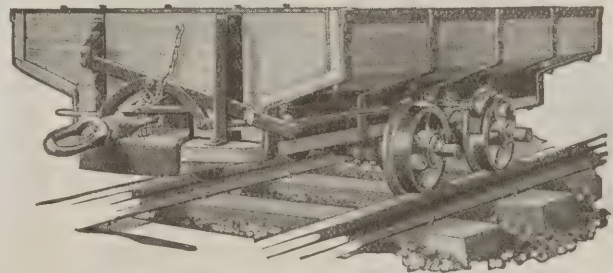
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**IT PAYS TO BUY
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"The Best"

The
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MINING CAR
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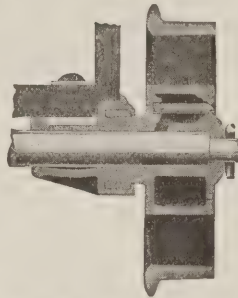
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This Truck is the ideal running-gear for large or small mines, light or heavy cars, animal or mechanical haulage. It will solve that problem of hard-running cars—on level track it runs 25 per cent easier than other improved trucks selling at the same price.

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It is the product of 80 years of wire rope manufacture.

John A. Roebling's Sons Company
Trenton, New Jersey

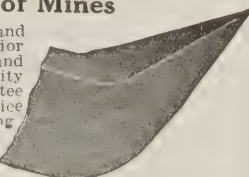
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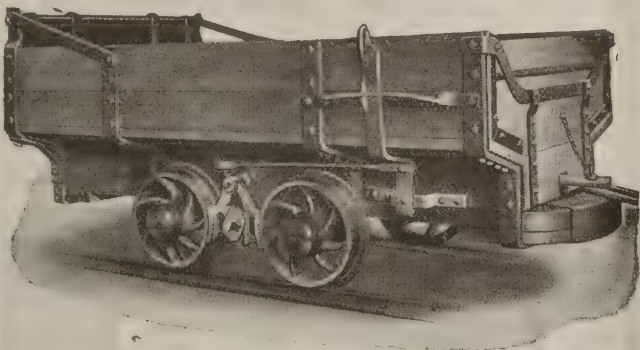
Their extraordinary length of good service is the outstanding feature of LOBDELL wheels.

It is the result of over eighty-five years of wheel making experience and is demonstrated by the experiences of hundreds of satisfied users.

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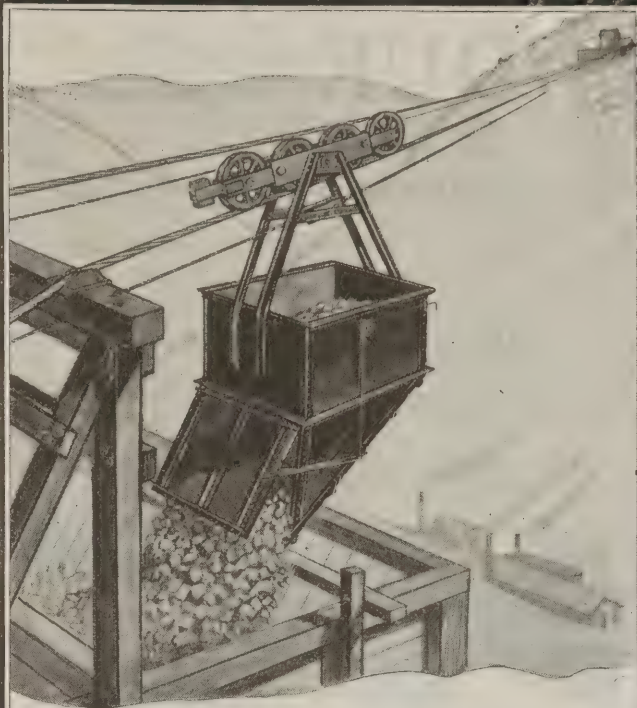
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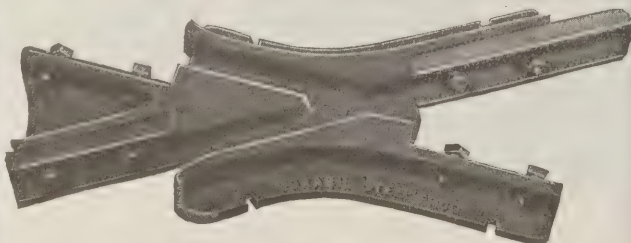
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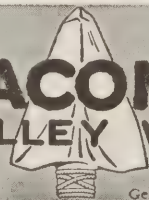


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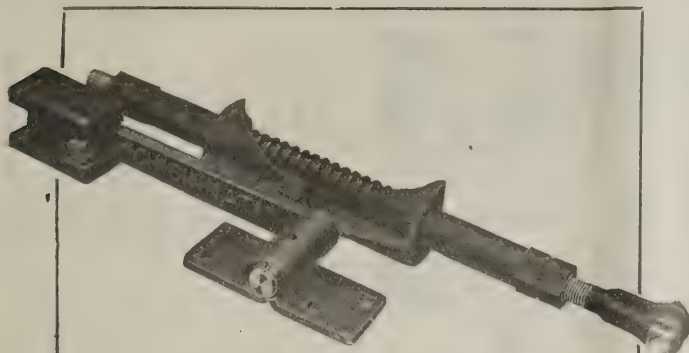
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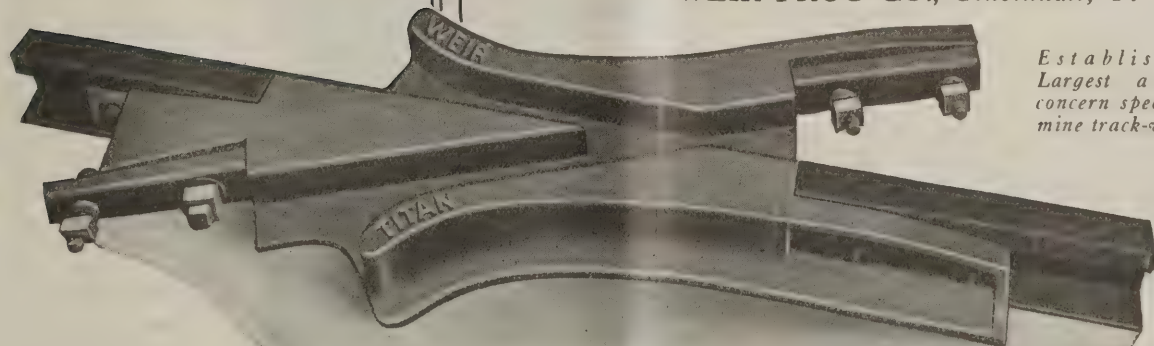
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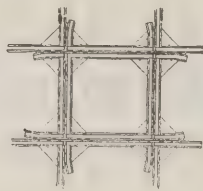
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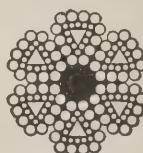
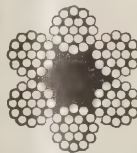
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48	118
80	88
55	90
32	94
92	125
65	131
42	81
92	121
81	68
32	105
99	92
69	130
Average 64-5/4 days	Average 105 days

View of exterior of Legitt's Creek Colliery, Scranton, Pa.



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